The ASTC ratings of mid-rise wood constructions using CertainTeed SilentFX® QuickCut gypsum board [3rd edition]

Mahn, Jeffrey

Publisher's version / Version de l'éditeur:
https://doi.org/10.4224/40001230
Client Report (National Research Council of Canada. Construction); no. A1-007750.3, 2019-08-22

NRC·CNRC CONSTRUCTION

The ASTC Ratings of Mid-rise Wood Constructions Using CertainTeed SilentFX® QuickCut Gypsum Board

CertainTeed
Report A1-007750.3
Third Edition
22 August 2019

National Research Council Canada
Conseil national de recherches Canada
Canada

The ASTC Ratings of Mid-rise Wood Constructions Using CertainTeed SilentFX® QuickCut Gypsum Board

Author

Jeffrey Mahn, Ph.D.
Research Officer

Approved

GUY NEWSHAM for

Brad Gover, Ph.D.
Director
Building Envelope & Materials
Intelligent Building Operations
NRC Construction

Report No:	A1-007750.3 Third Edition
Report Date:	22 August 2019
Contract No:	A1-007750
Agreement date:	2 October 2015
Program:	Building Regulations for Market Access

144 pages

Copy no. 2 of 3

Table of Contents

List of Figures

List of Tables

Executive Summary

The 2015 edition of the National Building Code of Canada (NBCC) includes significant changes to the acoustic requirements for residential constructions. The 2015 edition defines the acoustic requirements in terms of the Apparent Sound Transmission Class (ASTC) rating which includes contributions from flanking transmission and therefore is a better descriptor of how well the sound insulation of a building will actually protect the inhabitants of the building from unwanted noise than the STC rating which was used in earlier editions of the NBCC. The 2015 NBCC requires an ASTC rating ≥ 47 for constructions between dwelling units.

The ASTC rating that a construction will achieve depends on the design of the building elements including the gypsum board, the framing and the thermal insulation as well as the design of the junctions between the building elements. Changes to the building elements or the junctions will change the ASTC rating.

Fifty five examples of the calculation of the ASTC rating for typical mid-rise wood constructions (single and triple staggered wood stud walls and floors constructed of I-joists) with 15.9 mm (5/8”) SilentFX® QuickCut gypsum board, 15.9 mm CertainTeed Type X gypsum board and CertainTeed Sustainable fiberglass insulation are presented. All of the constructions shown in the examples have an ASTC rating which is greater than 47.

In addition to the examples for mid-rise wood framing, example using 15.9 mm SilentFX® QuickCut gypsum board as a lining on cross laminated timber (CLT) constructions are also presented in this report.

1. Objective

The 2015 edition of the National Building Code of Canada (NBCC) includes significant changes to the acoustic requirements for residential constructions. Earlier editions of the NBCC described the acoustic requirements in terms of the Sound Transmission Class (STC) rating of the assemblies that separate dwellings in a building. In the 2015 edition, for constructions that separate dwelling units, the requirements based on a STC rating were replaced with new requirements based on the Apparent Sound Transmission Class (ASTC) rating. The NBCC requires that the ASTC rating is at least 47 for constructions between dwelling units. The requirements for constructions that separate dwelling units from elevator shafts or refuse chutes remained unchanged in the 2015 NBCC.

It is important to note that the ASTC rating is not interchangeable with the STC rating. The STC rating only considers the sound transmitted through the common wall or floor between rooms. The ASTC rating includes contributions from other transmission paths between the rooms (referred to as flanking paths as shown in Figure 1) and is therefore a better metric of the sound transmission that occupants in buildings will experience in practice. Since the ASTC rating includes transmission paths other than the direct transmission path, it is typically lower in numerical value than the STC rating of the common wall or floor.

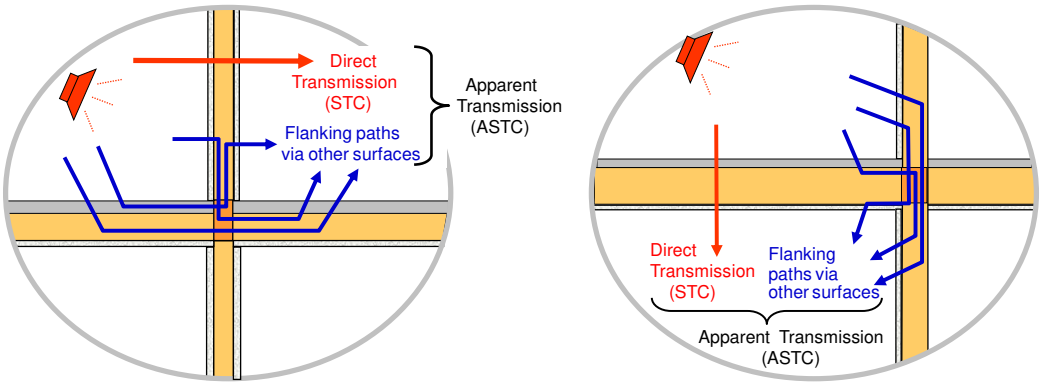


Figure 1: Comparison between STC and ASTC

The 2015 NBCC allows for three methods of demonstrating compliance with the acoustic requirements. The methods include post completion field testing, constructing buildings using the prescribed acceptable solutions found in Part 9 of the NBCC and the prediction of the ASTC rating using the prediction methods based on the standards, ISO 15712 [1] and ISO 10848 [2] and described in detail in the National Research Council Canada Research Report RR-331 *Guide to Calculating Airborne Sound Transmission in Buildings* [3]. The Report RR-331 focuses on the method of showing compliance by the prediction of the ASTC rating.

This report presents all of the laboratory measured data that is required to calculate the ASTC rating of typical mid-rise wood constructions that include the CertainTeed gypsum board and fiberglass insulation products which were evaluated for this study. The method of calculating the ASTC rating is detailed and examples of typical mid-rise wood constructions using 15.9 mm SilentFX® QuickCut gypsum board are presented. The examples include horizontal transmission for side-by-side rooms and vertical transmission for one-above-the-other rooms.

Also presented in this report are the ΔSTC ratings of linings for CLT[1] constructions which can be used to determine the ASTC ratings for CLT constructions which use the linings as explained in the National Research Council Canada Research Report RR-335 *Apparent Sound Insulation in Cross-Laminated Timber Buildings* [4].

2. ASTC Examples Summary

Fifty five examples of the calculation of the ASTC rating of mid-rise wood constructions using 15.9 mm SilentFX® QuickCut Gypsum Board directly attached to single or triple staggered stud walls are presented. The examples use the simplified method of the calculations as detailed in the National Research Council Report RR-331 to calculate the ASTC rating of side-by-side rooms and one-above-the-other rooms.

The examples include two different floor systems.

Floor system 1 is assembly FC-1 from Client Report A1-100035-02.1 available from http://doi.org/10.4224/21274579

The floor details include:

> One layer of 15.9 mm (5/8") OSB directly attached to wood I-joists (type TJ1 110) 302 mm (12") deep spaced 406 mm (16") on center. Rim board (45 mm (1-3/4") thick and 302 mm deep) installed at each end of the I-joists. The cavities between the I-joists filled with 150 mm R20 glass fiber insulation. Resilient channels installed perpendicular to the wood I-joists and spaced 406 mm on center. Two layers of 12.7 mm (1/2") Type X gypsum board installed with long axis perpendicular to the resilient channels. See report A1-100035-02.1 for further details.

Floor system 2 has a UL/cUL fire resistance rating of one hour (UL/cUL Design M535). The floor details are described in UL Product Spec™ BXUV7 - Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada: http://productspec.ul.com/document.php?id=BXUV.M535

The floor details include

> One layer of 15 mm (19/32") OSB directly attached to wood I-joists (type TJ1 110) 241.3 mm (9.5") deep spaced 406 mm (16") on center. Doubled-up rim board (32 mm (1-1/4") thick and 241.3 mm deep) installed at each end of the I-joists. The cavities between the I-joists filled with 150 mm R20 glass fiber insulation. Resilient channels installed perpendicular to the wood I-joists and spaced 305 mm (12") on center. Two courses of resilient channel positioned back to back and oriented opposite at gypsum panel butt-joints. Channel splices overlapped 102 mm (4") beneath wood trusses. Base layer of 15.9 mm (5/8") SilentFX® QuickCut Drywall 1200 mm (4') wide, installed perpendicular to resilient channels. Face layer of 2.7 mm (1/2") thick x 1200 mm (4') wide CertainTeed Type C fire resistant drywall installed perpendicular to resilient channels. See reference BXUV.M535 for further details.

Note that some of the floors shown in the example include bare subfloors. The examples are shown with bare subfloors to demonstrate the minimum ASTC rating these constructions can achieve. It is expected that in practice, floor finishes such as carpeting or tile will be installed over the bare subfloor. The addition of floor finishes will in most cases achieve the same ASTC ratings or increase the ASTC ratings shown in the examples.

The ASTC ratings for the constructions in the examples are summarized in the following tables. The constructions are sorted by ASTC ratings. The constructions which achieve the highest ASTC ratings are those which use 15.9 mm SilentFX® QuickCut Drywall in both rooms.

2.1 Summary - Side-By-Side Rooms - Non-loadbearing Common Wall

Example Number	ASTC Rating	Report Page Number	Framing		Shear Wall	Gypsum Board Directly Attached to the Wood Studs	Floor System	Floor Topping
			Common Wall	Flanking Walls				
2	50	16	Single Staggered Studs	Triple Staggered Studs	No	Mix of 15.9 mm SilentFX® QuickCut Gypsum Board and 15.9 mm Type X	1	None
8	50	34	"	"	Yes	"	"	"
10	50	38	"	"	Yes	"	"	Two layers of 12 mm cementitious flooring underlayment
12	50	42	"	"	Yes	"	"	38 mm thick gypsum concrete on a 9 mm closed cell foam
45	50	28	"	"	No	"	2	None
47	50	46	"	"	Yes	"	"	"
4	51	20	"	"	No	"	1	Two layers of 12 mm cementitious flooring underlayment
6	51	24	"	"	No	"	"	38 mm thick gypsum concrete on a 9 mm closed cell foam
7	53	32	"	"	Yes	15.9 mm SilentFX® QuickCut Gypsum Board	"	None
13	53	48	"	"	Yes	"	"	"
9	53	36	"	"	Yes	"	"	Two layers of 12 mm cementitious flooring underlayment
11	53	40	"	"	Yes	"	"	38 mm thick gypsum concrete on a 9 mm closed cell foam
46	53	44	"	"	Yes	"	2	None
1	54	14	"	"	No	"	1	"

Example Number	ASTC Rating	Report Page Number	Framing		Shear Wall	Gypsum Board Directly Attached to the Wood Studs	Floor System	Floor Topping
			Common Wall	Flanking Walls				
14	54	50	Single Staggered Studs	Triple Staggered Studs	Yes	15.9 mm SilentFX® QuickCut Gypsum Board	1	None
3	54	18	"	"	No	"	"	Two layers of 12 mm cementitious flooring underlayment
5	54	22	"	"	No	"	"	38 mm thick gypsum concrete on a 9 mm closed cell foam
44	54	26	"	"	No	"	2	None

2.2 Summary - Side-By-Side Rooms - Loadbearing Common Wall

Example Number	ASTC Rating	Report Page Number	Framing		Shear Wall	Gypsum Board Directly Attached to the Wood Studs	Floor System	Floor Topping
			Common Wall	Flanking Walls				
16	48	56	Triple Staggered Studs	Single Staggered Studs	No	Mix of 15.9 mm SilentFX® QuickCut Gypsum Board and 15.9 mm Type X	1	None
22	48	74	"	"	Yes	"	"	"
18	48	60	"	"	No	"	"	Two layers of 12 mm cementitious flooring underlayment
24	48	78	"	"	Yes	"	"	"
20	48	64	"	"	No	"	"	38 mm thick gypsum concrete on a 9 mm closed cell foam
26	48	82	"	"	Yes	"	"	"
49	48	68	"	"	No	"	2	None
51	48	86	"	"	Yes	"	"	"
48	50	66	"	"	No	15.9 mm SilentFX® QuickCut Gypsum Board	"	"
50	50	84	"	"	Yes	"	"	"
15	51	54	"	"	No	"	1	"
21	51	72	"	"	Yes	"	"	"
27	51	88	"	"	Yes	"	"	"
28	51	90	"	"	Yes	"	"	"

Example Number	ASTC Rating	Report Page Number	Framing		Shear Wall	Gypsum Board Directly Attached to the Wood Studs	Floor System	Floor Topping
			Common Wall	Flanking Walls				
17	51	58	Triple Staggered Studs	Single Staggered Studs	No	15.9 mm SilentFX® QuickCut Gypsum Board	1	Two layers of 12 mm cementitious flooring underlayment
23	51	76	"	"	Yes	"	"	"
19	51	62	"	"	No	"	"	38 mm thick gypsum concrete on a 9 mm closed cell foam
25	51	80	"	"	Yes	"	"	"

2.3 Summary - Rooms One-above-the-Other

Example Number	ASTC Rating	Report Page Number	Framing		Shear Wall	Gypsum Board Directly Attached to the Wood Studs	Floor System	Floor Topping
			Floor	Walls				
53	49	108	I-Joists	Single and Triple Staggered	No	Mix of 15.9 mm SilentFX® QuickCut Gypsum Board and 15.9 mm Type X	2	None
55	49	126	"	"	Yes	"	"	"
52	50	106	"	"	No	15.9 mm SilentFX® QuickCut Gypsum Board	"	"
54	50	124	"	"	Yes	"	"	"
30	52	96	"	"	No	Mix of 15.9 mm SilentFX® QuickCut Gypsum Board and 15.9 mm Type X	1	"
36	52	114	"	"	Yes	"	"	"
29	52	94	"	"	No	15.9 mm SilentFX® QuickCut Gypsum Board	"	"
35	52	112	"	"	Yes	"	"	"
41	52	128	"	"	Yes	"	"	"
42	52	130	"	"	Yes	"	"	"
32	55	100	"	"	No	Mix of 15.9 mm SilentFX® QuickCut Gypsum Board and 15.9 mm Type X	"	Two layers of 12 mm cementitious flooring underlayment
38	55	118	"	"	Yes	"	"	"
31	56	98	"	"	No	15.9 mm SilentFX® QuickCut Gypsum Board	"	"
37	56	116	"	"	Yes	"	"	"

Example Number	ASTC Rating	Report Page Number	Framing		Shear Wall	Gypsum Board Directly Attached to the Wood Studs	Floor System	Floor Topping
			Floor	Walls				
34	61	104	I-Joists	Single and Triple Staggered	No	Mix of 15.9 mm SilentFX® QuickCut Gypsum Board and 15.9 mm Type X	1	38 mm thick gypsum concrete on a 9 mm closed cell foam
40	61	122	"	"	Yes	"	"	"
33	63	102	"	"	No	15.9 mm SilentFX® QuickCut Gypsum Board	"	"
39	63	120	"	"	Yes	"	"	"

3. Standard Scenarios for the ASTC Examples

For the purposes of this report, the ASTC ratings of mid-rise wood constructions are calculated using the Standard Scenarios presented in the National Research Council Canada Research Report RR-331 for side-by-side and one-above-the-other rooms. The Standard Scenario rooms are shown in Figure 2 and Figure 3.

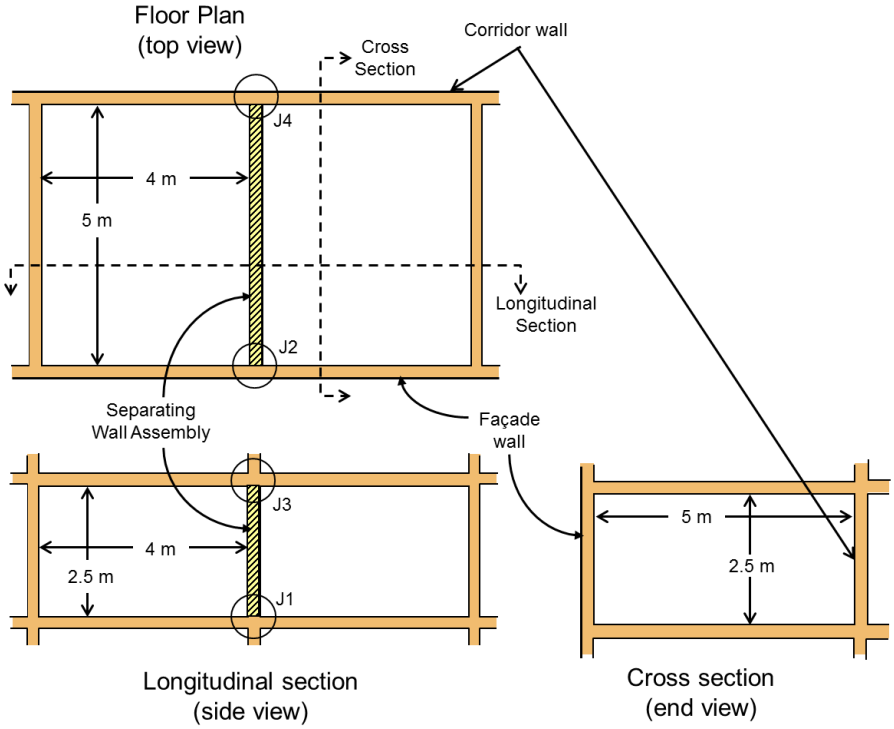


Figure 2: Standard Scenario from the NRC Research Report RR-331 for "horizontal room pair" case where the rooms are side-by side with a separating wall assembly between the rooms.

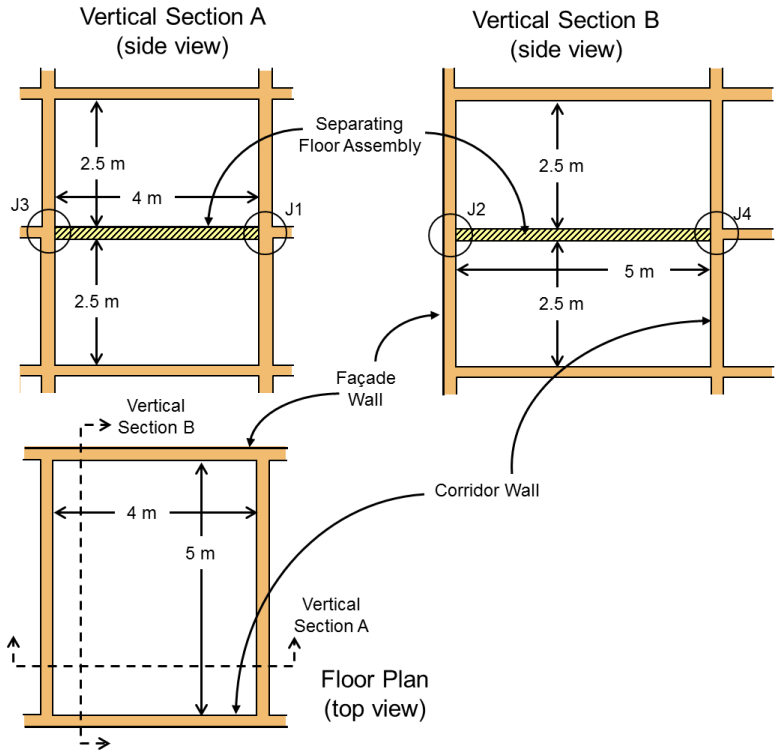


Figure 3: Standard Scenario from the NRC Research Report RR-331 for "vertical room pair" case where one of the pair of rooms is above the other with a floor/ceiling assembly between the two rooms.

The pertinent dimensions and junction details of the Standard Scenario rooms are:

- For horizontal room pairs (rooms are side-by-side) the separating wall is 2.5 m high by 5 m wide, the flanking floors and ceilings are 4 m by 5 m and the flanking walls are 2.5 m by 4 m.
- For vertical room pairs (one room is above the other) the separating floor/ceiling is 4 m by 5 m and the flanking walls in both rooms are 2.5 m high.
- In general, it is assumed that the junctions at one side of the room (at the separating wall if rooms are side-by-side) are cross junctions, while one or both of the other two junctions are T-junctions. This enables the examples to illustrate the typical differences between the two common junction cases.
- For a horizontal room pair, the separating wall has T-junctions with the flanking walls at both the façade and corridor sides and cross junctions at the floor and ceiling.
- For a vertical room pair, the façade wall has a T-junction with the separating floor, but the opposing corridor wall has a cross junction, as do the other two walls.

Deviations from the dimensions shown in the Standard Scenarios can change the ASTC ratings.

4. ASTC Examples

Examples of the calculation of the ASTC ratings of mid-rise wood constructions are shown in the following sections. The examples use the simplified method of the calculations as detailed in the National Research Council Report RR-331.

This page is intentionally left blank

4.1 Side-by-Side Rooms: Non-Load Bearing Single Staggered Stud Separating Wall Assembly

Example Number	ASTC Rating	Construction				
		Wallboard Room 1	Wallboard Room 2	Floor System	Floor Topping Room 1	Floor Topping Room 2
1	54	One layer of 15.9 mm SilentFX® QuickCut Gypsum Board	One layer of 15.9 mm SilentFX® QuickCut Gypsum Board	1	None	None
2	50	"	One layer of 15.9 mm CertainTeed Type X gypsum board	"	None	"
3	54	"	One layer of 15.9 mm SilentFX® QuickCut Gypsum Board	"	Two layers of 12 mm cementitious flooring underlayment	"
4	51	"	One layer of 15.9 mm CertainTeed Type X gypsum board	"	"	"
5	54	"	One layer of 15.9 mm SilentFX® QuickCut Gypsum Board	"	38 mm thick gypsum concrete on a 9 mm closed cell foam	"
6	51	"	One layer of 15.9 mm CertainTeed Type X gypsum board	"	"	"
44	54	"	One layer of 15.9 mm SilentFX® QuickCut Gypsum Board	2	None	None
45	50	"	One layer of 15.9 mm CertainTeed Type X gypsum board	"	"	"

Example 1: Rooms side-by-side - Non-loadbearing Separating Wall

- **Simplified Method.**
- **Common single staggered wood stud wall.**
- **All other walls are triple staggered wood stud walls.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board directly fixed to the wood studs of all walls.**
- **One layer of 15 mm OSB on the floors.**

Separating wall assembly (non-loadbearing) with:

- Staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm (2x6).
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to each side of the wood studs.
- One layer of 89 mm thick CertainTeed R12 Sustainable Insulation® in the wall cavity.

Junction 1: Bottom Junction (separating wall / floor) with:

- Joists oriented parallel to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Subfloor of one layer of 15 mm OSB directly attached to I-joists.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the floor cavity.

Junction 2 or 4: Each Side (separating wall /abutting side wall) with:

- Triple staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to each side of the wood studs.
- One layer of 89 mm thick CertainTeed R12 Sustainable Insulation® in the wall cavity.

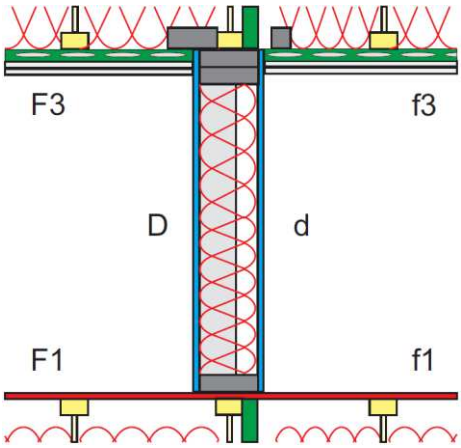
Junction 3: Top Junction (separating wall / ceiling) with:

- Joists oriented parallel to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Resilient channels installed perpendicular to wood I-joists and spaced 400 mm on center.
- Two layers of 12.7 mm CertainTeed Type X gypsum board installed on the resilient channels on the ceiling.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the ceiling cavity.

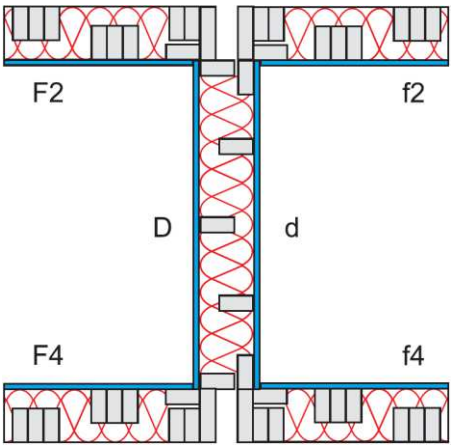
Room Parameters

- See Figure 2 of this report or Figure 1.3 of the National Research Council Report RR-331.
- The separating wall is 2.5 m high by 5 m wide.
- The flanking walls 2.5 m high by 4 m wide.
- The floor / ceilings are 4 m by 5 m.

Illustration for this case



Junction of a single staggered stud separating wall with one layer of 15.9 mm CertainTeed SilentFX® QuickCut gypsum board directly attached to the studs on both sides. A floor of wood I-joists with one layer of 15 mm OSB in both rooms. The wall also connects with a ceiling of two layers of 12.7 mm CertainTeed Type X gypsum board installed on resilient channels.
(Side view of Junctions 1 and 3).



Junction of a single staggered stud separating wall with side walls of triple staggered studs. One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in both rooms.
(Plan view of Junction 2 or 4).

Example 1	Reference	Value
Direct STC Rating of Path Dd		
STC_{Dd}	Report A1-007750.2 Appendix B	**54**
Junction 1 - Seperating wall and the floor assembly		
Flanking Path Ff_1		
$Flanking\ STC_{lab,F1,f1}$	Report A1-007750.2 Appendix B,C and D	66
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,f1}$	RR-331 Eq. 1.5	70
Flanking Path Fd_1		
$Flanking\ STC_{lab,F1,d}$	Report A1-007750.2 Appendix B,C and D	73
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,d}$	RR-331 Eq. 1.5	77
Flanking Path Df_1		
$Flanking\ STC_{lab,D,f1}$	Report A1-007750.2 Appendix B,C and D	73
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f1}$	RR-331 Eq. 1.5	77
Flanking STC for Junction 1		**69**
Junction 2 - Separating wall and the flanking wall assemblies		
Flanking Path Ff_2		
$Flanking\ STC_{lab,F2,f2}$	Report A1-007750.2 Appendix B,C and D	69
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,f2}$	RR-331 Eq. 1.5	76
Flanking Path Fd_2		
$Flanking\ STC_{lab,F2,d}$	Report A1-007750.2 Appendix B,C and D	72
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,d}$	RR-331 Eq. 1.5	79
Flanking Path Df_2		
$Flanking\ STC_{lab,D,f2}$	Report A1-007750.2 Appendix B,C and D	72
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,D,f2}$	RR-331 Eq. 1.5	79
Flanking STC for Junction 2		**73**
Junction 3 -Seperating wall and the ceiling assembly		
Flanking Path Ff_3		
$Flanking\ STC_{lab,F3,f3}$	Report A1-007750.2 Appendix B,C and D	73
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,f3}$	RR-331 Eq. 1.5	77
Flanking Path Fd_3		
$Flanking\ STC_{lab,F3,d}$	Report A1-007750.2 Appendix B,C and D	71
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,d}$	RR-331 Eq. 1.5	75
Flanking Path Df_3		
$Flanking\ STC_{lab,D,f3}$	Report A1-007750.2 Appendix B,C and D	71
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f3}$	RR-331 Eq. 1.5	75
Flanking STC for Junction 3		**71**
Junction 4 - Separating wall and the flanking wall assemblies		
Flanking STC for Junction 4 - Same as Junction 2		**73**
ASTC due to Direct plus Flanking Transmission	RR-331 Equation 1.4	**54**

Example 2: Rooms side-by-side - Non-loadbearing Separating Wall

- **Simplified Method.**
- **Common single staggered wood stud wall.**
- **All other walls are triple staggered wood stud walls.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board fixed to the wood studs in one room.**
- **One layer of 15.9 mm (5/8") CertainTeed Type X fixed to the wood studs in the other room.**
- **One layer of 15.9 mm OSB on the floors.**

Separating wall assembly (non-loadbearing) with:

- Staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm (2x6).
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to one side of the wood studs and one layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the other side of the wood studs.
- One layer of 89 mm thick CertainTeed R12 Sustainable Insulation® in the wall cavity.

Junction 1: Bottom Junction (separating wall / floor) with:

- Joists oriented parallel to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Subfloor of one layer of 15 mm OSB directly attached to I-joists.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the floor cavity.

Junction 2 or 4: Each Side (separating wall /abutting side wall) with:

- Tipple staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in one room (F2 and F4).
- One layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the wood studs in the other room (f2 and f4).
- One layer of 89 mm thick CertainTeed R12 Sustainable Insulation® in the wall cavities.

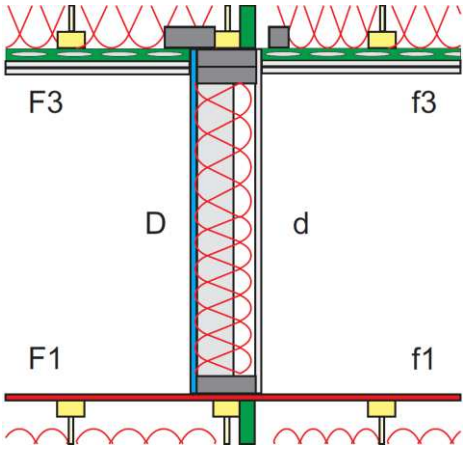
Junction 3: Top Junction (separating wall / ceiling) with:

- Joists oriented parallel to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Resilient channels installed perpendicular to wood I-joists and spaced 400 mm on center.
- Two layers of 12.7 mm CertainTeed Type X gypsum board installed on the resilient channels on the ceiling.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the ceiling cavity.

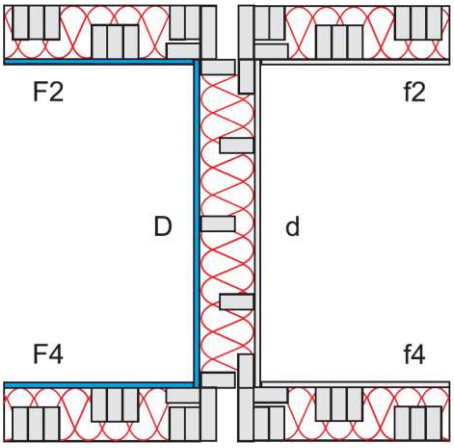
Room Parameters

- See Figure 2 of this report or Figure 1.3 of the National Research Council Report RR-331.
- The separating wall is 2.5 m high by 5 m wide.
- The flanking walls 2.5 m high by 4 m wide.
- The floor / ceilings are 4 m by 5 m.

Illustration for this case



Junction of a single staggered stud separating wall with one layer of 15.9 mm CertainTeed SilentFX® QuickCut gypsum board directly attached to the studs on one side. One layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the studs on the other side. A floor of wood I-joists with one layer of 15 mm OSB in both rooms. The wall also connects with a ceiling of two layers of 12.7 mm CertainTeed Type X gypsum board installed on resilient channels. (Side view of Junctions 1 and 3).



Junction of a single staggered stud separating wall with side walls of triple staggered studs. One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in one room. One layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the wood studs in the other room. (Plan view of Junction 2 or 4).

Example 2	Reference	Value
Direct STC Rating of Path Dd		
STC_{Dd}	Report A1-007750.2 Appendix B	**51**
Junction 1 - Seperating wall and the floor assembly		
Flanking Path Ff_1		
$Flanking\ STC_{lab,F1,f1}$	Report A1-007750.2 Appendix B,C and D	66
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,f1}$	RR-331 Eq. 1.5	70
Flanking Path Fd_1		
$Flanking\ STC_{lab,F1,d}$	Report A1-007750.2 Appendix B,C and D	64
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,d}$	RR-331 Eq. 1.5	68
Flanking Path Df_1		
$Flanking\ STC_{lab,D,f1}$	Report A1-007750.2 Appendix B,C and D	66
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f1}$	RR-331 Eq. 1.5	70
Flanking STC for Junction 1		**64**
Junction 2 - Separating wall and the flanking wall assemblies		
Flanking Path Ff_2		
$Flanking\ STC_{lab,F2,f2}$	Report A1-007750.2 Appendix B,C and D	66
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,f2}$	RR-331 Eq. 1.5	73
Flanking Path Fd_2		
$Flanking\ STC_{lab,F2,d}$	Report A1-007750.2 Appendix B,C and D	67
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,d}$	RR-331 Eq. 1.5	74
Flanking Path Df_2		
$Flanking\ STC_{lab,D,f2}$	Report A1-007750.2 Appendix B,C and D	68
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,D,f2}$	RR-331 Eq. 1.5	75
Flanking STC for Junction 2		**69**
Junction 3 -Seperating wall and the ceiling assembly		
Flanking Path Ff_3		
$Flanking\ STC_{lab,F3,f3}$	Report A1-007750.2 Appendix B,C and D	66
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,f3}$	RR-331 Eq. 1.5	70
Flanking Path Fd_3		
$Flanking\ STC_{lab,F3,d}$	Report A1-007750.2 Appendix B,C and D	63
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,d}$	RR-331 Eq. 1.5	67
Flanking Path Df_3		
$Flanking\ STC_{lab,D,f3}$	Report A1-007750.2 Appendix B,C and D	65
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f3}$	RR-331 Eq. 1.5	69
Flanking STC for Junction 3		**64**
Junction 4 - Separating wall and the flanking wall assemblies		
Flanking STC for Junction 4 - Same as Junction 2		**69**
ASTC due to Direct plus Flanking Transmission	RR-331 Equation 1.4	**50**

Example 3: Rooms side-by-side - Non-loadbearing Separating Wall

- **Simplified Method.**
- **Common single staggered wood stud wall.**
- **All other walls are triple staggered wood stud walls.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board directly fixed to the wood studs of all walls.**
- **Topping of cementitious flooring in one room.**

Separating wall assembly (non-loadbearing) with:

- Staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm (2x6).
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to each side of the wood studs.
- One layer of 89 mm thick CertainTeed R12 Sustainable Insulation® in the wall cavity.

Junction 1: Bottom Junction (separating wall / floor) with:

- Joists oriented parallel to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Subfloor of one layer of 15 mm OSB directly attached to I-joists.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the floor cavity.
- Topping of two layers of 12 mm cementitious flooring underlayment installed on top of 12 mm wood fiber board underlayment in one room (F1).

Junction 2 or 4: Each Side (separating wall /abutting side wall) with:

- Triple staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to each side of the wood studs.
- One layer of 89 mm thick CertainTeed R12 Sustainable Insulation® in the wall cavity.

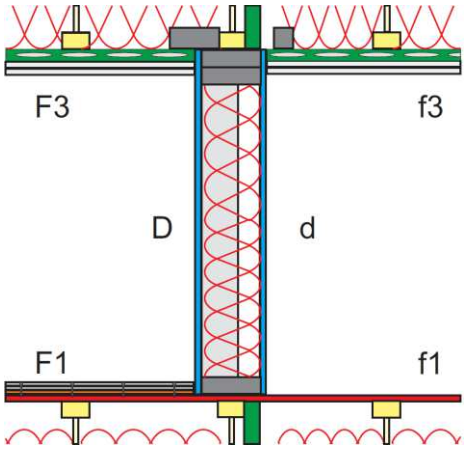
Junction 3: Top Junction (separating wall / ceiling) with:

- Joists oriented parallel to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Resilient channels installed perpendicular to wood I-joists and spaced 400 mm on center.
- Two layers of 12.7 mm CertainTeed Type X gypsum board installed on the resilient channels on the ceiling.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the ceiling cavity.

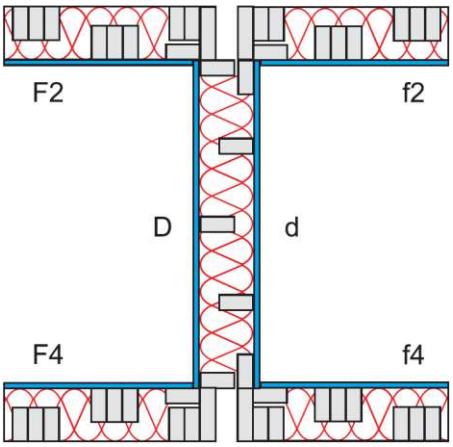
Room Parameters

- See Figure 2 of this report or Figure 1.3 of the National Research Council Report RR-331.
- The separating wall is 2.5 m high by 5 m wide.
- The flanking walls 2.5 m high by 4 m wide.
- The floor / ceilings are 4 m by 5 m.

Illustration for this case



Junction of a single staggered stud separating wall with one layer of 15.9 mm CertainTeed SilentFX® QuickCut gypsum board directly attached to the studs on both sides. A floor of wood I-joists with one layer of 15 mm OSB in both rooms. Topping of two layers of 12 mm cementitious flooring underlayment installed on top of 12 mm wood fiber board underlayment in one room (F1). The wall also connects with a ceiling of two layers of 12.7 mm CertainTeed Type X gypsum board installed on resilient channels. (Side view of Junctions 1 and 3).



Junction of a single staggered stud separating wall with side walls of triple staggered studs. One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in both rooms. (Plan view of Junction 2 or 4).

Example 3	Reference	Value
Direct STC Rating of Path Dd		
STC_{Dd}	Report A1-007750.2 Appendix B	**54**
Junction 1 - Seperating wall and the floor assembly		
Flanking Path Ff_1		
$Flanking\ STC_{lab,F1,f1}$	Report A1-007750.2 Appendix B,C and D	68
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,f1}$	RR-331 Eq. 1.5	72
Flanking Path Fd_1		
$Flanking\ STC_{lab,F1,d}$	Report A1-007750.2 Appendix B,C and D	75
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,d}$	RR-331 Eq. 1.5	79
Flanking Path Df_1		
$Flanking\ STC_{lab,D,f1}$	Report A1-007750.2 Appendix B,C and D	73
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f1}$	RR-331 Eq. 1.5	77
Flanking STC for Junction 1		**70**
Junction 2 - Separating wall and the flanking wall assemblies		
Flanking Path Ff_2		
$Flanking\ STC_{lab,F2,f2}$	Report A1-007750.2 Appendix B,C and D	69
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,f2}$	RR-331 Eq. 1.5	76
Flanking Path Fd_2		
$Flanking\ STC_{lab,F2,d}$	Report A1-007750.2 Appendix B,C and D	72
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,d}$	RR-331 Eq. 1.5	79
Flanking Path Df_2		
$Flanking\ STC_{lab,D,f2}$	Report A1-007750.2 Appendix B,C and D	72
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,D,f2}$	RR-331 Eq. 1.5	79
Flanking STC for Junction 2		**73**
Junction 3 -Seperating wall and the ceiling assembly		
Flanking Path Ff_3		
$Flanking\ STC_{lab,F3,f3}$	Report A1-007750.2 Appendix B,C and D	73
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,f3}$	RR-331 Eq. 1.5	77
Flanking Path Fd_3		
$Flanking\ STC_{lab,F3,d}$	Report A1-007750.2 Appendix B,C and D	71
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,d}$	RR-331 Eq. 1.5	75
Flanking Path Df_3		
$Flanking\ STC_{lab,D,f3}$	Report A1-007750.2 Appendix B,C and D	71
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f3}$	RR-331 Eq. 1.5	75
Flanking STC for Junction 3		**71**
Junction 4 - Separating wall and the flanking wall assemblies		
Flanking STC for Junction 4 - Same as Junction 2		**73**
ASTC due to Direct plus Flanking Transmission	RR-331 Equation 1.4	**54**

Example 4: Rooms side-by-side - Non-loadbearing Separating Wall

- **Simplified Method.**
- **Common single staggered wood stud wall.**
- **All other walls are triple staggered wood stud walls.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board fixed to the wood studs in one room.**
- **One layer of 15.9 mm (5/8") CertainTeed Type X fixed to the wood studs in the other room.**
- **Topping of cementitious flooring in one room.**

Separating wall assembly (non-loadbearing) with:

- Staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm (2x6).
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to one side of the wood studs and one layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the other side of the wood studs.
- One layer of 89 mm thick CertainTeed R12 Sustainable Insulation® in the wall cavity.

Junction 1: Bottom Junction (separating wall / floor) with:

- Joists oriented parallel to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Subfloor of one layer of 15 mm OSB directly attached to I-joists.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the floor cavity.
- Topping of two layers of 12 mm cementitious flooring underlayment installed on top of 12 mm wood fiber board underlayment in one room (F1).

Junction 2 or 4: Each Side (separating wall /abutting side wall) with:

- Tipple staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in one room (F2 and F4).
- One layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the wood studs in the other room (f2 and f4).
- One layer of 89 mm thick CertainTeed R12 Sustainable Insulation® in the wall cavities.

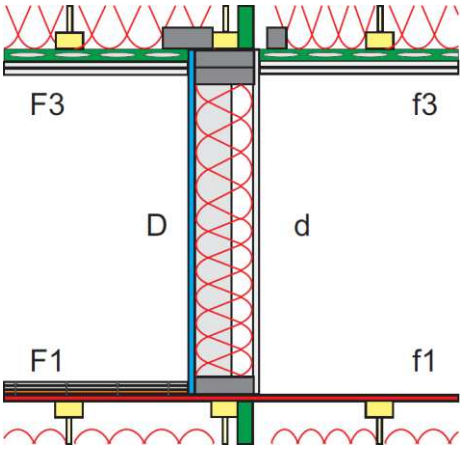
Junction 3: Top Junction (separating wall / ceiling) with:

- Joists oriented parallel to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Resilient channels installed perpendicular to wood I-joists and spaced 400 mm on center.
- Two layers of 12.7 mm CertainTeed Type X gypsum board installed on the resilient channels on the ceiling.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the ceiling cavity.

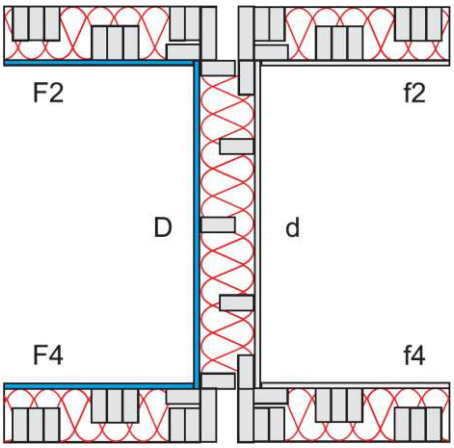
Room Parameters

- See Figure 2 of this report or Figure 1.3 of the National Research Council Report RR-331.
- The separating wall is 2.5 m high by 5 m wide.
- The flanking walls 2.5 m high by 4 m wide.
- The floor / ceilings are 4 m by 5 m.

Illustration for this case



Junction of a single staggered stud separating wall with one layer of 15.9 mm CertainTeed SilentFX® QuickCut gypsum board directly attached to the studs on one side. One layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the studs on the other side. A floor of wood I-joists with one layer of 15 mm OSB in both rooms. Topping of two layers of 12 mm cementitious flooring underlayment installed on top of 12 mm wood fiber board underlayment in one room (F1). The wall also connects with a ceiling of two layers of 12.7 mm CertainTeed Type X gypsum board installed on resilient channels. (Side view of Junctions 1 and 3).



Junction of single staggered stud separating wall with side walls of triple staggered studs. One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in one room. CertainTeed Type X gypsum board directly attached to the wood studs in the other room. (Plan view of Junction 2 or 4).

Example 4	Reference	Value
Direct STC Rating of Path Dd		
STC_{Dd}	Report A1-007750.2 Appendix B	**51**
Junction 1 - Seperating wall and the floor assembly		
Flanking Path Ff_1		
$Flanking\ STC_{lab,F1,f1}$	Report A1-007750.2 Appendix B,C and D	68
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,f1}$	RR-331 Eq. 1.5	72
Flanking Path Fd_1		
$Flanking\ STC_{lab,F1,d}$	Report A1-007750.2 Appendix B,C and D	66
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,d}$	RR-331 Eq. 1.5	70
Flanking Path Df_1		
$Flanking\ STC_{lab,D,f1}$	Report A1-007750.2 Appendix B,C and D	66
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f1}$	RR-331 Eq. 1.5	70
Flanking STC for Junction 1		**66**
Junction 2 - Separating wall and the flanking wall assemblies		
Flanking Path Ff_2		
$Flanking\ STC_{lab,F2,f2}$	Report A1-007750.2 Appendix B,C and D	66
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,f2}$	RR-331 Eq. 1.5	73
Flanking Path Fd_2		
$Flanking\ STC_{lab,F2,d}$	Report A1-007750.2 Appendix B,C and D	67
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,d}$	RR-331 Eq. 1.5	74
Flanking Path Df_2		
$Flanking\ STC_{lab,D,f2}$	Report A1-007750.2 Appendix B,C and D	68
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,D,f2}$	RR-331 Eq. 1.5	75
Flanking STC for Junction 2		**69**
Junction 3 -Seperating wall and the ceiling assembly		
Flanking Path Ff_3		
$Flanking\ STC_{lab,F3,f3}$	Report A1-007750.2 Appendix B,C and D	66
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,f3}$	RR-331 Eq. 1.5	70
Flanking Path Fd_3		
$Flanking\ STC_{lab,F3,d}$	Report A1-007750.2 Appendix B,C and D	63
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,d}$	RR-331 Eq. 1.5	67
Flanking Path Df_3		
$Flanking\ STC_{lab,D,f3}$	Report A1-007750.2 Appendix B,C and D	65
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f3}$	RR-331 Eq. 1.5	69
Flanking STC for Junction 3		**64**
Junction 4 - Separating wall and the flanking wall assemblies		
Flanking STC for Junction 4 - Same as Junction 2		**69**
ASTC due to Direct plus Flanking Transmission	RR-331 Equation 1.4	**51**

Example 5: Rooms side-by-side - Non-loadbearing Separating Wall

- **Simplified Method.**
- **Common single staggered wood stud wall.**
- **All other walls are triple staggered wood stud walls.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board directly fixed to the wood studs of all walls.**
- **Topping of 38 mm thick gypsum concrete in one room.**

Separating wall assembly (non-loadbearing) with:

- Staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm (2x6).
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to each side of the wood studs.
- One layer of 89 mm thick CertainTeed R12 Sustainable Insulation® in the wall cavity.

Junction 1: Bottom Junction (separating wall / floor) with:

- Joists oriented parallel to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Subfloor of one layer of 15 mm OSB directly attached to I-joists.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the floor cavity.
- Topping of 38 mm thick gypsum concrete on a 9 mm closed cell foam interlayer in one room (F1).

Junction 2 or 4: Each Side (separating wall /abutting side wall) with:

- Triple staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to each side of the wood studs.
- One layer of 89 mm thick CertainTeed R12 Sustainable Insulation® in the wall cavity.

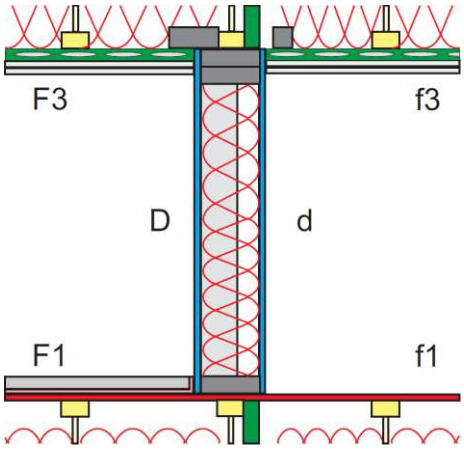
Junction 3: Top Junction (separating wall / ceiling) with:

- Joists oriented parallel to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Resilient channels installed perpendicular to wood I-joists and spaced 400 mm on center.
- Two layers of 12.7 mm CertainTeed Type X gypsum board installed on the resilient channels on the ceiling.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the ceiling cavity.

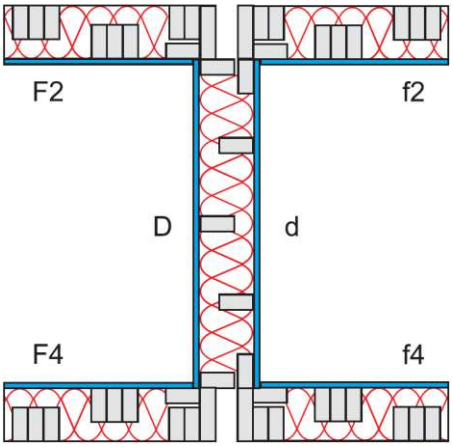
Room Parameters

- See Figure 2 of this report or Figure 1.3 of the National Research Council Report RR-331.
- The separating wall is 2.5 m high by 5 m wide.
- The flanking walls 2.5 m high by 4 m wide.
- The floor / ceilings are 4 m by 5 m.

Illustration for this case



Junction of a single staggered stud separating wall with one layer of 15.9 mm CertainTeed SilentFX® QuickCut gypsum board directly attached to the studs on both sides. A floor of wood I-joists with one layer of 15 mm OSB in both rooms. Topping of 38 mm thick gypsum concrete on a 9 mm closed cell foam interlayer in one room (F1). The wall also connects with a ceiling of two layers of 12.7 mm CertainTeed Type X gypsum board installed on resilient channels. (Side view of Junctions 1 and 3).



Junction of a single staggered stud separating wall with side walls of triple staggered studs. One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in both rooms. (Plan view of Junction 2 or 4).

Example 5	Reference	Value
Direct STC Rating of Path Dd		
STC_{Dd}	Report A1-007750.2 Appendix B	**54**
Junction 1 - Seperating wall and the floor assembly		
Flanking Path Ff_1		
$Flanking\ STC_{lab,F1,f1}$	Report A1-007750.2 Appendix B,C and D	73
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,f1}$	RR-331 Eq. 1.5	77
Flanking Path Fd_1		
$Flanking\ STC_{lab,F1,d}$	Report A1-007750.2 Appendix B,C and D	81
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,d}$	RR-331 Eq. 1.5	85
Flanking Path Df_1		
$Flanking\ STC_{lab,D,f1}$	Report A1-007750.2 Appendix B,C and D	73
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f1}$	RR-331 Eq. 1.5	77
Flanking STC for Junction 1		**74**
Junction 2 - Separating wall and the flanking wall assemblies		
Flanking Path Ff_2		
$Flanking\ STC_{lab,F2,f2}$	Report A1-007750.2 Appendix B,C and D	69
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,f2}$	RR-331 Eq. 1.5	76
Flanking Path Fd_2		
$Flanking\ STC_{lab,F2,d}$	Report A1-007750.2 Appendix B,C and D	72
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,d}$	RR-331 Eq. 1.5	79
Flanking Path Df_2		
$Flanking\ STC_{lab,D,f2}$	Report A1-007750.2 Appendix B,C and D	72
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,D,f2}$	RR-331 Eq. 1.5	79
Flanking STC for Junction 2		**73**
Junction 3 -Seperating wall and the ceiling assembly		
Flanking Path Ff_3		
$Flanking\ STC_{lab,F3,f3}$	Report A1-007750.2 Appendix B,C and D	73
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,f3}$	RR-331 Eq. 1.5	77
Flanking Path Fd_3		
$Flanking\ STC_{lab,F3,d}$	Report A1-007750.2 Appendix B,C and D	71
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,d}$	RR-331 Eq. 1.5	75
Flanking Path Df_3		
$Flanking\ STC_{lab,D,f3}$	Report A1-007750.2 Appendix B,C and D	71
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f3}$	RR-331 Eq. 1.5	75
Flanking STC for Junction 3		**71**
Junction 4 - Separating wall and the flanking wall assemblies		
Flanking STC for Junction 4 - Same as Junction 2		**73**
ASTC due to Direct plus Flanking Transmission	RR-331 Equation 1.4	**54**

Example 6: Rooms side-by-side - Non-loadbearing Separating Wall

- **Simplified Method.**
- **Common single staggered wood stud wall.**
- **All other walls are triple staggered wood stud walls.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board fixed to the wood studs in one room.**
- **One layer of 15.9 mm (5/8") CertainTeed Type X fixed to the wood studs in the other room.**
- **Topping of 38 mm thick gypsum concrete in one room.**

Separating wall assembly (non-loadbearing) with:

- Staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm (2x6).
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to one side of the wood studs and one layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the other side of the wood studs.
- One layer of 89 mm thick CertainTeed R12 Sustainable Insulation® in the wall cavity.

Junction 1: Bottom Junction (separating wall / floor) with:

- Joists oriented parallel to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Subfloor of one layer of 15 mm OSB directly attached to I-joists.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the floor cavity.
- Topping of 38 mm thick gypsum concrete on a 9 mm closed cell foam interlayer in one room (F1).

Junction 2 or 4: Each Side (separating wall /abutting side wall) with:

- Tipple staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in one room (F2 and F4).
- One layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the wood studs in the other room (f2 and f4).
- One layer of 89 mm thick CertainTeed R12 Sustainable Insulation® in the wall cavities.

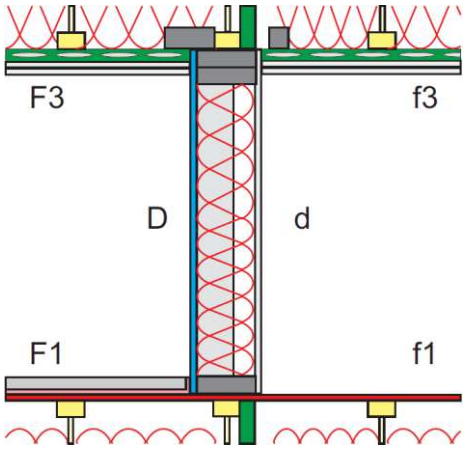
Junction 3: Top Junction (separating wall / ceiling) with:

- Joists oriented parallel to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Resilient channels installed perpendicular to wood I-joists and spaced 400 mm on center.
- Two layers of 12.7 mm CertainTeed Type X gypsum board installed on the resilient channels on the ceiling.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the ceiling cavity.

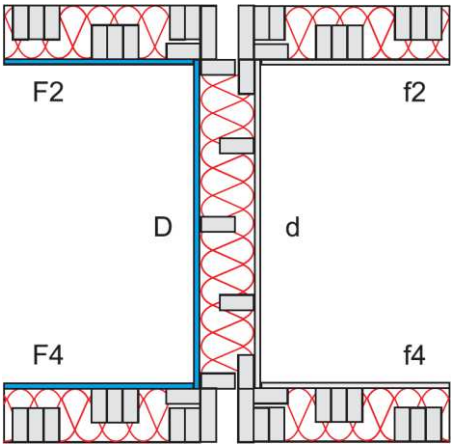
Room Parameters

- See Figure 2 of this report or Figure 1.3 of the National Research Council Report RR-331.
- The separating wall is 2.5 m high by 5 m wide.
- The flanking walls 2.5 m high by 4 m wide.
- The floor / ceilings are 4 m by 5 m.

Illustration for this case



Junction of a single staggered stud separating wall with one layer of 15.9 mm CertainTeed SilentFX® QuickCut gypsum board directly attached to the studs on one side. One layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the studs on the other side. A floor of wood I-joists with one layer of 15 mm OSB in both rooms. Topping of 38 mm thick gypsum concrete on a 9 mm closed cell foam interlayer in one room (F1). The wall also connects with a ceiling of two layers of 12.7 mm CertainTeed Type X gypsum board installed on resilient channels. (Side view of Junctions 1 and 3).



Junction of a single staggered stud separating wall with side walls of triple staggered studs. One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in one room. One layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the wood studs in the other room. (Plan view of Junction 2 or 4).

Example 6 Error! Reference source not found.	Reference	Value
Direct STC Rating of Path Dd		
STC_{Dd}	Report A1-007750.2 Appendix B	**51**
Junction 1 - Seperating wall and the floor assembly		
Flanking Path Ff_1		
$Flanking\ STC_{lab,F1,f1}$	Report A1-007750.2 Appendix B,C and D	73
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,f1}$	RR-331 Eq. 1.5	77
Flanking Path Fd_1		
$Flanking\ STC_{lab,F1,d}$	Report A1-007750.2 Appendix B,C and D	71
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,d}$	RR-331 Eq. 1.5	75
Flanking Path Df_1		
$Flanking\ STC_{lab,D,f1}$	Report A1-007750.2 Appendix B,C and D	66
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f1}$	RR-331 Eq. 1.5	70
Flanking STC for Junction 1		**68**
Junction 2 - Separating wall and the flanking wall assemblies		
Flanking Path Ff_2		
$Flanking\ STC_{lab,F2,f2}$	Report A1-007750.2 Appendix B,C and D	66
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,f2}$	RR-331 Eq. 1.5	73
Flanking Path Fd_2		
$Flanking\ STC_{lab,F2,d}$	Report A1-007750.2 Appendix B,C and D	67
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,d}$	RR-331 Eq. 1.5	74
Flanking Path Df_2		
$Flanking\ STC_{lab,D,f2}$	Report A1-007750.2 Appendix B,C and D	68
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,D,f2}$	RR-331 Eq. 1.5	75
Flanking STC for Junction 2		**69**
Junction 3 -Seperating wall and the ceiling assembly		
Flanking Path Ff_3		
$Flanking\ STC_{lab,F3,f3}$	Report A1-007750.2 Appendix B,C and D	66
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,f3}$	RR-331 Eq. 1.5	70
Flanking Path Fd_3		
$Flanking\ STC_{lab,F3,d}$	Report A1-007750.2 Appendix B,C and D	63
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,d}$	RR-331 Eq. 1.5	67
Flanking Path Df_3		
$Flanking\ STC_{lab,D,f3}$	Report A1-007750.2 Appendix B,C and D	65
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f3}$	RR-331 Eq. 1.5	69
Flanking STC for Junction 3		**64**
Junction 4 - Separating wall and the flanking wall assemblies		
Flanking STC for Junction 4 - Same as Junction 2		**69**
ASTC due to Direct plus Flanking Transmission	RR-331 Equation 1.4	**51**

Example 44: Rooms side-by-side - Non-loadbearing Separating Wall

- **Simplified Method.**
- **Common single staggered wood stud wall.**
- **All other walls are triple staggered wood stud walls.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board directly fixed to the wood studs of all walls.**
- **Fire rated floor BXUV.M535[1] with a bare 15 mm OSB subfloor.[2]**

Separating wall assembly (non-loadbearing) with:

- Staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm (2x6).
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to each side of the wood studs.
- One layer of 89 mm thick CertainTeed R12 Sustainable Insulation® in the wall cavity.

Junction 1: Bottom Junction (separating wall / floor) with:

- Joists oriented parallel to the separating wall assembly.
- Wood I-joists 241 mm (9.5") deep spaced 406 mm (16") on center. Doubled rim boards (32 mm (1-1/4") thick and 241 mm deep) installed at each end of the I-joists.
- Subfloor of 15 mm (19/32") OSB directly attached to the I-joists.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the floor cavity.

Junction 2 or 4: Each Side (separating wall /abutting side wall) with:

- Triple staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to each side of the wood studs.
- One layer of 89 mm thick CertainTeed R12 Sustainable Insulation® in the wall cavity.

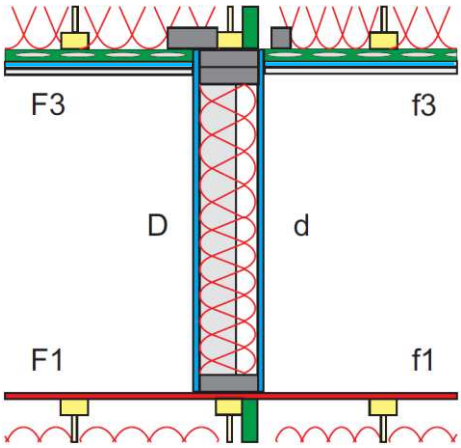
Junction 3: Top Junction (separating wall / ceiling) with:

- Joists oriented parallel to the separating wall assembly.
- Wood I-joists 241 mm (9.5") deep spaced 406 mm (16") on center. Doubled rim boards (32 mm (1-1/4") thick and 241 mm deep) installed at each end of the I-joists.
- Resilient channels installed perpendicular to wood I-joists and spaced 305 mm (12") on center.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the ceiling cavity.
- Base layer of layer of 15.9 mm SilentFX® QuickCut gypsum board and a face layer of 12.7 mm (1/2") CertainTeed Type C gypsum board installed on the resilient channels on the ceiling.

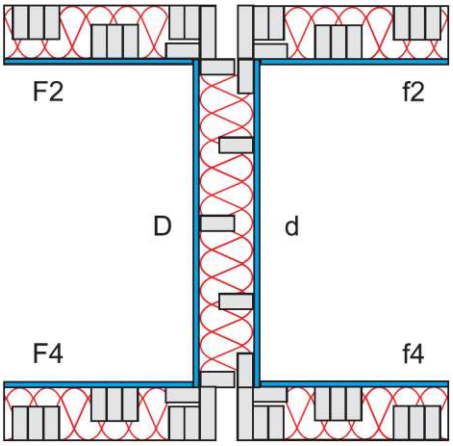
Room Parameters

- See Figure 2 of this report or Figure 1.3 of the National Research Council Report RR-331.
- The separating wall is 2.5 m high by 5 m wide.
- The flanking walls 2.5 m high by 4 m wide.
- The floor / ceilings are 4 m by 5 m.

Illustration for this case



Junction of a single staggered stud separating wall with one layer of 15.9 mm CertainTeed SilentFX® QuickCut gypsum board directly attached to the studs on both sides. A floor of wood I-joists with one layer of 15 mm OSB in both rooms. The wall also connects with a ceiling of a base layer of layer of 15.9 mm SilentFX® QuickCut gypsum board and a face layer of 12.7 mm (1/2") CertainTeed Type C gypsum board installed on resilient channels.
(Side view of Junctions 1 and 3).



Junction of a single staggered stud separating wall with side walls of triple staggered studs. One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in both rooms.
(Plan view of Junction 2 or 4).

Example 44	Reference	Value
Direct STC Rating of Path Dd		
Laboratory Measured STC Rating	Report A1-007750.2 Appendix B	**54**
Junction 1 - Junction between the seperating wall and the floor assembly		
Flanking Path Ff_1		
$Flanking\ STC_{\ lab,F1,f1}$	Reports A1-007750.2 and A1-012057.1	63
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,F1,f1}$	RR-331 Eq. 1.5	67
Flanking Path Fd_1		
$Flanking\ STC_{\ lab,F1,d}$	Reports A1-007750.2 and A1-012057.1	72
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,F1,d}$	RR-331 Eq. 1.5	76
Flanking Path Df_1		
$Flanking\ STC_{\ lab,D,f1}$	Reports A1-007750.2 and A1-012057.1	72
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,D,f1}$	RR-331 Eq. 1.5	76
Flanking STC for Junction 1		**66**
Junction 2 - Junction between the separating wall and the flanking wall assemblies		
Flanking Path Ff_2		
$Flanking\ STC_{\ lab,F2,f2}$	Report A1-007750.2 Appendix B, C, and D	69
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{\ situ,F2,f2}$	RR-331 Eq. 1.5	76
Flanking Path Fd_2		
$Flanking\ STC_{\ lab,F2,d}$	Report A1-007750.2 Appendix B, C, and D	72
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{\ situ,F2,d}$	RR-331 Eq. 1.5	79
Flanking Path Df_2		
$Flanking\ STC_{\ lab,D,f2}$	Report A1-007750.2 Appendix B, C, and D	72
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{\ situ,D,f2}$	RR-331 Eq. 1.5	79
Flanking STC for Junction 2		**73**
Junction 3 - Junction between the seperating wall and the ceiling assembly		
Flanking Path Ff_3		
$Flanking\ STC_{\ lab,F3,f3}$	Reports A1-007750.2 and A1-012057.1	70
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,F3,f3}$	RR-331 Eq. 1.5	74
Flanking Path Fd_3		
$Flanking\ STC_{\ lab,F3,d}$	Reports A1-007750.2 and A1-012057.1	70
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,F3,d}$	RR-331 Eq. 1.5	74
Flanking Path Df_3		
$Flanking\ STC_{\ lab,D,f3}$	Reports A1-007750.2 and A1-012057.1	70
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,D,f3}$	RR-331 Eq. 1.5	74
Flanking STC for Junction 3		**69**
Junction 4 - Junction between the separating wall and the flanking wall assemblies		
Flanking STC for Junction 4 - Same as Junction 2		**73**
ASTC due to Direct plus Flanking Transmission	RR-331 Section 1.4	**54**

Example 45: Rooms side-by-side - Non-loadbearing Separating Wall

- **Simplified Method.**
- **Common single staggered wood stud wall.**
- **All other walls are triple staggered wood stud walls.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board fixed to the wood studs in one room.**
- **One layer of 15.9 mm (5/8") CertainTeed Type X fixed to the wood studs in the other room.**
- **Fire rated floor BXUV.M535[1] with a bare 15 mm OSB subfloor.[2]**

Separating wall assembly (non-loadbearing) with:

- Staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm (2x6).
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to one side of the wood studs and one layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the other side of the wood studs.
- One layer of 89 mm thick CertainTeed R12 Sustainable Insulation® in the wall cavity.

Junction 1: Bottom Junction (separating wall / floor) with:

- Joists oriented parallel to the separating wall assembly.
- Wood I-joists 241 mm (9.5") deep spaced 406 mm (16") on center. Doubled rim boards (32 mm (1-1/4") thick and 241 mm deep) installed at each end of the I-joists.
- Subfloor of 15 mm (19/32") OSB directly attached to the I-joists.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the floor cavity.

Junction 2 or 4: Each Side (separating wall /abutting side wall) with:

- Tipple staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in one room (F2 and F4).
- One layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the wood studs in the other room (f2 and f4).
- One layer of 89 mm thick CertainTeed R12 Sustainable Insulation® in the wall cavities.

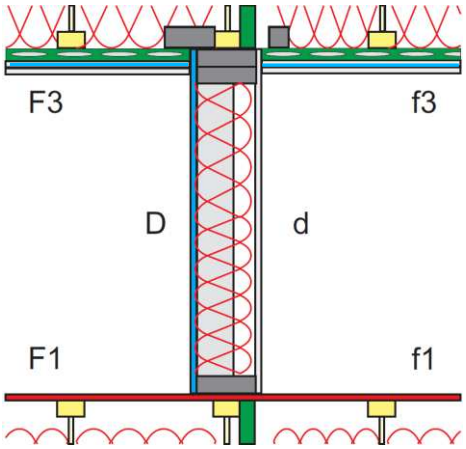
Junction 3: Top Junction (separating wall / ceiling) with:

- Joists oriented parallel to the separating wall assembly.
- Wood I-joists 241 mm (9.5") deep spaced 406 mm (16") on center. Doubled rim boards (32 mm (1-1/4") thick and 241 mm deep) installed at each end of the I-joists.
- Resilient channels installed perpendicular to wood I-joists and spaced 305 mm (12") on center.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the ceiling cavity.
- Base layer of layer of 15.9 mm SilentFX® QuickCut gypsum board and a face layer of 12.7 mm (1/2") CertainTeed Type C gypsum board installed on the resilient channels on the ceiling.

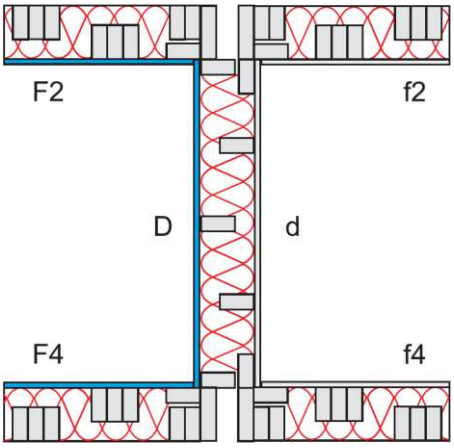
Room Parameters

- See Figure 2 of this report or Figure 1.3 of the National Research Council Report RR-331.
- The separating wall is 2.5 m high by 5 m wide.
- The flanking walls 2.5 m high by 4 m wide.
- The floor / ceilings are 4 m by 5 m.

Illustration for this case



Junction of a single staggered stud separating wall with one layer of 15.9 mm CertainTeed SilentFX® QuickCut gypsum board directly attached to the studs on one side. One layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the studs on the other side. A floor of wood I-joists with one layer of 15 mm OSB in both rooms. The wall also connects with a ceiling of a base layer of layer of 15.9 mm SilentFX® QuickCut gypsum board and a face layer of 12.7 mm (1/2") CertainTeed Type C gypsum board installed on resilient channels. (Side view of Junctions 1 and 3).



Junction of a single staggered stud separating wall with side walls of triple staggered studs. One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in one room. One layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the wood studs in the other room. (Plan view of Junction 2 or 4).

Example 45	Reference	Value
Direct STC Rating of Path Dd		
Laboratory Measured STC Rating	Report A1-007750.2 Appendix B	**51**
Junction 1 - Junction between the seperating wall and the floor assembly		
Flanking Path Ff_1		
$Flanking\ STC_{\ lab,F1,f1}$	Reports A1-007750.2 and A1-012057.1	63
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,F1,f1}$	RR-331 Eq. 1.5	67
Flanking Path Fd_1		
$Flanking\ STC_{\ lab,F1,d}$	Reports A1-007750.2 and A1-012057.1	62
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,F1,d}$	RR-331 Eq. 1.5	66
Flanking Path Df_1		
$Flanking\ STC_{\ lab,D,f1}$	Reports A1-007750.2 and A1-012057.1	64
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,D,f1}$	RR-331 Eq. 1.5	68
Flanking STC for Junction 1		**62**
Junction 2 - Junction between the separating wall and the flanking wall assemblies		
Flanking Path Ff_2		
$Flanking\ STC_{\ lab,F2,f2}$	Report A1-007750.2 Appendix B, C, and D	66
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{\ situ,F2,f2}$	RR-331 Eq. 1.5	73
Flanking Path Fd_2		
$Flanking\ STC_{\ lab,F2,d}$	Report A1-007750.2 Appendix B, C, and D	67
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{\ situ,F2,d}$	RR-331 Eq. 1.5	74
Flanking Path Df_2		
$Flanking\ STC_{\ lab,D,f2}$	Report A1-007750.2 Appendix B, C, and D	68
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{\ situ,D,f2}$	RR-331 Eq. 1.5	75
Flanking STC for Junction 2		**69**
Junction 3 - Junction between the seperating wall and the ceiling assembly		
Flanking Path Ff_3		
$Flanking\ STC_{\ lab,F3,f3}$	Reports A1-007750.2 and A1-012057.1	63
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,F3,f3}$	RR-331 Eq. 1.5	67
Flanking Path Fd_3		
$Flanking\ STC_{\ lab,F3,d}$	Reports A1-007750.2 and A1-012057.1	61
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,F3,d}$	RR-331 Eq. 1.5	65
Flanking Path Df_3		
$Flanking\ STC_{\ lab,D,f3}$	Reports A1-007750.2 and A1-012057.1	63
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,D,f3}$	RR-331 Eq. 1.5	67
Flanking STC for Junction 3		**61**
Junction 4 - Junction between the separating wall and the flanking wall assemblies		
Flanking STC for Junction 4 - Same as Junction 2		**69**
ASTC due to Direct plus Flanking Transmission	RR-331 Section 1.4	**50**

This page is intentionally left blank

4.2 Side-By-Side Rooms - Non-Load Bearing Single Staggered Stud Separating Wall Assembly with Shear Elements

Case Number	ASTC Rating	Construction				
		Wallboard Room 1	Wallboard Room 2	Floor System	Floor Topping Room 1	Floor Topping Room 2
7	53	One layer of 15.9 mm SilentFX® QuickCut gypsum board fixed to 15.9 mm Plywood	One layer of 15.9 mm SilentFX® QuickCut gypsum board	1	None	None
8	50	"	One layer of 15.9 mm CertainTeed Type X gypsum board	"	None	"
9	53	"	One layer of 15.9 mm SilentFX® QuickCut gypsum board	"	Two layers of 12 mm cementitious flooring underlayment	"
10	50	"	One layer of 15.9 mm CertainTeed Type X gypsum board	"	"	"
11	53	"	One layer of 15.9 mm SilentFX® QuickCut gypsum board	"	38 mm thick gypsum concrete on a 9 mm closed cell foam	"
12	50	"	One layer of 15.9 mm CertainTeed Type X gypsum board	"	"	"
46	53	"	One layer of 15.9 mm SilentFX® QuickCut gypsum board	2	None	"
47	50	"	One layer of 15.9 mm CertainTeed Type X gypsum board	"	"	"
13	53	One layer of 15.9 mm SilentFX® QuickCut gypsum board on all walls. One layer of 15.9 mm plywood directly fixed to one side of the common partition.		1	None	"
14	54	One layer of 15.9 mm SilentFX® QuickCut gypsum board on all walls. One layer of 15.9 mm plywood directly fixed to the walls on one side of the rooms.		"	"	"

Example 7: Rooms side-by-side - Non-loadbearing Separating Wall

- **Simplified Method.**
- **Common single staggered wood stud wall.**
- **All other walls are triple staggered wood stud walls.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to the wood studs in one room.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board directly attached to the wood studs in the other room.**
- **One layer of 15 mm OSB on the floors.**

Separating wall assembly (non-loadbearing) with:

- Staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm (2x6).
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to one side of the wood studs (D) and one layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the other side of the wood studs (d).
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 1: Bottom Junction (separating wall / floor) with:

- Joists oriented parallel to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Subfloor of one layer of 15 mm OSB directly attached to I-joists.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the floor cavity.

Junction 2 or 4: Each Side (separating wall /abutting side wall) with:

- Tipple staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to the wood studs in one room (F2 and F4).
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in the other room (f2 and f4).
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavities.

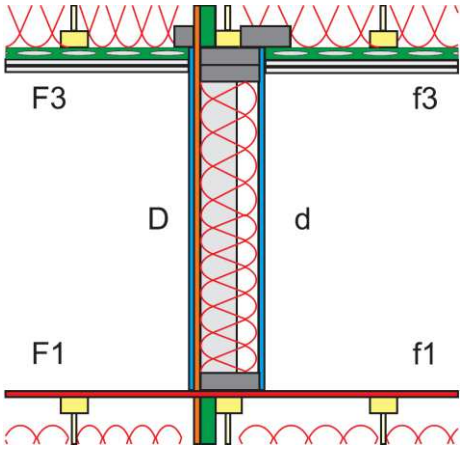
Junction 3: Top Junction (separating wall / ceiling) with:

- Joists oriented parallel to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Resilient channels installed perpendicular to wood I-joists and spaced 400 mm on center.
- Two layers of 12.7 mm CertainTeed Type X gypsum board installed on the resilient channels on the ceiling.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the ceiling cavity.

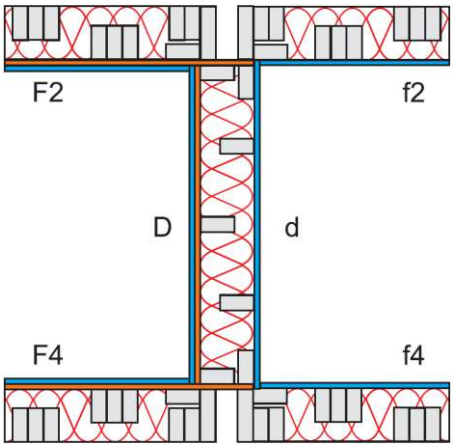
Room Parameters

- See Figure 2 of this report or Figure 1.3 of the National Research Council Report RR-331.
- The separating wall is 2.5 m high by 5 m wide.
- The flanking walls 2.5 m high by 4 m wide.
- The floor / ceilings are 4 m by 5 m.

Illustration for this case



Junction of a single staggered stud separating wall with one layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9mm plywood directly attached to the wood studs on one side (D). One layer of 15.9 mm SilentFX® QuickCut gypsum board directly fixed to the wood studs on the other side (d). A floor of wood I-joists with one layer of 15 mm OSB in both rooms. The wall also connects with a ceiling of two layers of 12.7 mm CertainTeed Type X gypsum board installed on resilient channels. (Side view of Junctions 1 and 3).



Junction of a single staggered stud separating wall with side walls of triple staggered studs. One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm Plywood directly attached to the wood studs in one room. One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in the other room. (Plan view of Junction 2 or 4).

Example 7	Reference	Value
Direct STC Rating of Path Dd		
STC_{Dd}	Report A1-007750.2 Appendix B	**53**
Junction 1 - Seperating wall and the floor assembly		
Flanking Path Ff_1		
$Flanking\ STC_{lab,F1,f1}$	Report A1-007750.2 Appendix B,C and D	66
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,f1}$	RR-331 Eq. 1.5	70
Flanking Path Fd_1		
$Flanking\ STC_{lab,F1,d}$	Report A1-007750.2 Appendix B,C and D	74
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,d}$	RR-331 Eq. 1.5	78
Flanking Path Df_1		
$Flanking\ STC_{lab,D,f1}$	Report A1-007750.2 Appendix B,C and D	73
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f1}$	RR-331 Eq. 1.5	77
Flanking STC for Junction 1		**69**
Junction 2 - Separating wall and the flanking wall assemblies		
Flanking Path Ff_2		
$Flanking\ STC_{lab,F2,f2}$	Report A1-007750.2 Appendix B,C and D	69
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,f2}$	RR-331 Eq. 1.5	76
Flanking Path Fd_2		
$Flanking\ STC_{lab,F2,d}$	Report A1-007750.2 Appendix B,C and D	72
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,d}$	RR-331 Eq. 1.5	79
Flanking Path Df_2		
$Flanking\ STC_{lab,D,f2}$	Report A1-007750.2 Appendix B,C and D	72
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,D,f2}$	RR-331 Eq. 1.5	79
Flanking STC for Junction 2		**73**
Junction 3 -Seperating wall and the ceiling assembly		
Flanking Path Ff_3		
$Flanking\ STC_{lab,F3,f3}$	Report A1-007750.2 Appendix B,C and D	73
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,f3}$	RR-331 Eq. 1.5	77
Flanking Path Fd_3		
$Flanking\ STC_{lab,F3,d}$	Report A1-007750.2 Appendix B,C and D	72
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,d}$	RR-331 Eq. 1.5	76
Flanking Path Df_3		
$Flanking\ STC_{lab,D,f3}$	Report A1-007750.2 Appendix B,C and D	71
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f3}$	RR-331 Eq. 1.5	75
Flanking STC for Junction 3		**71**
Junction 4 - Separating wall and the flanking wall assemblies		
Flanking STC for Junction 4 - Same as Junction 2		**73**
ASTC due to Direct plus Flanking Transmission	RR-331 Equation 1.4	**53**

Example 8: Rooms side-by-side - Non-loadbearing Separating Wall

- **Simplified Method.**
- **Common single staggered wood stud wall.**
- **All other walls are triple staggered wood stud walls.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to the wood studs in one room.**
- **One layer of 15.9 mm (5/8") CertainTeed Type X gypsum board directly attached to the wood studs in the other room.**
- **One layer of 15 mm OSB on the floors.**

Separating wall assembly (non-loadbearing) with:

- Staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm (2x6).
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to one side of the wood studs (D) and one layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the other side of the wood studs (d).
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 1: Bottom Junction (separating wall / floor) with:

- Joists oriented parallel to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Subfloor of one layer of 15 mm OSB directly attached to I-joists.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the floor cavity.

Junction 2 or 4: Each Side (separating wall /abutting side wall) with:

- Tipple staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to the wood studs in one room (F2 and F4).
- One layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the wood studs in the other room (f2 and f4).
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavities.

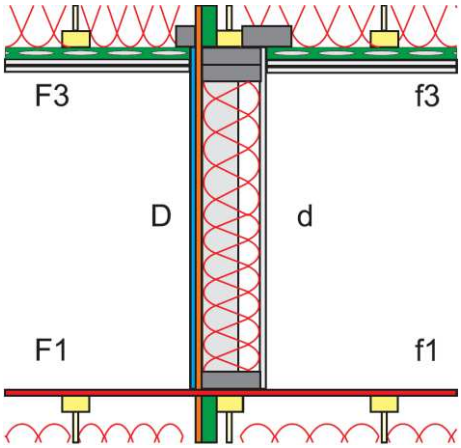
Junction 3: Top Junction (separating wall / ceiling) with:

- Joists oriented parallel to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Resilient channels installed perpendicular to wood I-joists and spaced 400 mm on center.
- Two layers of 12.7 mm CertainTeed Type X gypsum board installed on the resilient channels on the ceiling.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the ceiling cavity.

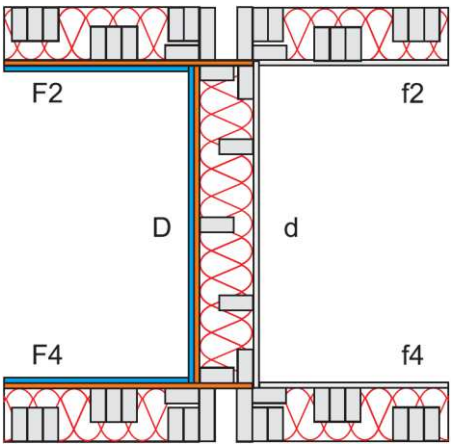
Room Parameters

- See Figure 2 of this report or Figure 1.3 of the National Research Council Report RR-331.
- The separating wall is 2.5 m high by 5 m wide.
- The flanking walls 2.5 m high by 4 m wide.
- The floor / ceilings are 4 m by 5 m.

Illustration for this case



Junction of a single staggered stud separating wall with one layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9mm plywood directly attached to the wood studs on one side (D). One layer of 15.9 mm CertainTeed Type X gypsum board directly fixed to the wood studs on the other side (d). A floor of wood I-joists with one layer of 15 mm OSB in both rooms. The wall also connects with a ceiling of two layers of 12.7 mm CertainTeed Type X gypsum board installed on resilient channels. (Side view of Junctions 1 and 3).



Junction of a single staggered stud separating wall with side walls of triple staggered studs. One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm Plywood directly attached to the wood studs in one room. One layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the wood studs in the other room. (Plan view of Junction 2 or 4).

Example 8	Reference	Value
Direct STC Rating of Path Dd		
STC_{Dd}	Report A1-007750.2 Appendix B	**50**
Junction 1 - Seperating wall and the floor assembly		
Flanking Path Ff_1		
$Flanking\ STC_{lab,F1,f1}$	Report A1-007750.2 Appendix B,C and D	66
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,f1}$	RR-331 Eq. 1.5	70
Flanking Path Fd_1		
$Flanking\ STC_{lab,F1,d}$	Report A1-007750.2 Appendix B,C and D	69
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,d}$	RR-331 Eq. 1.5	73
Flanking Path Df_1		
$Flanking\ STC_{lab,D,f1}$	Report A1-007750.2 Appendix B,C and D	71
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f1}$	RR-331 Eq. 1.5	75
Flanking STC for Junction 1		**67**
Junction 2 - Separating wall and the flanking wall assemblies		
Flanking Path Ff_2		
$Flanking\ STC_{lab,F2,f2}$	Report A1-007750.2 Appendix B,C and D	66
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,f2}$	RR-331 Eq. 1.5	73
Flanking Path Fd_2		
$Flanking\ STC_{lab,F2,d}$	Report A1-007750.2 Appendix B,C and D	66
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,d}$	RR-331 Eq. 1.5	73
Flanking Path Df_2		
$Flanking\ STC_{lab,D,f2}$	Report A1-007750.2 Appendix B,C and D	68
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,D,f2}$	RR-331 Eq. 1.5	75
Flanking STC for Junction 2		**69**
Junction 3 -Seperating wall and the ceiling assembly		
Flanking Path Ff_3		
$Flanking\ STC_{lab,F3,f3}$	Report A1-007750.2 Appendix B,C and D	73
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,f3}$	RR-331 Eq. 1.5	77
Flanking Path Fd_3		
$Flanking\ STC_{lab,F3,d}$	Report A1-007750.2 Appendix B,C and D	67
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,d}$	RR-331 Eq. 1.5	71
Flanking Path Df_3		
$Flanking\ STC_{lab,D,f3}$	Report A1-007750.2 Appendix B,C and D	69
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f3}$	RR-331 Eq. 1.5	73
Flanking STC for Junction 3		**68**
Junction 4 - Separating wall and the flanking wall assemblies		
Flanking STC for Junction 4 - Same as Junction 2		**69**
ASTC due to Direct plus Flanking Transmission	RR-331 Equation 1.4	**50**

Example 9: Rooms side-by-side - Non-loadbearing Separating Wall

- **Simplified Method.**
- **Common single staggered wood stud wall.**
- **All other walls are triple staggered wood stud walls.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to the wood studs in one room.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board directly attached to the wood studs in the other room.**
- **Topping of cementitious flooring in one room.**

Separating wall assembly (non-loadbearing) with:

- Staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm (2x6).
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to one side of the wood studs (D) and one layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the other side of the wood studs (d).
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 1: Bottom Junction (separating wall / floor) with:

- Joists oriented parallel to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Subfloor of one layer of 15 mm OSB directly attached to I-joists.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the floor cavity.
- Topping of two layers of 12 mm cementitious flooring underlayment installed on top of 12 mm wood fiber board underlayment in one room (F1).

Junction 2 or 4: Each Side (separating wall /abutting side wall) with:

- Tipple staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to the wood studs in one room (F2 and F4).
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in the other room (f2 and f4).
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavities.

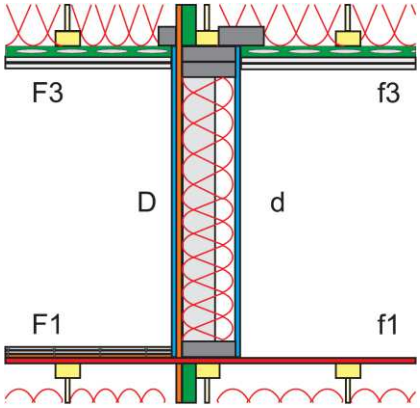
Junction 3: Top Junction (separating wall / ceiling) with:

- Joists oriented parallel to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Resilient channels installed perpendicular to wood I-joists and spaced 400 mm on center.
- Two layers of 12.7 mm CertainTeed Type X gypsum board installed on the resilient channels on the ceiling.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the ceiling cavity.

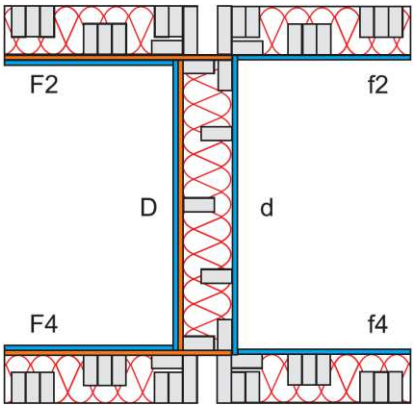
Room Parameters

- See Figure 2 of this report or Figure 1.3 of the National Research Council Report RR-331.
- The separating wall is 2.5 m high by 5 m wide.
- The flanking walls 2.5 m high by 4 m wide.
- The floor / ceilings are 4 m by 5 m.

Illustration for this case



Junction of a single staggered stud separating wall with one layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9mm plywood directly attached to the wood studs on one side (D). One layer of 15.9 mm SilentFX® QuickCut gypsum board directly fixed to the wood studs on the other side (d). A floor of wood I-joists with one layer of 15 mm OSB in both rooms. Topping of two layers of 12 mm cementitious flooring underlayment installed on top of 12 mm wood fiber board underlayment in one room (F1). The wall also connects with a ceiling of two layers of 12.7 mm CertainTeed Type X gypsum board installed on resilient channels. (Side view of Junctions 1 and 3).



Junction of a single staggered stud separating wall with side walls of triple staggered studs. One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm Plywood directly attached to the wood studs in one room. One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in the other room. (Plan view of Junction 2 or 4).

Example 9	Reference	Value
Direct STC Rating of Path Dd		
STC_{Dd}	Report A1-007750.2 Appendix B	**53**
Junction 1 - Seperating wall and the floor assembly		
Flanking Path Ff_1		
$Flanking\ STC_{lab,F1,f1}$	Report A1-007750.2 Appendix B,C and D	68
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,f1}$	RR-331 Eq. 1.5	72
Flanking Path Fd_1		
$Flanking\ STC_{lab,F1,d}$	Report A1-007750.2 Appendix B,C and D	76
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,d}$	RR-331 Eq. 1.5	80
Flanking Path Df_1		
$Flanking\ STC_{lab,D,f1}$	Report A1-007750.2 Appendix B,C and D	73
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f1}$	RR-331 Eq. 1.5	77
Flanking STC for Junction 1		**70**
Junction 2 - Separating wall and the flanking wall assemblies		
Flanking Path Ff_2		
$Flanking\ STC_{lab,F2,f2}$	Report A1-007750.2 Appendix B,C and D	69
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,f2}$	RR-331 Eq. 1.5	76
Flanking Path Fd_2		
$Flanking\ STC_{lab,F2,d}$	Report A1-007750.2 Appendix B,C and D	72
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,d}$	RR-331 Eq. 1.5	79
Flanking Path Df_2		
$Flanking\ STC_{lab,D,f2}$	Report A1-007750.2 Appendix B,C and D	72
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,D,f2}$	RR-331 Eq. 1.5	79
Flanking STC for Junction 2		**73**
Junction 3 -Seperating wall and the ceiling assembly		
Flanking Path Ff_3		
$Flanking\ STC_{lab,F3,f3}$	Report A1-007750.2 Appendix B,C and D	73
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,f3}$	RR-331 Eq. 1.5	77
Flanking Path Fd_3		
$Flanking\ STC_{lab,F3,d}$	Report A1-007750.2 Appendix B,C and D	72
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,d}$	RR-331 Eq. 1.5	76
Flanking Path Df_3		
$Flanking\ STC_{lab,D,f3}$	Report A1-007750.2 Appendix B,C and D	71
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f3}$	RR-331 Eq. 1.5	75
Flanking STC for Junction 3		**71**
Junction 4 - Separating wall and the flanking wall assemblies		
Flanking STC for Junction 4 - Same as Junction 2		**73**
ASTC due to Direct plus Flanking Transmission	RR-331 Equation 1.4	**53**

Example 10: Rooms side-by-side - Non-loadbearing Separating Wall

- **Simplified Method.**
- **Common single staggered wood stud wall.**
- **All other walls are triple staggered wood stud walls.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to the wood studs in one room.**
- **One layer of 15.9 mm (5/8") CertainTeed Type X gypsum board directly attached to the wood studs in the other room.**
- **Topping of cementitious flooring in one room.**

Separating wall assembly (non-loadbearing) with:

- Staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm (2x6).
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to one side of the wood studs (D) and one layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the other side of the wood studs (d).
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 1: Bottom Junction (separating wall / floor) with:

- Joists oriented parallel to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Subfloor of one layer of 15 mm OSB directly attached to I-joists.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the floor cavity.
- Topping of two layers of 12 mm cementitious flooring underlayment installed on top of 12 mm wood fiber board underlayment in one room (F1).

Junction 2 or 4: Each Side (separating wall /abutting side wall) with:

- Tipple staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to the wood studs in one room (F2 and F4).
- One layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the wood studs in the other room (f2 and f4).
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavities.

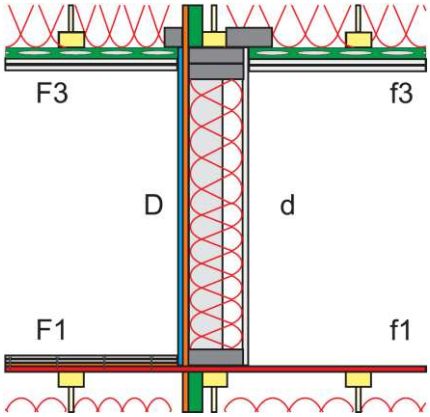
Junction 3: Top Junction (separating wall / ceiling) with:

- Joists oriented parallel to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Resilient channels installed perpendicular to wood I-joists and spaced 400 mm on center.
- Two layers of 12.7 mm CertainTeed Type X gypsum board installed on the resilient channels on the ceiling.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the ceiling cavity.

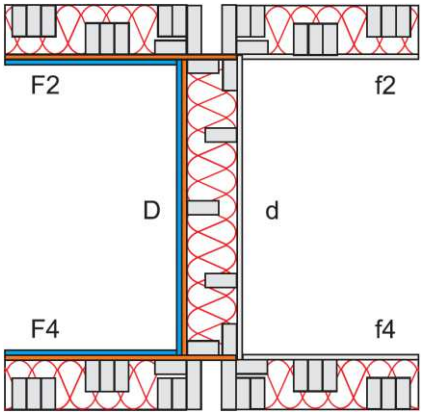
Room Parameters

- See Figure 2 of this report or Figure 1.3 of the National Research Council Report RR-331.
- The separating wall is 2.5 m high by 5 m wide.
- The flanking walls 2.5 m high by 4 m wide.
- The floor / ceilings are 4 m by 5 m.

Illustration for this case



Junction of a single staggered stud separating wall with one layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9mm plywood directly attached to the wood studs on one side (D). One layer of 15.9 mm CertainTeed Type X gypsum board directly fixed to the wood studs on the other side (d). A floor of wood I-joists with one layer of 15 mm OSB in both rooms. Topping of two layers of 12 mm cementitious flooring underlayment installed on top of 12 mm wood fiber board underlayment in one room (F1). The wall also connects with a ceiling of two layers of 12.7 mm CertainTeed Type X gypsum board installed on resilient channels. (Side view of Junctions 1 and 3).



Junction of a single staggered stud separating wall with side walls of triple staggered studs. One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm Plywood directly attached to the wood studs in one room. One layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the wood studs in the other room. (Plan view of Junction 2 or 4).

Example 10	Reference	Value
Direct STC Rating of Path Dd		
STC_{Dd}	Report A1-007750.2 Appendix B	**50**
Junction 1 - Seperating wall and the floor assembly		
Flanking Path Ff_1		
$Flanking\ STC_{lab,F1,f1}$	Report A1-007750.2 Appendix B,C and D	68
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,f1}$	RR-331 Eq. 1.5	72
Flanking Path Fd_1		
$Flanking\ STC_{lab,F1,d}$	Report A1-007750.2 Appendix B,C and D	71
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,d}$	RR-331 Eq. 1.5	75
Flanking Path Df_1		
$Flanking\ STC_{lab,D,f1}$	Report A1-007750.2 Appendix B,C and D	71
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f1}$	RR-331 Eq. 1.5	75
Flanking STC for Junction 1		**69**
Junction 2 - Separating wall and the flanking wall assemblies		
Flanking Path Ff_2		
$Flanking\ STC_{lab,F2,f2}$	Report A1-007750.2 Appendix B,C and D	66
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,f2}$	RR-331 Eq. 1.5	73
Flanking Path Fd_2		
$Flanking\ STC_{lab,F2,d}$	Report A1-007750.2 Appendix B,C and D	66
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,d}$	RR-331 Eq. 1.5	73
Flanking Path Df_2		
$Flanking\ STC_{lab,D,f2}$	Report A1-007750.2 Appendix B,C and D	68
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,D,f2}$	RR-331 Eq. 1.5	75
Flanking STC for Junction 2		**69**
Junction 3 -Seperating wall and the ceiling assembly		
Flanking Path Ff_3		
$Flanking\ STC_{lab,F3,f3}$	Report A1-007750.2 Appendix B,C and D	73
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,f3}$	RR-331 Eq. 1.5	77
Flanking Path Fd_3		
$Flanking\ STC_{lab,F3,d}$	Report A1-007750.2 Appendix B,C and D	67
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,d}$	RR-331 Eq. 1.5	71
Flanking Path Df_3		
$Flanking\ STC_{lab,D,f3}$	Report A1-007750.2 Appendix B,C and D	69
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f3}$	RR-331 Eq. 1.5	73
Flanking STC for Junction 3		**68**
Junction 4 - Separating wall and the flanking wall assemblies		
Flanking STC for Junction 4 - Same as Junction 2		**69**
ASTC due to Direct plus Flanking Transmission	RR-331 Equation 1.4	**50**

Example 11: Rooms side-by-side - Non-loadbearing Separating Wall

- **Simplified Method.**
- **Common single staggered wood stud wall.**
- **All other walls are triple staggered wood stud walls.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to the wood studs in one room.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board directly attached to the wood studs in the other room.**
- **Topping of 38 mm thick gypsum concrete in one room.**

Separating wall assembly (non-loadbearing) with:

- Staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm (2x6).
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to one side of the wood studs (D) and one layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the other side of the wood studs (d).
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 1: Bottom Junction (separating wall / floor) with:

- Joists oriented parallel to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Subfloor of one layer of 15 mm OSB directly attached to I-joists.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the floor cavity.
- Topping of 38 mm thick gypsum concrete on a 9 mm closed cell foam interlayer in one room (F1).

Junction 2 or 4: Each Side (separating wall /abutting side wall) with:

- Tipple staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to the wood studs in one room (F2 and F4).
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in the other room (f2 and f4).
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavities.

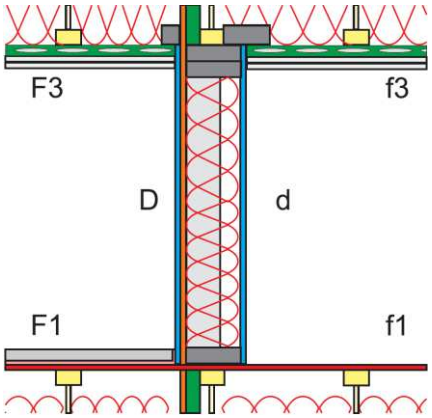
Junction 3: Top Junction (separating wall / ceiling) with:

- Joists oriented parallel to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Resilient channels installed perpendicular to wood I-joists and spaced 400 mm on center.
- Two layers of 12.7 mm CertainTeed Type X gypsum board installed on the resilient channels on the ceiling.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the ceiling cavity.

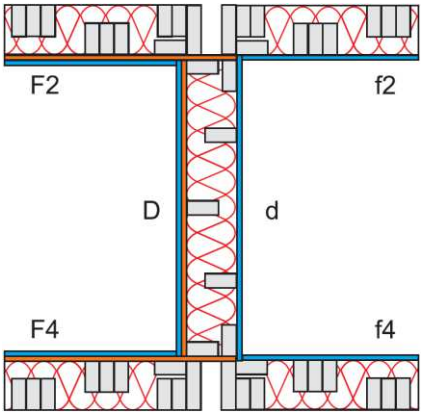
Room Parameters

- See Figure 2 of this report or Figure 1.3 of the National Research Council Report RR-331.
- The separating wall is 2.5 m high by 5 m wide.
- The flanking walls 2.5 m high by 4 m wide.
- The floor / ceilings are 4 m by 5 m.

Illustration for this case



Junction of a single staggered stud separating wall with one layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9mm plywood directly attached to the wood studs on one side (D). One layer of 15.9 mm SilentFX® QuickCut gypsum board directly fixed to the wood studs on the other side (d). A floor of wood I-joists with one layer of 15 mm OSB in both rooms. Topping of 38 mm thick gypsum concrete on a 9 mm closed cell foam interlayer in one room (F1). The wall also connects with a ceiling of two layers of 12.7 mm CertainTeed Type X gypsum board installed on resilient channels. (Side view of Junctions 1 and 3).



Junction of a single staggered stud separating wall with side walls of triple staggered studs. One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm Plywood directly attached to the wood studs in one room. One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in the other room. (Plan view of Junction 2 or 4).

Example 11	Reference	Value
Direct STC Rating of Path Dd		
STC_{Dd}	Report A1-007750.2 Appendix B	**53**
Junction 1 - Seperating wall and the floor assembly		
Flanking Path Ff_1		
$Flanking\ STC_{lab,F1,f1}$	Report A1-007750.2 Appendix B,C and D	73
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,f1}$	RR-331 Eq. 1.5	77
Flanking Path Fd_1		
$Flanking\ STC_{lab,F1,d}$	Report A1-007750.2 Appendix B,C and D	81
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,d}$	RR-331 Eq. 1.5	85
Flanking Path Df_1		
$Flanking\ STC_{lab,D,f1}$	Report A1-007750.2 Appendix B,C and D	73
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f1}$	RR-331 Eq. 1.5	77
Flanking STC for Junction 1		**74**
Junction 2 - Separating wall and the flanking wall assemblies		
Flanking Path Ff_2		
$Flanking\ STC_{lab,F2,f2}$	Report A1-007750.2 Appendix B,C and D	69
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,f2}$	RR-331 Eq. 1.5	76
Flanking Path Fd_2		
$Flanking\ STC_{lab,F2,d}$	Report A1-007750.2 Appendix B,C and D	72
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,d}$	RR-331 Eq. 1.5	79
Flanking Path Df_2		
$Flanking\ STC_{lab,D,f2}$	Report A1-007750.2 Appendix B,C and D	72
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,D,f2}$	RR-331 Eq. 1.5	79
Flanking STC for Junction 2		**73**
Junction 3 -Seperating wall and the ceiling assembly		
Flanking Path Ff_3		
$Flanking\ STC_{lab,F3,f3}$	Report A1-007750.2 Appendix B,C and D	73
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,f3}$	RR-331 Eq. 1.5	77
Flanking Path Fd_3		
$Flanking\ STC_{lab,F3,d}$	Report A1-007750.2 Appendix B,C and D	72
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,d}$	RR-331 Eq. 1.5	76
Flanking Path Df_3		
$Flanking\ STC_{lab,D,f3}$	Report A1-007750.2 Appendix B,C and D	71
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f3}$	RR-331 Eq. 1.5	75
Flanking STC for Junction 3		**71**
Junction 4 - Separating wall and the flanking wall assemblies		
Flanking STC for Junction 4 - Same as Junction 2		**73**
ASTC due to Direct plus Flanking Transmission	RR-331 Equation 1.4	**53**

Example 12: Rooms side-by-side - Non-loadbearing Separating Wall

- **Simplified Method.**
- **Common single staggered wood stud wall.**
- **All other walls are triple staggered wood stud walls.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to the wood studs in one room.**
- **One layer of 15.9 mm (5/8") CertainTeed Type X gypsum board directly attached to the wood studs in the other room.**
- **Topping of 38 mm thick gypsum concrete in one room.**

Separating wall assembly (non-loadbearing) with:

- Staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm (2x6).
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to one side of the wood studs (D) and one layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the other side of the wood studs (d).
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 1: Bottom Junction (separating wall / floor) with:

- Joists oriented parallel to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Subfloor of one layer of 15 mm OSB directly attached to I-joists.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the floor cavity.
- Topping of 38 mm thick gypsum concrete on a 9 mm closed cell foam interlayer in one room (F1).

Junction 2 or 4: Each Side (separating wall /abutting side wall) with:

- Tipple staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to the wood studs in one room (F2 and F4).
- One layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the wood studs in the other room (f2 and f4).
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavities.

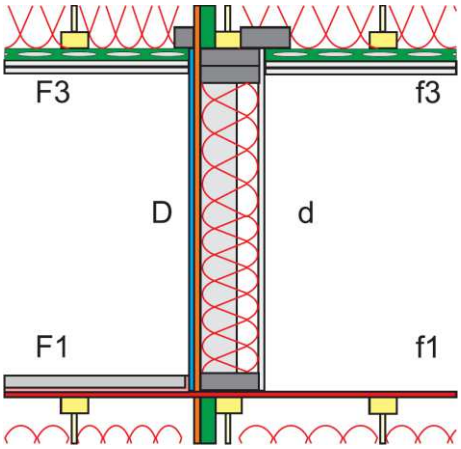
Junction 3: Top Junction (separating wall / ceiling) with:

- Joists oriented parallel to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Resilient channels installed perpendicular to wood I-joists and spaced 400 mm on center.
- Two layers of 12.7 mm CertainTeed Type X gypsum board installed on the resilient channels on the ceiling.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the ceiling cavity.

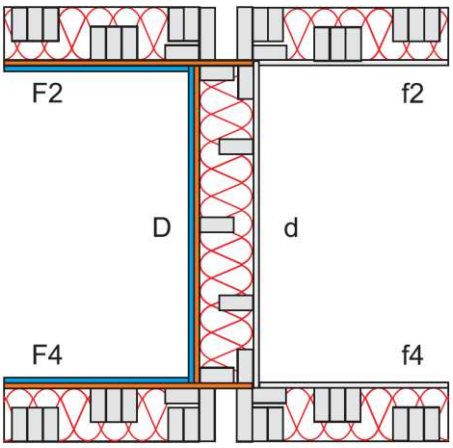
Room Parameters

- See Figure 2 of this report or Figure 1.3 of the National Research Council Report RR-331.
- The separating wall is 2.5 m high by 5 m wide.
- The flanking walls 2.5 m high by 4 m wide.
- The floor / ceilings are 4 m by 5 m.

Illustration for this case



Junction of a single staggered stud separating wall with one layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9mm plywood directly attached to the wood studs on one side (D). One layer of 15.9 mm CertainTeed Type X gypsum board directly fixed to the wood studs on the other side (d). A floor of wood I-joists with one layer of 15 mm OSB in both rooms. Topping of 38 mm thick gypsum concrete on a 9 mm closed cell foam interlayer in one room (F1). The wall also connects with a ceiling of two layers of 12.7 mm CertainTeed Type X gypsum board installed on resilient channels. (Side view of Junctions 1 and 3).



Junction of a single staggered stud separating wall with side walls of triple staggered studs. One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm Plywood directly attached to the wood studs in one room. One layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the wood studs in the other room. (Plan view of Junction 2 or 4).

Example 12	Reference	Value
Direct STC Rating of Path Dd		
STC_{Dd}	Report A1-007750.2 Appendix B	**50**
Junction 1 - Seperating wall and the floor assembly		
Flanking Path Ff_1		
$Flanking\ STC_{lab,F1,f1}$	Report A1-007750.2 Appendix B,C and D	73
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,f1}$	RR-331 Eq. 1.5	77
Flanking Path Fd_1		
$Flanking\ STC_{lab,F1,d}$	Report A1-007750.2 Appendix B,C and D	77
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,d}$	RR-331 Eq. 1.5	81
Flanking Path Df_1		
$Flanking\ STC_{lab,D,f1}$	Report A1-007750.2 Appendix B,C and D	71
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f1}$	RR-331 Eq. 1.5	75
Flanking STC for Junction 1		**72**
Junction 2 - Separating wall and the flanking wall assemblies		
Flanking Path Ff_2		
$Flanking\ STC_{lab,F2,f2}$	Report A1-007750.2 Appendix B,C and D	66
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,f2}$	RR-331 Eq. 1.5	73
Flanking Path Fd_2		
$Flanking\ STC_{lab,F2,d}$	Report A1-007750.2 Appendix B,C and D	66
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,d}$	RR-331 Eq. 1.5	73
Flanking Path Df_2		
$Flanking\ STC_{lab,D,f2}$	Report A1-007750.2 Appendix B,C and D	68
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,D,f2}$	RR-331 Eq. 1.5	75
Flanking STC for Junction 2		**69**
Junction 3 -Seperating wall and the ceiling assembly		
Flanking Path Ff_3		
$Flanking\ STC_{lab,F3,f3}$	Report A1-007750.2 Appendix B,C and D	73
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,f3}$	RR-331 Eq. 1.5	77
Flanking Path Fd_3		
$Flanking\ STC_{lab,F3,d}$	Report A1-007750.2 Appendix B,C and D	67
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,d}$	RR-331 Eq. 1.5	71
Flanking Path Df_3		
$Flanking\ STC_{lab,D,f3}$	Report A1-007750.2 Appendix B,C and D	69
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f3}$	RR-331 Eq. 1.5	73
Flanking STC for Junction 3		**68**
Junction 4 - Separating wall and the flanking wall assemblies		
Flanking STC for Junction 4 - Same as Junction 2		**69**
ASTC due to Direct plus Flanking Transmission	RR-331 Equation 1.4	**50**

Example 46: Rooms side-by-side - Non-loadbearing Separating Wall

- **Simplified Method.**
- **Common single staggered wood stud wall.**
- **All other walls are triple staggered wood stud walls.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to the wood studs in one room.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board directly attached to the wood studs in the other room.**
- **Fire rated floor BXUV.M535[1] with a bare 15 mm OSB subfloor.[2]**

Separating wall assembly (non-loadbearing) with:

- Staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm (2x6).
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to one side of the wood studs (D) and one layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the other side of the wood studs (d).
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 1: Bottom Junction (separating wall / floor) with:

- Joists oriented parallel to the separating wall assembly.
- Wood I-joists 241 mm (9.5") deep spaced 406 mm (16") on center. Doubled rim boards (32 mm (1-1/4") thick and 241 mm deep) installed at each end of the I-joists.
- Subfloor of 15 mm (19/32") OSB directly attached to the I-joists.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the floor cavity.

Junction 2 or 4: Each Side (separating wall /abutting side wall) with:

- Tipple staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to the wood studs in one room (F2 and F4).
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in the other room (f2 and f4).
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavities.

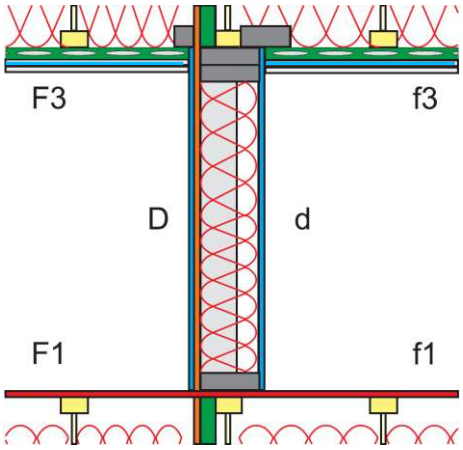
Junction 3: Top Junction (separating wall / ceiling) with:

- Joists oriented parallel to the separating wall assembly.
- Wood I-joists 241 mm (9.5") deep spaced 406 mm (16") on center. Doubled rim boards (32 mm (1-1/4") thick and 241 mm deep) installed at each end of the I-joists.
- Resilient channels installed perpendicular to wood I-joists and spaced 305 mm (12") on center.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the ceiling cavity.
- Base layer of layer of 15.9 mm SilentFX® QuickCut gypsum board and a face layer of 12.7 mm (1/2") CertainTeed Type C gypsum board installed on the resilient channels on the ceiling.

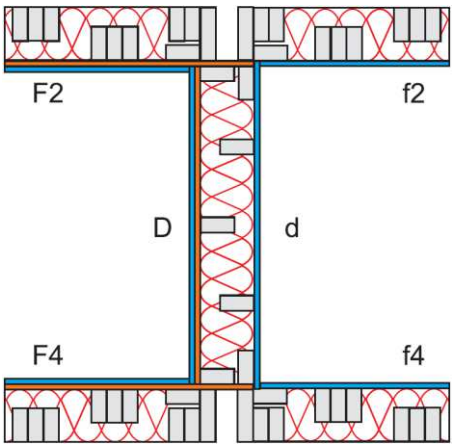
Room Parameters

- See Figure 2 of this report or Figure 1.3 of the National Research Council Report RR-331.
- The separating wall is 2.5 m high by 5 m wide.
- The flanking walls 2.5 m high by 4 m wide.
- The floor / ceilings are 4 m by 5 m.

Illustration for this case



Junction of a single staggered stud separating wall with one layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9mm plywood directly attached to the wood studs on one side (D). One layer of 15.9 mm SilentFX® QuickCut gypsum board directly fixed to the wood studs on the other side (d). A floor of wood I-joists with one layer of 15 mm OSB in both rooms. The wall also connects with a ceiling of a base layer of layer of 15.9 mm SilentFX® QuickCut gypsum board and a face layer of 12.7 mm (1/2") CertainTeed Type C gypsum board installed on resilient channels. (Side view of Junctions 1 and 3).



Junction of a single staggered stud separating wall with side walls of triple staggered studs. One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm Plywood directly attached to the wood studs in one room. One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in the other room. (Plan view of Junction 2 or 4).

Example 46	Reference	Value
Direct STC Rating of Path Dd		
Laboratory Measured STC Rating	Report A1-007750.2 Appendix B	**53**
Junction 1 - Junction between the seperating wall and the floor assembly		
Flanking Path Ff_1		
$Flanking\ STC_{\ lab,F1,f1}$	Reports A1-007750.2 and A1-012057.1	63
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,F1,f1}$	RR-331 Eq. 1.5	67
Flanking Path Fd_1		
$Flanking\ STC_{\ lab,F1,d}$	Reports A1-007750.2 and A1-012057.1	72
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,F1,d}$	RR-331 Eq. 1.5	76
Flanking Path Df_1		
$Flanking\ STC_{\ lab,D,f1}$	Reports A1-007750.2 and A1-012057.1	72
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,D,f1}$	RR-331 Eq. 1.5	76
Flanking STC for Junction 1		**66**
Junction 2 - Junction between the separating wall and the flanking wall assemblies		
Flanking Path Ff_2		
$Flanking\ STC_{\ lab,F2,f2}$	Report A1-007750.2 Appendix B, C, and D	69
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{\ situ,F2,f2}$	RR-331 Eq. 1.5	76
Flanking Path Fd_2		
$Flanking\ STC_{\ lab,F2,d}$	Report A1-007750.2 Appendix B, C, and D	72
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{\ situ,F2,d}$	RR-331 Eq. 1.5	79
Flanking Path Df_2		
$Flanking\ STC_{\ lab,D,f2}$	Report A1-007750.2 Appendix B, C, and D	72
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{\ situ,D,f2}$	RR-331 Eq. 1.5	79
Flanking STC for Junction 2		**73**
Junction 3 - Junction between the seperating wall and the ceiling assembly		
Flanking Path Ff_3		
$Flanking\ STC_{\ lab,F3,f3}$	Reports A1-007750.2 and A1-012057.1	70
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,F3,f3}$	RR-331 Eq. 1.5	74
Flanking Path Fd_3		
$Flanking\ STC_{\ lab,F3,d}$	Reports A1-007750.2 and A1-012057.1	70
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,F3,d}$	RR-331 Eq. 1.5	74
Flanking Path Df_3		
$Flanking\ STC_{\ lab,D,f3}$	Reports A1-007750.2 and A1-012057.1	70
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,D,f3}$	RR-331 Eq. 1.5	74
Flanking STC for Junction 3		**69**
Junction 4 - Junction between the separating wall and the flanking wall assemblies		
Flanking STC for Junction 4 - Same as Junction 2		**73**
ASTC due to Direct plus Flanking Transmission	RR-331 Section 1.4	**53**

Example 47: Rooms side-by-side - Non-loadbearing Separating Wall

- **Simplified Method.**
- **Common single staggered wood stud wall.**
- **All other walls are triple staggered wood stud walls.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to the wood studs in one room.**
- **One layer of 15.9 mm (5/8") CertainTeed Type X gypsum board directly attached to the wood studs in the other room.**
- **Fire rated floor BXUV.M535[1] with a bare 15 mm OSB subfloor.[2]**

Separating wall assembly (non-loadbearing) with:

- Staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm (2x6).
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to one side of the wood studs (D) and one layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the other side of the wood studs (d).
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 1: Bottom Junction (separating wall / floor) with:

- Joists oriented parallel to the separating wall assembly.
- Wood I-joists 241 mm (9.5") deep spaced 406 mm (16") on center. Doubled rim boards (32 mm (1-1/4") thick and 241 mm deep) installed at each end of the I-joists.
- Subfloor of 15 mm (19/32") OSB directly attached to the I-joists.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the floor cavity.

Junction 2 or 4: Each Side (separating wall /abutting side wall) with:

- Tipple staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to the wood studs in one room (F2 and F4).
- One layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the wood studs in the other room (f2 and f4).
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavities.

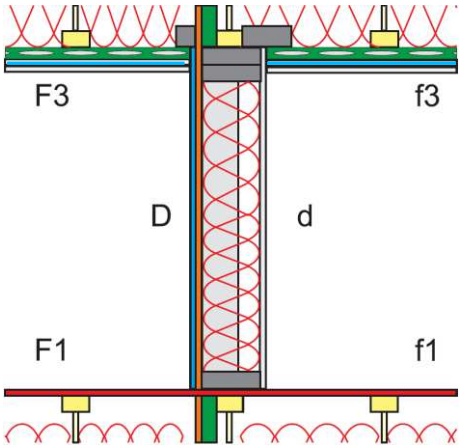
Junction 3: Top Junction (separating wall / ceiling) with:

- Joists oriented parallel to the separating wall assembly.
- Wood I-joists 241 mm (9.5") deep spaced 406 mm (16") on center. Doubled rim boards (32 mm (1-1/4") thick and 241 mm deep) installed at each end of the I-joists.
- Resilient channels installed perpendicular to wood I-joists and spaced 305 mm (12") on center.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the ceiling cavity.
- Base layer of layer of 15.9 mm SilentFX® QuickCut gypsum board and a face layer of 12.7 mm (1/2") CertainTeed Type C gypsum board installed on the resilient channels on the ceiling.

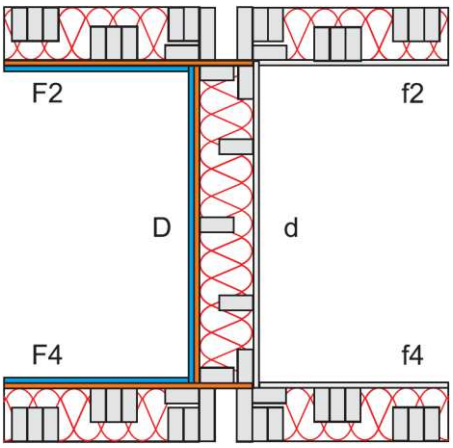
Room Parameters

- See Figure 2 of this report or Figure 1.3 of the National Research Council Report RR-331.
- The separating wall is 2.5 m high by 5 m wide.
- The flanking walls 2.5 m high by 4 m wide.
- The floor / ceilings are 4 m by 5 m.

Illustration for this case



Junction of a single staggered stud separating wall with one layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9mm plywood directly attached to the wood studs on one side (D). One layer of 15.9 mm CertainTeed Type X gypsum board directly fixed to the wood studs on the other side (d). A floor of wood I-joists with one layer of 15 mm OSB in both rooms. The wall also connects with a ceiling of a base layer of layer of 15.9 mm SilentFX® QuickCut gypsum board and a face layer of 12.7 mm (1/2") CertainTeed Type C gypsum board installed on resilient channels. (Side view of Junctions 1 and 3).



Junction of a single staggered stud separating wall with side walls of triple staggered studs. One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm Plywood directly attached to the wood studs in one room. One layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the wood studs in the other room. (Plan view of Junction 2 or 4).

Example 47	Reference	Value
Direct STC Rating of Path Dd		
Laboratory Measured STC Rating	Report A1-007750.2 Appendix B	**50**
Junction 1 - Junction between the seperating wall and the floor assembly		
Flanking Path Ff_1		
$Flanking\ STC_{\ lab,F1,f1}$	Reports A1-007750.2 and A1-012057.1	63
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,F1,f1}$	RR-331 Eq. 1.5	67
Flanking Path Fd_1		
$Flanking\ STC_{\ lab,F1,d}$	Reports A1-007750.2 and A1-012057.1	68
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,F1,d}$	RR-331 Eq. 1.5	72
Flanking Path Df_1		
$Flanking\ STC_{\ lab,D,f1}$	Reports A1-007750.2 and A1-012057.1	70
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,D,f1}$	RR-331 Eq. 1.5	74
Flanking STC for Junction 1		**65**
Junction 2 - Junction between the separating wall and the flanking wall assemblies		
Flanking Path Ff_2		
$Flanking\ STC_{\ lab,F2,f2}$	Report A1-007750.2 Appendix B, C, and D	66
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{\ situ,F2,f2}$	RR-331 Eq. 1.5	73
Flanking Path Fd_2		
$Flanking\ STC_{\ lab,F2,d}$	Report A1-007750.2 Appendix B, C, and D	66
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{\ situ,F2,d}$	RR-331 Eq. 1.5	73
Flanking Path Df_2		
$Flanking\ STC_{\ lab,D,f2}$	Report A1-007750.2 Appendix B, C, and D	68
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{\ situ,D,f2}$	RR-331 Eq. 1.5	75
Flanking STC for Junction 2		**69**
Junction 3 - Junction between the seperating wall and the ceiling assembly		
Flanking Path Ff_3		
$Flanking\ STC_{\ lab,F3,f3}$	Reports A1-007750.2 and A1-012057.1	70
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,F3,f3}$	RR-331 Eq. 1.5	74
Flanking Path Fd_3		
$Flanking\ STC_{\ lab,F3,d}$	Reports A1-007750.2 and A1-012057.1	66
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,F3,d}$	RR-331 Eq. 1.5	70
Flanking Path Df_3		
$Flanking\ STC_{\ lab,D,f3}$	Reports A1-007750.2 and A1-012057.1	68
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,D,f3}$	RR-331 Eq. 1.5	72
Flanking STC for Junction 3		**67**
Junction 4 - Junction between the separating wall and the flanking wall assemblies		
Flanking STC for Junction 4 - Same as Junction 2		**69**
ASTC due to Direct plus Flanking Transmission	RR-331 Section 1.4	**50**

Example 13: Rooms side-by-side - Non-loadbearing Separating Wall

- **Simplified Method.**
- **Common single staggered wood stud wall.**
- **All other walls are triple staggered wood stud walls.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to the wood studs on one side of the separating wall.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board directly attached to the wood studs on the other side of the separating wall and the studs of the other walls.**
- **One layer of 15 mm OSB on the floors.**

Separating wall assembly (non-loadbearing) with:

- Staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm (2x6).
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to one side of the wood studs (D) and one layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the other side of the wood studs (d).
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 1: Bottom Junction (separating wall / floor) with:

- Joists oriented parallel to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Subfloor of one layer of 15 mm OSB directly attached to I-joists.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the floor cavity.

Junction 2 or 4: Each Side (separating wall /abutting side wall) with:

- Triple staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to each side of the wood studs.
- One layer of 89 mm thick CertainTeed R12 Sustainable Insulation® in the wall cavity.

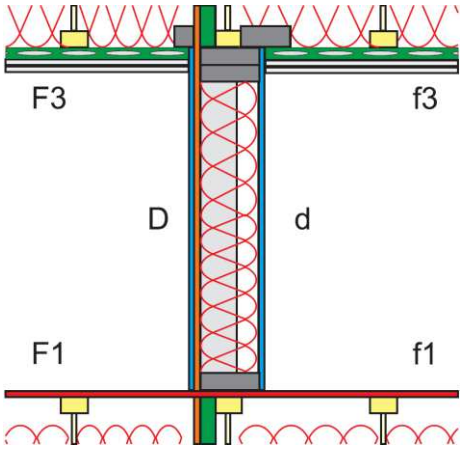
Junction 3: Top Junction (separating wall / ceiling) with:

- Joists oriented parallel to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Resilient channels installed perpendicular to wood I-joists and spaced 400 mm on center.
- Two layers of 12.7 mm CertainTeed Type X gypsum board installed on the resilient channels on the ceiling.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the ceiling cavity.

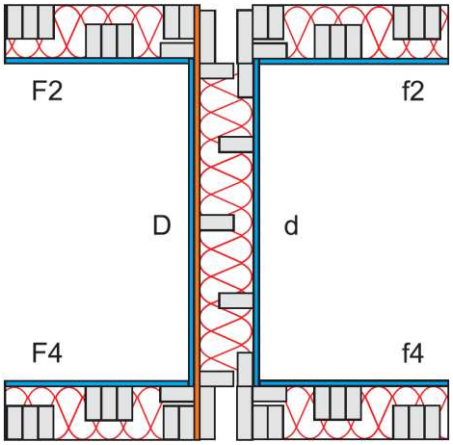
Room Parameters

- See Figure 2 of this report or Figure 1.3 of the National Research Council Report RR-331.
- The separating wall is 2.5 m high by 5 m wide.
- The flanking walls 2.5 m high by 4 m wide.
- The floor / ceilings are 4 m by 5 m.

Illustration for this case



Junction of a single staggered stud separating wall with one layer of 15.9 mm CertainTeed SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to the studs on one side (D). One layer of 15.9 mm CertainTeed SilentFX® QuickCut gypsum board directly attached to the studs on the other side A floor of wood I-joists with one layer of 15 mm OSB in both rooms. The wall also connects with a ceiling of two layers of 12.7 mm CertainTeed Type X gypsum board installed on resilient channels. (Side view of Junctions 1 and 3).



Junction of a single staggered stud separating wall with side walls of triple staggered studs. One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm Plywood directly attached to the wood studs of one side of the common wall (D). One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to all other wood studs. (Plan view of Junction 2 or 4).

Example 13	Reference	Value
Direct STC Rating of Path Dd		
STC_{Dd}	Report A1-007750.2 Appendix B	**53**
Junction 1 - Seperating wall and the floor assembly		
Flanking Path Ff_1		
$Flanking\ STC_{lab,F1,f1}$	Report A1-007750.2 Appendix B,C and D	66
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,f1}$	RR-331 Eq. 1.5	70
Flanking Path Fd_1		
$Flanking\ STC_{lab,F1,d}$	Report A1-007750.2 Appendix B,C and D	73
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,d}$	RR-331 Eq. 1.5	77
Flanking Path Df_1		
$Flanking\ STC_{lab,D,f1}$	Report A1-007750.2 Appendix B,C and D	74
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f1}$	RR-331 Eq. 1.5	78
Flanking STC for Junction 1		**69**
Junction 2 - Separating wall and the flanking wall assemblies		
Flanking Path Ff_2		
$Flanking\ STC_{lab,F2,f2}$	Report A1-007750.2 Appendix B,C and D	68
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,f2}$	RR-331 Eq. 1.5	75
Flanking Path Fd_2		
$Flanking\ STC_{lab,F2,d}$	Report A1-007750.2 Appendix B,C and D	70
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,d}$	RR-331 Eq. 1.5	77
Flanking Path Df_2		
$Flanking\ STC_{lab,D,f2}$	Report A1-007750.2 Appendix B,C and D	72
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,D,f2}$	RR-331 Eq. 1.5	79
Flanking STC for Junction 2		**72**
Junction 3 -Seperating wall and the ceiling assembly		
Flanking Path Ff_3		
$Flanking\ STC_{lab,F3,f3}$	Report A1-007750.2 Appendix B,C and D	73
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,f3}$	RR-331 Eq. 1.5	77
Flanking Path Fd_3		
$Flanking\ STC_{lab,F3,d}$	Report A1-007750.2 Appendix B,C and D	71
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,d}$	RR-331 Eq. 1.5	75
Flanking Path Df_3		
$Flanking\ STC_{lab,D,f3}$	Report A1-007750.2 Appendix B,C and D	72
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f3}$	RR-331 Eq. 1.5	76
Flanking STC for Junction 3		**71**
Junction 4 - Separating wall and the flanking wall assemblies		
Flanking STC for Junction 4 - Same as Junction 2		**72**
ASTC due to Direct plus Flanking Transmission	RR-331 Equation 1.4	**53**

Example 14: Rooms side-by-side - Non-loadbearing Separating Wall

- **Simplified Method.**
- **Common single staggered wood stud wall.**
- **All other walls are triple staggered wood stud walls.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to the wood studs of walls F4 and f4.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board directly attached to the wood studs on the studs of the other walls.**
- **One layer of 15 mm OSB on the floors.**

Separating wall assembly (non-loadbearing) with:

- Staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm (2x6).
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to each side of the wood studs.
- One layer of 89 mm thick CertainTeed R12 Sustainable Insulation® in the wall cavity.

Junction 1: Bottom Junction (separating wall / floor) with:

- Joists oriented parallel to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Subfloor of one layer of 15 mm OSB directly attached to I-joists.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the floor cavity.

Junction 2: (separating wall /abutting side wall) with:

- Tipple staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs.
- One layer of 152 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 3: Top Junction (separating wall / ceiling) with:

- Joists oriented parallel to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Resilient channels installed perpendicular to wood I-joists and spaced 400 mm on center.
- Two layers of 12.7 mm CertainTeed Type X gypsum board installed on the resilient channels on the ceiling.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the ceiling cavity.

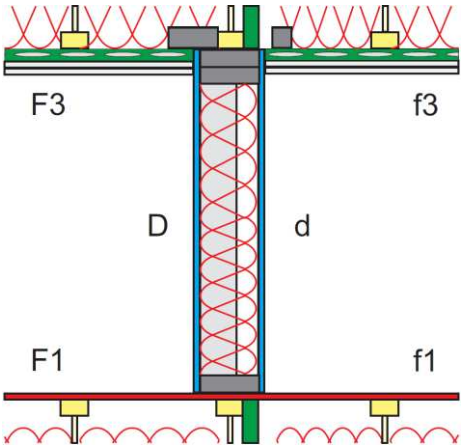
Junction 4: (separating wall /abutting side wall) with:

- Tipple staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to the wood studs.
- One layer of 152 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

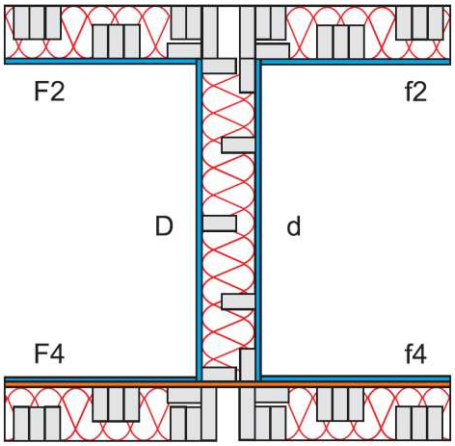
Room Parameters

- See Figure 2 of this report or Figure 1.3 of the National Research Council Report RR-331.
- The separating wall is 2.5 m high by 5 m wide.
- The flanking walls 2.5 m high by 4 m wide.
- The floor / ceilings are 4 m by 5 m.

Illustration for this case



Junction of a single staggered stud separating wall with one layer of 15.9 mm CertainTeed SilentFX® QuickCut gypsum board directly attached to the studs on both sides. A floor of wood I-joists with one layer of 15 mm OSB in both rooms. The wall also connects with a ceiling of two layers of 12.7 mm CertainTeed Type X gypsum board installed on resilient channels.
(Side view of Junctions 1 and 3).



Junction of a single staggered stud separating wall with side walls of triple staggered studs. One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm Plywood directly attached to the wood studs of one side of walls F4 and f4. One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to all other wood studs. (Plan view of Junction 2 or 4).

Example 14	Reference	Value
Direct STC Rating of Path Dd		
STC_{Dd}	Report A1-007750.2 Appendix B	**54**
Junction 1 - Seperating wall and the floor assembly		
Flanking Path Ff_1		
$Flanking\ STC_{lab,F1,f1}$	Report A1-007750.2 Appendix B,C and D	66
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,f1}$	RR-331 Eq. 1.5	70
Flanking Path Fd_1		
$Flanking\ STC_{lab,F1,d}$	Report A1-007750.2 Appendix B,C and D	73
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,d}$	RR-331 Eq. 1.5	77
Flanking Path Df_1		
$Flanking\ STC_{lab,D,f1}$	Report A1-007750.2 Appendix B,C and D	73
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f1}$	RR-331 Eq. 1.5	77
Flanking STC for Junction 1		**69**
Junction 2 - Separating wall and the flanking wall assemblies		
Flanking Path Ff_2		
$Flanking\ STC_{lab,F2,f2}$	Report A1-007750.2 Appendix B,C and D	66
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,f2}$	RR-331 Eq. 1.5	73
Flanking Path Fd_2		
$Flanking\ STC_{lab,F2,d}$	Report A1-007750.2 Appendix B,C and D	70
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,d}$	RR-331 Eq. 1.5	77
Flanking Path Df_2		
$Flanking\ STC_{lab,D,f2}$	Report A1-007750.2 Appendix B,C and D	70
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,D,f2}$	RR-331 Eq. 1.5	77
Flanking STC for Junction 2		**70**
Junction 3 -Seperating wall and the ceiling assembly		
Flanking Path Ff_3		
$Flanking\ STC_{lab,F3,f3}$	Report A1-007750.2 Appendix B,C and D	73
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,f3}$	RR-331 Eq. 1.5	77
Flanking Path Fd_3		
$Flanking\ STC_{lab,F3,d}$	Report A1-007750.2 Appendix B,C and D	71
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,d}$	RR-331 Eq. 1.5	75
Flanking Path Df_3		
$Flanking\ STC_{lab,D,f3}$	Report A1-007750.2 Appendix B,C and D	71
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f3}$	RR-331 Eq. 1.5	75
Flanking STC for Junction 3		**71**
Junction 4 - Separating wall and the flanking wall assemblies		
Flanking STC for Junction 4 - Same as Junction 2		**70**
ASTC due to Direct plus Flanking Transmission	RR-331 Equation 1.4	**54**

This page is intentionally left blank

4.3 Side-by-Side Rooms - Load Bearing Triple Staggered Stud Separating Wall Assembly

Example	ASTC	Wallboard Room 1	Wallboard Room 2	Floor System	Floor Topping Room 1	Floor Topping Room 2
15	51	One layer of 15.9 mm SilentFX® QuickCut gypsum board	One layer of 15.9 mm SilentFX® QuickCut gypsum board	1	None	None
16	48	"	One layer of 15.9 mm CertainTeed Type X gypsum board	"	"	"
17	51	"	One layer of 15.9 mm SilentFX® QuickCut gypsum board	"	Two layers of 12 mm cementitious flooring underlayment	"
18	48	"	One layer of 15.9 mm CertainTeed Type X gypsum board	"	"	"
19	51	"	One layer of 15.9 mm SilentFX® QuickCut gypsum board	"	38 mm thick gypsum concrete on a 9 mm closed cell foam	"
20	48	"	One layer of 15.9 mm CertainTeed Type X gypsum board	"	"	"
48	50	"	One layer of 15.9 mm SilentFX® QuickCut gypsum board	2	None	None
49	48	"	One layer of 15.9 mm CertainTeed Type X gypsum board	"	"	"

Example 15: Rooms side-by-side - Loadbearing Separating Wall

- **Simplified Method.**
- **Common triple staggered wood stud wall.**
- **All other walls are single staggered wood stud walls.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board directly fixed to the wood studs of all walls.**
- **One layer of 15 mm OSB on the floors.**

Separating wall assembly (loadbearing) with:

- Triple staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to each side of the wood studs.
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 1: Bottom Junction (separating wall / floor) with:

- Joists oriented perpendicular to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Subfloor of one layer of 15 mm OSB directly attached to I-joists.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the floor cavity.

Junction 2 or 4: Each Side (separating wall /abutting side wall) with:

- Single staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to each side of the wood studs.
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

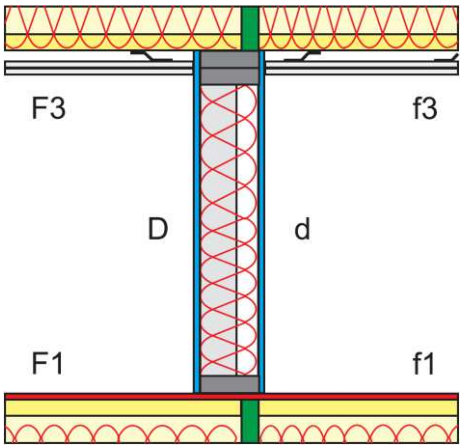
Junction 3: Top Junction (separating wall / ceiling) with:

- Joists oriented perpendicular to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Resilient channels installed perpendicular to wood I-joists and spaced 400 mm on center.
- Two layers of 12.7 mm CertainTeed Type X gypsum board installed on the resilient channels on the ceiling.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the ceiling cavity.

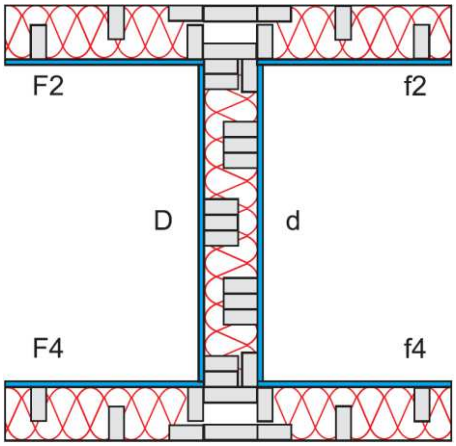
Room Parameters

- See Figure 2 of this report or Figure 1.3 of the National Research Council Report RR-331.
- The separating wall is 2.5 m high by 5 m wide.
- The flanking walls 2.5 m high by 4 m wide.
- The floor / ceilings are 4 m by 5 m.

Illustration for this case



Junction of a triple staggered stud separating wall with one layer of 15.9 mm CertainTeed SilentFX® QuickCut gypsum board directly attached to the studs on both sides. A floor of wood I-joists with one layer of 15 mm OSB in both rooms. The wall also connects with a ceiling of two layers of 12.7 mm CertainTeed Type X gypsum board installed on resilient channels. (Side view of Junctions 1 and 3).



Junction of a triple staggered stud separating wall with one layer of 15.9 mm CertainTeed SilentFX® QuickCut gypsum board directly attached to the wood studs with side walls of single staggered studs with one layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs. (Plan view of Junction 2 or 4).

Example 15	Reference	Value
Direct STC Rating of Path Dd		
STC_{Dd}	Report A1-007750.2 Appendix B	**51**
Junction 1 - Seperating wall and the floor assembly		
Flanking Path Ff_1		
$Flanking\ STC_{lab,F1,f1}$	Report A1-007750.2 Appendix B,C and D	66
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,f1}$	RR-331 Eq. 1.5	70
Flanking Path Fd_1		
$Flanking\ STC_{lab,F1,d}$	Report A1-007750.2 Appendix B,C and D	65
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,d}$	RR-331 Eq. 1.5	69
Flanking Path Df_1		
$Flanking\ STC_{lab,D,f1}$	Report A1-007750.2 Appendix B,C and D	65
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f1}$	RR-331 Eq. 1.5	69
Flanking STC for Junction 1		**65**
Junction 2 - Separating wall and the flanking wall assemblies		
Flanking Path Ff_2		
$Flanking\ STC_{lab,F2,f2}$	Report A1-007750.2 Appendix B,C and D	78
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,f2}$	RR-331 Eq. 1.5	85
Flanking Path Fd_2		
$Flanking\ STC_{lab,F2,d}$	Report A1-007750.2 Appendix B,C and D	73
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,d}$	RR-331 Eq. 1.5	80
Flanking Path Df_2		
$Flanking\ STC_{lab,D,f2}$	Report A1-007750.2 Appendix B,C and D	73
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,D,f2}$	RR-331 Eq. 1.5	80
Flanking STC for Junction 2		**76**
Junction 3 -Seperating wall and the ceiling assembly		
Flanking Path Ff_3		
$Flanking\ STC_{lab,F3,f3}$	Report A1-007750.2 Appendix B,C and D	66
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,f3}$	RR-331 Eq. 1.5	70
Flanking Path Fd_3		
$Flanking\ STC_{lab,F3,d}$	Report A1-007750.2 Appendix B,C and D	64
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,d}$	RR-331 Eq. 1.5	68
Flanking Path Df_3		
$Flanking\ STC_{lab,D,f3}$	Report A1-007750.2 Appendix B,C and D	64
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f3}$	RR-331 Eq. 1.5	68
Flanking STC for Junction 3		**64**
Junction 4 - Separating wall and the flanking wall assemblies		
Flanking STC for Junction 4 - Same as Junction 2		**76**
ASTC due to Direct plus Flanking Transmission	RR-331 Equation 1.4	**51**

Example 16: Rooms side-by-side - Loadbearing Separating Wall

- **Simplified Method.**
- **Common triple staggered wood stud wall.**
- **All other walls are single staggered wood stud walls.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board fixed to the wood studs in one room.**
- **One layer of 15.9 mm (5/8") CertainTeed Type X fixed to the wood studs in the other room.**
- **One layer of 15 mm OSB on the floors**

Separating wall assembly (loadbearing) with:

- Triple staggered 38 mm x 89 mm (2x4) wood studs spaced 406 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to one side of the wood studs and one layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the other side of the wood studs.
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 1: Bottom Junction (separating wall / floor) with:

- Joists oriented perpendicular to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Subfloor of one layer of 15 mm OSB directly attached to I-joists.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the floor cavity.

Junction 2 or 4: Each Side (separating wall /abutting side wall) with:

- Single staggered 38 mm x 89 mm wood studs spaced 406 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in one room (F2 and F4).
- One layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the wood studs in the other room (f2 and f4).
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavities.

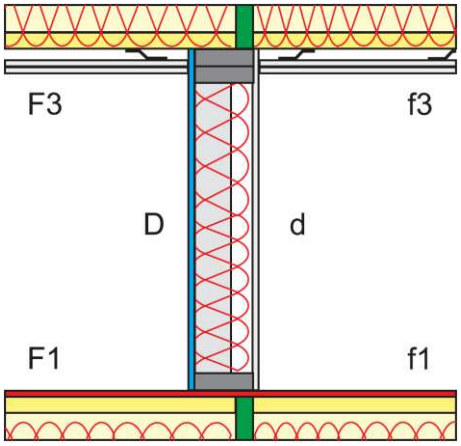
Junction 3: Top Junction (separating wall / ceiling) with:

- Joists oriented perpendicular to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Resilient channels installed perpendicular to wood I-joists and spaced 400 mm on center.
- Two layers of 12.7 mm CertainTeed Type X gypsum board installed on the resilient channels on the ceiling.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the ceiling cavity.

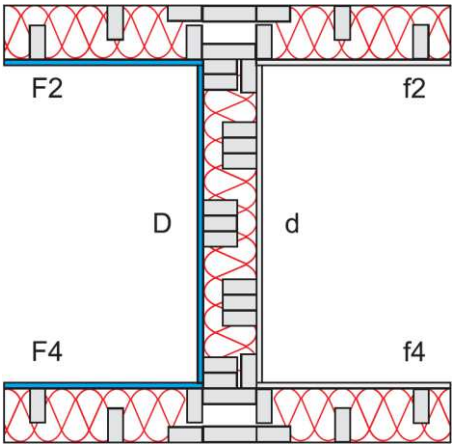
Room Parameters

- See Figure 2 of this report or Figure 1.3 of the National Research Council Report RR-331.
- The separating wall is 2.5 m high by 5 m wide.
- The flanking walls 2.5 m high by 4 m wide.
- The floor / ceilings are 4 m by 5 m.

Illustration for this case



Junction of a triple staggered stud separating wall with one layer of 15.9 mm CertainTeed SilentFX® QuickCut gypsum board directly attached to the studs on one side. One layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the studs on the other side. A floor of wood I-joists with one layer of 15 mm OSB in both rooms. The wall also connects with a ceiling of two layers of 12.7 mm CertainTeed Type X gypsum board installed on resilient channels. (Side view of Junctions 1 and 3).



Junction of a triple staggered stud separating wall with side walls of single staggered studs. One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in one room. One layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the wood studs in the other room. (Plan view of Junction 2 or 4).

Example 16	Reference	Value
Direct STC Rating of Path Dd		
STC_{Dd}	Report A1-007750.2 Appendix B	**48**
Junction 1 - Seperating wall and the floor assembly		
Flanking Path Ff_1		
$Flanking\ STC_{lab,F1,f1}$	Report A1-007750.2 Appendix B,C and D	66
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,f1}$	RR-331 Eq. 1.5	70
Flanking Path Fd_1		
$Flanking\ STC_{lab,F1,d}$	Report A1-007750.2 Appendix B,C and D	63
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,d}$	RR-331 Eq. 1.5	67
Flanking Path Df_1		
$Flanking\ STC_{lab,D,f1}$	Report A1-007750.2 Appendix B,C and D	64
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f1}$	RR-331 Eq. 1.5	68
Flanking STC for Junction 1		**63**
Junction 2 - Separating wall and the flanking wall assemblies		
Flanking Path Ff_2		
$Flanking\ STC_{lab,F2,f2}$	Report A1-007750.2 Appendix B,C and D	72
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,f2}$	RR-331 Eq. 1.5	79
Flanking Path Fd_2		
$Flanking\ STC_{lab,F2,d}$	Report A1-007750.2 Appendix B,C and D	69
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,d}$	RR-331 Eq. 1.5	76
Flanking Path Df_2		
$Flanking\ STC_{lab,D,f2}$	Report A1-007750.2 Appendix B,C and D	68
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,D,f2}$	RR-331 Eq. 1.5	75
Flanking STC for Junction 2		**72**
Junction 3 -Seperating wall and the ceiling assembly		
Flanking Path Ff_3		
$Flanking\ STC_{lab,F3,f3}$	Report A1-007750.2 Appendix B,C and D	66
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,f3}$	RR-331 Eq. 1.5	70
Flanking Path Fd_3		
$Flanking\ STC_{lab,F3,d}$	Report A1-007750.2 Appendix B,C and D	62
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,d}$	RR-331 Eq. 1.5	66
Flanking Path Df_3		
$Flanking\ STC_{lab,D,f3}$	Report A1-007750.2 Appendix B,C and D	63
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f3}$	RR-331 Eq. 1.5	67
Flanking STC for Junction 3		**63**
Junction 4 - Separating wall and the flanking wall assemblies		
Flanking STC for Junction 4 - Same as Junction 2		**72**
ASTC due to Direct plus Flanking Transmission	RR-331 Equation 1.4	**48**

Example 17: Rooms side-by-side - Loadbearing Separating Wall

- **Simplified Method.**
- **Common triple staggered wood stud wall.**
- **All other walls are single staggered wood stud walls.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board directly fixed to the wood studs of all walls.**
- **Topping of cementitious flooring in one room.**

Separating wall assembly (loadbearing) with:

- Triple staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to each side of the wood studs.
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 1: Bottom Junction (separating wall / floor) with:

- Joists oriented perpendicular to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Subfloor of one layer of 15 mm OSB directly attached to I-joists.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the floor cavity.
- Topping of two layers of 12 mm cementitious flooring underlayment installed on top of 12 mm wood fiber board underlayment in one room (F1).

Junction 2 or 4: Each Side (separating wall /abutting side wall) with:

- Single staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to each side of the wood studs.
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

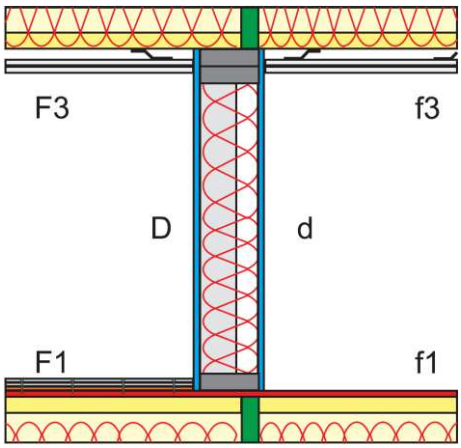
Junction 3: Top Junction (separating wall / ceiling) with:

- Joists oriented perpendicular to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Resilient channels installed perpendicular to wood I-joists and spaced 400 mm on center.
- Two layers of 12.7 mm CertainTeed Type X gypsum board installed on the resilient channels on the ceiling.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the ceiling cavity.

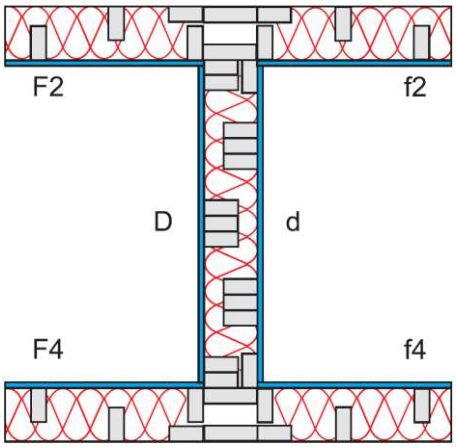
Room Parameters

- See Figure 2 of this report or Figure 1.3 of the National Research Council Report RR-331.
- The separating wall is 2.5 m high by 5 m wide.
- The flanking walls 2.5 m high by 4 m wide.
- The floor / ceilings are 4 m by 5 m.

Illustration for this case



Junction of a triple staggered stud separating wall with one layer of 15.9 mm CertainTeed SilentFX® QuickCut gypsum board directly attached to the studs on both sides. A floor of wood I-joists with one layer of 15 mm OSB in both rooms. Topping of two layers of 12 mm cementitious flooring underlayment installed on top of 12 mm wood fiber board underlayment in one room (F1). The wall also connects with a ceiling of two layers of 12.7 mm CertainTeed Type X gypsum board installed on resilient channels. (Side view of Junctions 1 and 3).



Junction of a triple staggered stud separating wall with one layer of 15.9 mm CertainTeed SilentFX® QuickCut gypsum board directly attached to the wood studs with side walls of single staggered studs with one layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs. (Plan view of Junction 2 or 4).

Example 17	Reference	Value
Direct STC Rating of Path Dd		
STC_{Dd}	Report A1-007750.2 Appendix B	**51**
Junction 1 - Seperating wall and the floor assembly		
Flanking Path Ff_1		
$Flanking\ STC_{lab,F1,f1}$	Report A1-007750.2 Appendix B,C and D	68
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,f1}$	RR-331 Eq. 1.5	72
Flanking Path Fd_1		
$Flanking\ STC_{lab,F1,d}$	Report A1-007750.2 Appendix B,C and D	67
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,d}$	RR-331 Eq. 1.5	71
Flanking Path Df_1		
$Flanking\ STC_{lab,D,f1}$	Report A1-007750.2 Appendix B,C and D	65
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f1}$	RR-331 Eq. 1.5	69
Flanking STC for Junction 1		**66**
Junction 2 - Separating wall and the flanking wall assemblies		
Flanking Path Ff_2		
$Flanking\ STC_{lab,F2,f2}$	Report A1-007750.2 Appendix B,C and D	78
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,f2}$	RR-331 Eq. 1.5	85
Flanking Path Fd_2		
$Flanking\ STC_{lab,F2,d}$	Report A1-007750.2 Appendix B,C and D	73
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,d}$	RR-331 Eq. 1.5	80
Flanking Path Df_2		
$Flanking\ STC_{lab,D,f2}$	Report A1-007750.2 Appendix B,C and D	73
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,D,f2}$	RR-331 Eq. 1.5	80
Flanking STC for Junction 2		**76**
Junction 3 -Seperating wall and the ceiling assembly		
Flanking Path Ff_3		
$Flanking\ STC_{lab,F3,f3}$	Report A1-007750.2 Appendix B,C and D	66
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,f3}$	RR-331 Eq. 1.5	70
Flanking Path Fd_3		
$Flanking\ STC_{lab,F3,d}$	Report A1-007750.2 Appendix B,C and D	64
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,d}$	RR-331 Eq. 1.5	68
Flanking Path Df_3		
$Flanking\ STC_{lab,D,f3}$	Report A1-007750.2 Appendix B,C and D	64
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f3}$	RR-331 Eq. 1.5	68
Flanking STC for Junction 3		**64**
Junction 4 - Separating wall and the flanking wall assemblies		
Flanking STC for Junction 4 - Same as Junction 2		**76**
ASTC due to Direct plus Flanking Transmission	RR-331 Equation 1.4	**51**

Example 18: Rooms side-by-side - Loadbearing Separating Wall

- **Simplified Method.**
- **Common triple staggered wood stud wall.**
- **All other walls are single staggered wood stud walls.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board fixed to the wood studs in one room.**
- **One layer of 15.9 mm (5/8") CertainTeed Type X fixed to the wood studs in the other room.**
- **Topping of cementitious flooring in one room.**

Separating wall assembly (loadbearing) with:

- Triple staggered 38 mm x 89 mm (2x4) wood studs spaced 406 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to one side of the wood studs and one layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the other side of the wood studs.
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 1: Bottom Junction (separating wall / floor) with:

- Joists oriented perpendicular to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Subfloor of one layer of 15 mm OSB directly attached to I-joists.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the floor cavity.
- Topping of two layers of 12 mm cementitious flooring underlayment installed on top of 12 mm wood fiber board underlayment in one room (F1).

Junction 2 or 4: Each Side (separating wall /abutting side wall) with:

- Single staggered 38 mm x 89 mm wood studs spaced 406 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in one room (F2 and F4).
- One layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the wood studs in the other room (f2 and f4).
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavities.

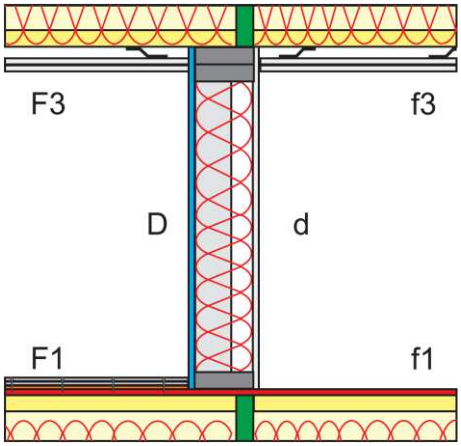
Junction 3: Top Junction (separating wall / ceiling) with:

- Joists oriented perpendicular to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Resilient channels installed perpendicular to wood I-joists and spaced 400 mm on center.
- Two layers of 12.7 mm CertainTeed Type X gypsum board installed on the resilient channels on the ceiling.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the ceiling cavity.

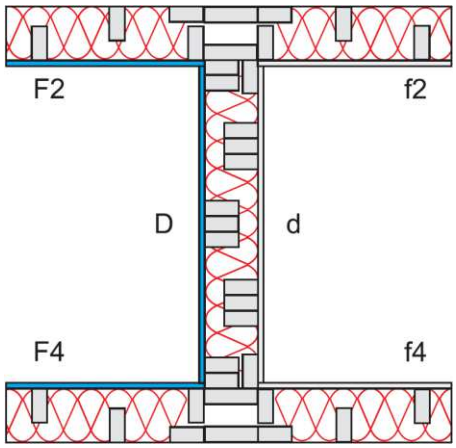
Room Parameters

- See Figure 2 of this report or Figure 1.3 of the National Research Council Report RR-331.
- The separating wall is 2.5 m high by 5 m wide.
- The flanking walls 2.5 m high by 4 m wide.
- The floor / ceilings are 4 m by 5 m.

Illustration for this case



Junction of a triple staggered stud separating wall with one layer of 15.9 mm CertainTeed SilentFX® QuickCut gypsum board directly attached to the studs on one side. One layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the studs on the other side. A floor of wood I-joists with one layer of 15 mm OSB in both rooms. Topping of two layers of 12 mm cementitious flooring underlayment installed on top of 12 mm wood fiber board underlayment in one room (F1). The wall also connects with a ceiling of two layers of 12.7 mm CertainTeed Type X gypsum board installed on resilient channels. (Side view of Junctions 1 and 3).



Junction of a triple staggered stud separating wall with side walls of single staggered studs. One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in one room. One layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the wood studs in the other room. (Plan view of Junction 2 or 4).

Example 18	Reference	Value
Direct STC Rating of Path Dd		
STC_{Dd}	Report A1-007750.2 Appendix B	**48**
Junction 1 - Seperating wall and the floor assembly		
Flanking Path Ff_1		
$Flanking\ STC_{lab,F1,f1}$	Report A1-007750.2 Appendix B,C and D	68
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,f1}$	RR-331 Eq. 1.5	72
Flanking Path Fd_1		
$Flanking\ STC_{lab,F1,d}$	Report A1-007750.2 Appendix B,C and D	65
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,d}$	RR-331 Eq. 1.5	69
Flanking Path Df_1		
$Flanking\ STC_{lab,D,f1}$	Report A1-007750.2 Appendix B,C and D	64
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f1}$	RR-331 Eq. 1.5	68
Flanking STC for Junction 1		**65**
Junction 2 - Separating wall and the flanking wall assemblies		
Flanking Path Ff_2		
$Flanking\ STC_{lab,F2,f2}$	Report A1-007750.2 Appendix B,C and D	72
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,f2}$	RR-331 Eq. 1.5	79
Flanking Path Fd_2		
$Flanking\ STC_{lab,F2,d}$	Report A1-007750.2 Appendix B,C and D	69
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,d}$	RR-331 Eq. 1.5	76
Flanking Path Df_2		
$Flanking\ STC_{lab,D,f2}$	Report A1-007750.2 Appendix B,C and D	68
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,D,f2}$	RR-331 Eq. 1.5	75
Flanking STC for Junction 2		**72**
Junction 3 -Seperating wall and the ceiling assembly		
Flanking Path Ff_3		
$Flanking\ STC_{lab,F3,f3}$	Report A1-007750.2 Appendix B,C and D	66
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,f3}$	RR-331 Eq. 1.5	70
Flanking Path Fd_3		
$Flanking\ STC_{lab,F3,d}$	Report A1-007750.2 Appendix B,C and D	62
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,d}$	RR-331 Eq. 1.5	66
Flanking Path Df_3		
$Flanking\ STC_{lab,D,f3}$	Report A1-007750.2 Appendix B,C and D	63
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f3}$	RR-331 Eq. 1.5	67
Flanking STC for Junction 3		**63**
Junction 4 - Separating wall and the flanking wall assemblies		
Flanking STC for Junction 4 - Same as Junction 2		**72**
ASTC due to Direct plus Flanking Transmission	RR-331 Equation 1.4	**48**

Example 19: Rooms side-by-side - Loadbearing Separating Wall

- **Simplified Method.**
- **Common triple staggered wood stud wall.**
- **All other walls are single staggered wood stud walls.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board directly fixed to the wood studs of all walls.**
- **Topping of 38 mm thick gypsum concrete in one room.**

Separating wall assembly (loadbearing) with:

- Triple staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to each side of the wood studs.
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 1: Bottom Junction (separating wall / floor) with:

- Joists oriented perpendicular to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Subfloor of one layer of 15 mm OSB directly attached to I-joists.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the floor cavity.
- Topping of 38 mm thick gypsum concrete on a 9 mm closed cell foam interlayer in one room (F1).

Junction 2 or 4: Each Side (separating wall /abutting side wall) with:

- Single staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to each side of the wood studs.
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

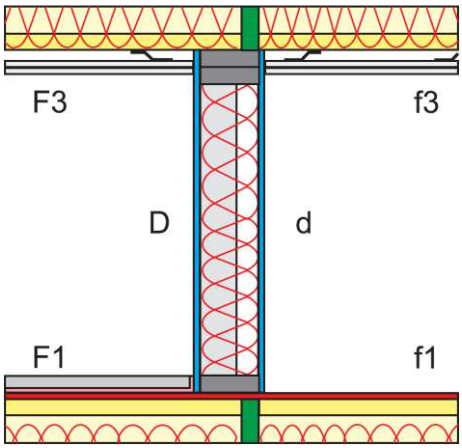
Junction 3: Top Junction (separating wall / ceiling) with:

- Joists oriented perpendicular to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Resilient channels installed perpendicular to wood I-joists and spaced 400 mm on center.
- Two layers of 12.7 mm CertainTeed Type X gypsum board installed on the resilient channels on the ceiling.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the ceiling cavity.

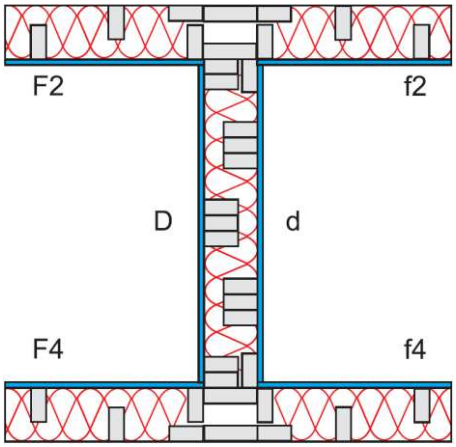
Room Parameters

- See Figure 2 of this report or Figure 1.3 of the National Research Council Report RR-331.
- The separating wall is 2.5 m high by 5 m wide.
- The flanking walls 2.5 m high by 4 m wide.
- The floor / ceilings are 4 m by 5 m.

Illustration for this case



Junction of a triple staggered stud separating wall with one layer of 15.9 mm CertainTeed SilentFX® QuickCut gypsum board directly attached to the studs on both sides. A floor of wood I-joists with one layer of 15 mm OSB in both rooms. Topping of 38 mm thick gypsum concrete on a 9 mm closed cell foam interlayer in one room (F1). The wall also connects with a ceiling of two layers of 12.7 mm CertainTeed Type X gypsum board installed on resilient channels. (Side view of Junctions 1 and 3).



Junction of a triple staggered stud separating wall with one layer of 15.9 mm CertainTeed SilentFX® QuickCut gypsum board directly attached to the wood studs with side walls of single staggered studs with one layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs. (Plan view of Junction 2 or 4).

Example 19	Reference	Value
Direct STC Rating of Path Dd		
STC_{Dd}	Report A1-007750.2 Appendix B	**51**
Junction 1 - Seperating wall and the floor assembly		
Flanking Path Ff_1		
$Flanking\ STC_{lab,F1,f1}$	Report A1-007750.2 Appendix B,C and D	73
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,f1}$	RR-331 Eq. 1.5	77
Flanking Path Fd_1		
$Flanking\ STC_{lab,F1,d}$	Report A1-007750.2 Appendix B,C and D	73
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,d}$	RR-331 Eq. 1.5	77
Flanking Path Df_1		
$Flanking\ STC_{lab,D,f1}$	Report A1-007750.2 Appendix B,C and D	65
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f1}$	RR-331 Eq. 1.5	69
Flanking STC for Junction 1		**68**
Junction 2 - Separating wall and the flanking wall assemblies		
Flanking Path Ff_2		
$Flanking\ STC_{lab,F2,f2}$	Report A1-007750.2 Appendix B,C and D	78
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,f2}$	RR-331 Eq. 1.5	85
Flanking Path Fd_2		
$Flanking\ STC_{lab,F2,d}$	Report A1-007750.2 Appendix B,C and D	73
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,d}$	RR-331 Eq. 1.5	80
Flanking Path Df_2		
$Flanking\ STC_{lab,D,f2}$	Report A1-007750.2 Appendix B,C and D	73
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,D,f2}$	RR-331 Eq. 1.5	80
Flanking STC for Junction 2		**76**
Junction 3 -Seperating wall and the ceiling assembly		
Flanking Path Ff_3		
$Flanking\ STC_{lab,F3,f3}$	Report A1-007750.2 Appendix B,C and D	66
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,f3}$	RR-331 Eq. 1.5	70
Flanking Path Fd_3		
$Flanking\ STC_{lab,F3,d}$	Report A1-007750.2 Appendix B,C and D	64
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,d}$	RR-331 Eq. 1.5	68
Flanking Path Df_3		
$Flanking\ STC_{lab,D,f3}$	Report A1-007750.2 Appendix B,C and D	64
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f3}$	RR-331 Eq. 1.5	68
Flanking STC for Junction 3		**64**
Junction 4 - Separating wall and the flanking wall assemblies		
Flanking STC for Junction 4 - Same as Junction 2		**76**
ASTC due to Direct plus Flanking Transmission	RR-331 Equation 1.4	**51**

Example 20: Rooms side-by-side - Loadbearing Separating Wall

- **Simplified Method.**
- **Common triple staggered wood stud wall.**
- **All other walls are single staggered wood stud walls.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board fixed to the wood studs in one room.**
- **One layer of 15.9 mm (5/8") CertainTeed Type X fixed to the wood studs in the other room.**
- **Topping of 38 mm thick gypsum concrete in one room.**

Separating wall assembly (loadbearing) with:

- Triple staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to each side of the wood studs.
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 1: Bottom Junction (separating wall / floor) with:

- Joists oriented perpendicular to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Subfloor of one layer of 15 mm OSB directly attached to I-joists.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the floor cavity.
- Topping of 38 mm thick gypsum concrete on a 9 mm closed cell foam interlayer in one room (F1).

Junction 2 or 4: Each Side (separating wall /abutting side wall) with:

- Single staggered 38 mm x 89 mm wood studs spaced 406 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in one room (F2 and F4).
- One layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the wood studs in the other room (f2 and f4).
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavities.

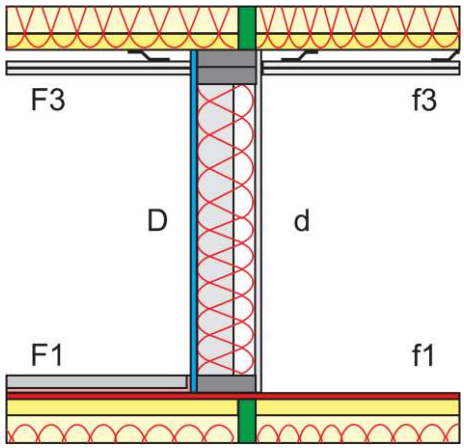
Junction 3: Top Junction (separating wall / ceiling) with:

- Joists oriented perpendicular to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Resilient channels installed perpendicular to wood I-joists and spaced 400 mm on center.
- Two layers of 12.7 mm CertainTeed Type X gypsum board installed on the resilient channels on the ceiling.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the ceiling cavity.

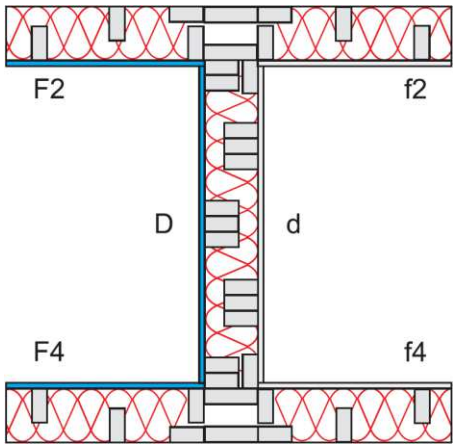
Room Parameters

- See Figure 2 of this report or Figure 1.3 of the National Research Council Report RR-331.
- The separating wall is 2.5 m high by 5 m wide.
- The flanking walls 2.5 m high by 4 m wide.
- The floor / ceilings are 4 m by 5 m.

Illustration for this case



Junction of a triple staggered stud separating wall with one layer of 15.9 mm CertainTeed SilentFX® QuickCut gypsum board directly attached on one side. CertainTeed Type X gypsum board directly attached to the other side. A floor of wood I-joists with one layer of 15 mm OSB in both rooms. Topping of 38 mm thick gypsum concrete on a 9 mm closed cell foam interlayer in one room (F1). The wall also connects with a ceiling of two layers of 12.7 mm CertainTeed Type X gypsum board installed on resilient channels. (Side view of Junctions 1 and 3).



Junction of a triple staggered stud separating wall with side walls of single staggered studs. One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in one room. One layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the wood studs in the other room. (Plan view of Junction 2 or 4).

Example 20	Reference	Value
Direct STC Rating of Path Dd		
STC_{Dd}	Report A1-007750.2 Appendix B	**48**
Junction 1 - Seperating wall and the floor assembly		
Flanking Path Ff_1		
$Flanking\ STC_{lab,F1,f1}$	Report A1-007750.2 Appendix B,C and D	73
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,f1}$	RR-331 Eq. 1.5	77
Flanking Path Fd_1		
$Flanking\ STC_{lab,F1,d}$	Report A1-007750.2 Appendix B,C and D	71
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,d}$	RR-331 Eq. 1.5	75
Flanking Path Df_1		
$Flanking\ STC_{lab,D,f1}$	Report A1-007750.2 Appendix B,C and D	64
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f1}$	RR-331 Eq. 1.5	68
Flanking STC for Junction 1		**67**
Junction 2 - Separating wall and the flanking wall assemblies		
Flanking Path Ff_2		
$Flanking\ STC_{lab,F2,f2}$	Report A1-007750.2 Appendix B,C and D	72
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,f2}$	RR-331 Eq. 1.5	79
Flanking Path Fd_2		
$Flanking\ STC_{lab,F2,d}$	Report A1-007750.2 Appendix B,C and D	69
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,d}$	RR-331 Eq. 1.5	76
Flanking Path Df_2		
$Flanking\ STC_{lab,D,f2}$	Report A1-007750.2 Appendix B,C and D	68
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,D,f2}$	RR-331 Eq. 1.5	75
Flanking STC for Junction 2		**72**
Junction 3 -Seperating wall and the ceiling assembly		
Flanking Path Ff_3		
$Flanking\ STC_{lab,F3,f3}$	Report A1-007750.2 Appendix B,C and D	66
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,f3}$	RR-331 Eq. 1.5	70
Flanking Path Fd_3		
$Flanking\ STC_{lab,F3,d}$	Report A1-007750.2 Appendix B,C and D	62
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,d}$	RR-331 Eq. 1.5	66
Flanking Path Df_3		
$Flanking\ STC_{lab,D,f3}$	Report A1-007750.2 Appendix B,C and D	63
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f3}$	RR-331 Eq. 1.5	67
Flanking STC for Junction 3		**63**
Junction 4 - Separating wall and the flanking wall assemblies		
Flanking STC for Junction 4 - Same as Junction 2		**72**
ASTC due to Direct plus Flanking Transmission	RR-331 Equation 1.4	**48**

Example 48: Rooms side-by-side - Loadbearing Separating Wall

- **Simplified Method.**
- **Common triple staggered wood stud wall.**
- **All other walls are single staggered wood stud walls.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board directly fixed to the wood studs of all walls.**
- **Fire rated floor BXUV.M535[1] with a bare 15 mm OSB subfloor.[2]**

Separating wall assembly (loadbearing) with:

- Triple staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to each side of the wood studs.
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 1: Bottom Junction (separating wall / floor) with:

- Joists oriented perpendicular to the separating wall assembly.
- Wood I-joists 241 mm (9.5") deep spaced 406 mm (16") on center. Doubled rim boards (32 mm (1-1/4") thick and 241 mm deep) installed at each end of the I-joists.
- Subfloor of 15 mm (19/32") OSB directly attached to the I-joists.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the floor cavity.

Junction 2 or 4: Each Side (separating wall /abutting side wall) with:

- Single staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to each side of the wood studs.
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

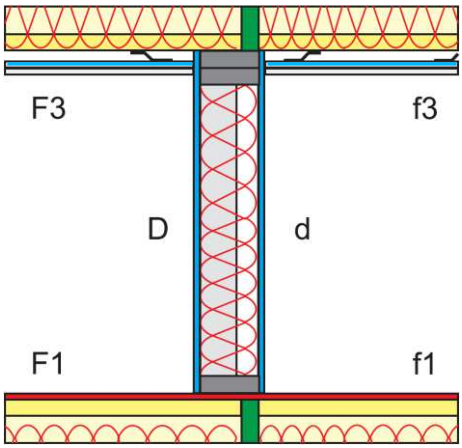
Junction 3: Top Junction (separating wall / ceiling) with:

- Joists oriented perpendicular to the separating wall assembly.
- Wood I-joists 241 mm (9.5") deep spaced 406 mm (16") on center. Doubled rim boards (32 mm (1-1/4") thick and 241 mm deep) installed at each end of the I-joists.
- Resilient channels installed perpendicular to wood I-joists and spaced 305 mm (12") on center.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the ceiling cavity.
- Base layer of layer of 15.9 mm SilentFX® QuickCut gypsum board and a face layer of 12.7 mm (1/2") CertainTeed Type C gypsum board installed on the resilient channels on the ceiling.

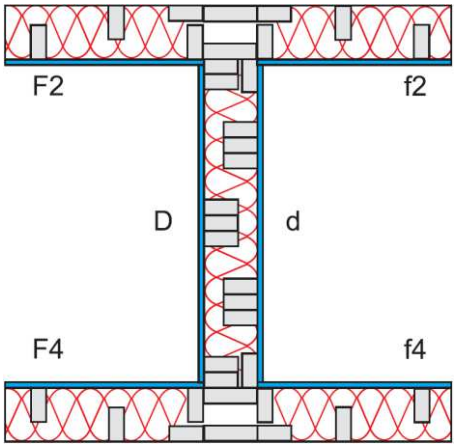
Room Parameters

- See Figure 2 of this report or Figure 1.3 of the National Research Council Report RR-331.
- The separating wall is 2.5 m high by 5 m wide.
- The flanking walls 2.5 m high by 4 m wide.
- The floor / ceilings are 4 m by 5 m.

Illustration for this case



Junction of a triple staggered stud separating wall with one layer of 15.9 mm CertainTeed SilentFX® QuickCut gypsum board directly attached to the studs on both sides. A floor of wood I-joists with one layer of 15 mm OSB in both rooms. The wall also connects with a ceiling of a base layer of layer of 15.9 mm SilentFX® QuickCut gypsum board and a face layer of 12.7 mm (1/2") CertainTeed Type C gypsum board installed on resilient channels. (Side view of Junctions 1 and 3).



Junction of a triple staggered stud separating wall with one layer of 15.9 mm CertainTeed SilentFX® QuickCut gypsum board directly attached to the wood studs with side walls of single staggered studs with one layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs. (Plan view of Junction 2 or 4).

Example 48	Reference	Value
Direct STC Rating of Path Dd		
Laboratory Measured STC Rating	Report A1-007750.2 Appendix B	**51**
Junction 1 - Junction between the seperating wall and the floor assembly		
Flanking Path Ff_1		
$Flanking\ STC_{\ lab,F1,f1}$	Reports A1-007750.2 and A1-012057.1	63
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,F1,f1}$	RR-331 Eq. 1.5	67
Flanking Path Fd_1		
$Flanking\ STC_{\ lab,F1,d}$	Reports A1-007750.2 and A1-012057.1	64
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,F1,d}$	RR-331 Eq. 1.5	68
Flanking Path Df_1		
$Flanking\ STC_{\ lab,D,f1}$	Reports A1-007750.2 and A1-012057.1	64
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,D,f1}$	RR-331 Eq. 1.5	68
Flanking STC for Junction 1		**63**
Junction 2 - Junction between the separating wall and the flanking wall assemblies		
Flanking Path Ff_2		
$Flanking\ STC_{\ lab,F2,f2}$	Report A1-007750.2 Appendix B, C, and D	78
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{\ situ,F2,f2}$	RR-331 Eq. 1.5	85
Flanking Path Fd_2		
$Flanking\ STC_{\ lab,F2,d}$	Report A1-007750.2 Appendix B, C, and D	73
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{\ situ,F2,d}$	RR-331 Eq. 1.5	80
Flanking Path Df_2		
$Flanking\ STC_{\ lab,D,f2}$	Report A1-007750.2 Appendix B, C, and D	73
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{\ situ,D,f2}$	RR-331 Eq. 1.5	80
Flanking STC for Junction 2		**76**
Junction 3 - Junction between the seperating wall and the ceiling assembly		
Flanking Path Ff_3		
$Flanking\ STC_{\ lab,F3,f3}$	Reports A1-007750.2 and A1-012057.1	63
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,F3,f3}$	RR-331 Eq. 1.5	67
Flanking Path Fd_3		
$Flanking\ STC_{\ lab,F3,d}$	Reports A1-007750.2 and A1-012057.1	63
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,F3,d}$	RR-331 Eq. 1.5	67
Flanking Path Df_3		
$Flanking\ STC_{\ lab,D,f3}$	Reports A1-007750.2 and A1-012057.1	63
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,D,f3}$	RR-331 Eq. 1.5	67
Flanking STC for Junction 3		**62**
Junction 4 - Junction between the separating wall and the flanking wall assemblies		
Flanking STC for Junction 4 - Same as Junction 2		**76**
ASTC due to Direct plus Flanking Transmission	RR-331 Section 1.4	**50**

Example 49: Rooms side-by-side - Loadbearing Separating Wall

- **Simplified Method.**
- **Common triple staggered wood stud wall.**
- **All other walls are single staggered wood stud walls.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board fixed to the wood studs in one room.**
- **One layer of 15.9 mm (5/8") CertainTeed Type X fixed to the wood studs in the other room.**
- **Fire rated floor BXUV.M535[1] with a bare 15 mm OSB subfloor.[2]**

Separating wall assembly (loadbearing) with:

- Triple staggered 38 mm x 89 mm (2x4) wood studs spaced 406 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to one side of the wood studs and one layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the other side of the wood studs.
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 1: Bottom Junction (separating wall / floor) with:

- Joists oriented perpendicular to the separating wall assembly.
- Wood I-joists 241 mm (9.5") deep spaced 406 mm (16") on center. Doubled rim boards (32 mm (1-1/4") thick and 241 mm deep) installed at each end of the I-joists.
- Subfloor of 15 mm (19/32") OSB directly attached to the I-joists.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the floor cavity.

Junction 2 or 4: Each Side (separating wall /abutting side wall) with:

- Single staggered 38 mm x 89 mm wood studs spaced 406 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in one room (F2 and F4).
- One layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the wood studs in the other room (f2 and f4).
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavities.

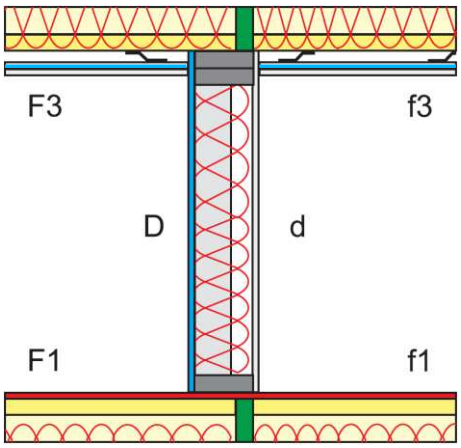
Junction 3: Top Junction (separating wall / ceiling) with:

- Joists oriented perpendicular to the separating wall assembly.
- Wood I-joists 241 mm (9.5") deep spaced 406 mm (16") on center. Doubled rim boards (32 mm (1-1/4") thick and 241 mm deep) installed at each end of the I-joists.
- Resilient channels installed perpendicular to wood I-joists and spaced 305 mm (12") on center.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the ceiling cavity.
- Base layer of layer of 15.9 mm SilentFX® QuickCut gypsum board and a face layer of 12.7 mm (1/2") CertainTeed Type C gypsum board installed on the resilient channels on the ceiling.

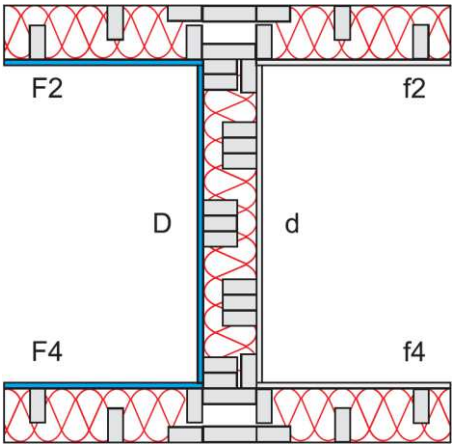
Room Parameters

- See Figure 2 of this report or Figure 1.3 of the National Research Council Report RR-331.
- The separating wall is 2.5 m high by 5 m wide.
- The flanking walls 2.5 m high by 4 m wide.
- The floor / ceilings are 4 m by 5 m.

Illustration for this case



Junction of a triple staggered stud separating wall with one layer of 15.9 mm CertainTeed SilentFX® QuickCut gypsum board directly attached to the studs on one side. One layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the studs on the other side. A floor of wood I-joists with one layer of 15 mm OSB in both rooms. The wall also connects with a ceiling of a base layer of layer of 15.9 mm SilentFX® QuickCut gypsum board and a face layer of 12.7 mm (1/2") CertainTeed Type C gypsum board installed on resilient channels. (Side view of Junctions 1 and 3).



Junction of a triple staggered stud separating wall with side walls of single staggered studs. One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in one room. One layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the wood studs in the other room. (Plan view of Junction 2 or 4).

Example 49	Reference	Value
Direct STC Rating of Path Dd		
Laboratory Measured STC Rating	Report A1-007750.2 Appendix B	**48**
Junction 1 - Junction between the seperating wall and the floor assembly		
Flanking Path Ff_1		
$Flanking\ STC_{\ lab,F1,f1}$	Reports A1-007750.2 and A1-012057.1	63
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,F1,f1}$	RR-331 Eq. 1.5	67
Flanking Path Fd_1		
$Flanking\ STC_{\ lab,F1,d}$	Reports A1-007750.2 and A1-012057.1	62
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,F1,d}$	RR-331 Eq. 1.5	66
Flanking Path Df_1		
$Flanking\ STC_{\ lab,D,f1}$	Reports A1-007750.2 and A1-012057.1	63
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,D,f1}$	RR-331 Eq. 1.5	67
Flanking STC for Junction 1		**62**
Junction 2 - Junction between the separating wall and the flanking wall assemblies		
Flanking Path Ff_2		
$Flanking\ STC_{\ lab,F2,f2}$	Report A1-007750.2 Appendix B, C, and D	72
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{\ situ,F2,f2}$	RR-331 Eq. 1.5	79
Flanking Path Fd_2		
$Flanking\ STC_{\ lab,F2,d}$	Report A1-007750.2 Appendix B, C, and D	69
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{\ situ,F2,d}$	RR-331 Eq. 1.5	76
Flanking Path Df_2		
$Flanking\ STC_{\ lab,D,f2}$	Report A1-007750.2 Appendix B, C, and D	68
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{\ situ,D,f2}$	RR-331 Eq. 1.5	75
Flanking STC for Junction 2		**72**
Junction 3 - Junction between the seperating wall and the ceiling assembly		
Flanking Path Ff_3		
$Flanking\ STC_{\ lab,F3,f3}$	Reports A1-007750.2 and A1-012057.1	63
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,F3,f3}$	RR-331 Eq. 1.5	67
Flanking Path Fd_3		
$Flanking\ STC_{\ lab,F3,d}$	Reports A1-007750.2 and A1-012057.1	61
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,F3,d}$	RR-331 Eq. 1.5	65
Flanking Path Df_3		
$Flanking\ STC_{\ lab,D,f3}$	Reports A1-007750.2 and A1-012057.1	62
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,D,f3}$	RR-331 Eq. 1.5	66
Flanking STC for Junction 3		**61**
Junction 4 - Junction between the separating wall and the flanking wall assemblies		
Flanking STC for Junction 4 - Same as Junction 2		**72**
ASTC due to Direct plus Flanking Transmission	RR-331 Section 1.4	**48**

This page is intentionally left blank

4.4 Side-By-Side Rooms - Load Bearing Triple Staggered Stud Separating Wall Assembly with Shear Elements

Example Number	ASTC Rating	Construction				
		Wallboard Room 1	Wallboard Room 2	Floor System	Floor Topping Room 1	Floor Topping Room 2
21	51	One layer of 15.9 mm SilentFX® QuickCut gypsum board fixed to 15.9 mm Plywood	One layer of 15.9 mm SilentFX® QuickCut gypsum board	1	None	None
22	48	"	One layer of 15.9 mm CertainTeed Type X gypsum board	"	None	"
23	51	"	One layer of 15.9 mm SilentFX® QuickCut gypsum board	"	Two layers of 12 mm cementitious flooring underlayment	"
24	48	"	One layer of 15.9 mm CertainTeed Type X gypsum board	"	"	"
25	51	"	One layer of 15.9 mm SilentFX® QuickCut gypsum board	"	38 mm thick gypsum concrete on a 9 mm closed cell foam	"
26	48	"	One layer of 15.9 mm CertainTeed Type X gypsum board	"	"	"
50	50	"	One layer of 15.9 mm SilentFX® QuickCut gypsum board	2	None	"
51	48	"	One layer of 15.9 mm CertainTeed Type X gypsum board	"	"	"
27	51	One layer of 15.9 mm SilentFX® QuickCut gypsum board on all walls. One layer of 15.9 mm plywood directly fixed to one side of the common partition.		1	None	"
28	51	One layer of 15.9 mm SilentFX® QuickCut gypsum board on all walls. One layer of 15.9 mm plywood directly fixed to the walls on one side of the rooms.		"	"	"

Example 21: Rooms side-by-side - Loadbearing Separating Wall

- **Simplified Method.**
- **Common triple staggered wood stud wall.**
- **All other walls are single staggered wood stud walls.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to the wood studs in one room.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board directly attached to the wood studs in the other room.**
- **One layer of 15 mm OSB on the floors.**

Separating wall assembly (loadbearing) with:

- Triple staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to one side of the wood studs (D) and one layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the other side of the wood studs (d).
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 1: Bottom Junction (separating wall / floor) with:

- Joists oriented perpendicular to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Subfloor of one layer of 15 mm OSB directly attached to I-joists.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the floor cavity.

Junction 2 or 4: Each Side (separating wall /abutting side wall) with:

- Single staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to the wood studs in one room (F2 and F4).
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in the other room (f2 and f4).
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavities.

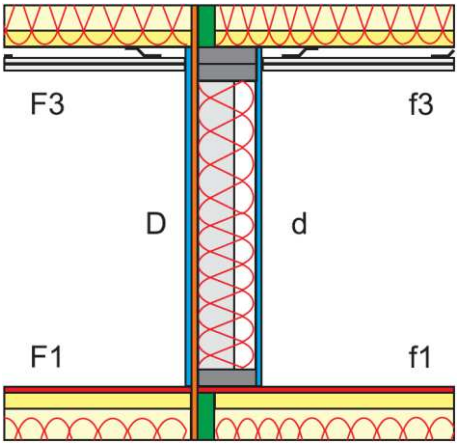
Junction 3: Top Junction (separating wall / ceiling) with:

- Joists oriented perpendicular to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Resilient channels installed perpendicular to wood I-joists and spaced 400 mm on center.
- Two layers of 12.7 mm CertainTeed Type X gypsum board installed on the resilient channels on the ceiling.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the ceiling cavity.

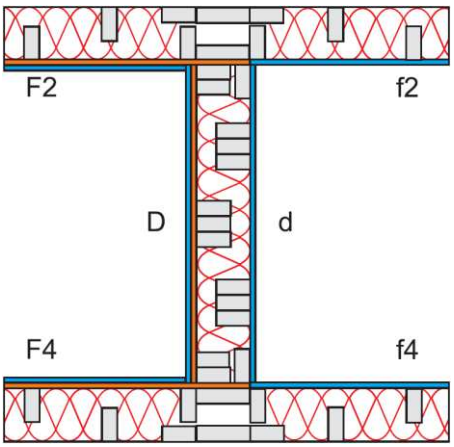
Room Parameters

- See Figure 2 of this report or Figure 1.3 of the National Research Council Report RR-331.
- The separating wall is 2.5 m high by 5 m wide.
- The flanking walls 2.5 m high by 4 m wide.
- The floor / ceilings are 4 m by 5 m.

Illustration for this case



Junction of a triple staggered stud separating wall with one layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9mm plywood directly attached to the wood studs on one side (D). One layer of 15.9 mm SilentFX® QuickCut gypsum board directly fixed to the wood studs on the other side (d). A floor of wood I-joists with one layer of 15 mm OSB in both rooms. The wall also connects with a ceiling of two layers of 12.7 mm CertainTeed Type X gypsum board installed on resilient channels. (Side view of Junctions 1 and 3).



Junction of a triple staggered stud separating wall with side walls of single staggered studs. One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm Plywood directly attached to the wood studs in one room. One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in the other room. (Plan view of Junction 2 or 4).

Example 21	Reference	Value
Direct STC Rating of Path Dd		
STC_{Dd}	Report A1-007750.2 Appendix B	**51**
Junction 1 - Seperating wall and the floor assembly		
Flanking Path Ff_1		
$Flanking\ STC_{lab,F1,f1}$	Report A1-007750.2 Appendix B,C and D	66
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,f1}$	RR-331 Eq. 1.5	70
Flanking Path Fd_1		
$Flanking\ STC_{lab,F1,d}$	Report A1-007750.2 Appendix B,C and D	65
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,d}$	RR-331 Eq. 1.5	69
Flanking Path Df_1		
$Flanking\ STC_{lab,D,f1}$	Report A1-007750.2 Appendix B,C and D	65
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f1}$	RR-331 Eq. 1.5	69
Flanking STC for Junction 1		**65**
Junction 2 - Separating wall and the flanking wall assemblies		
Flanking Path Ff_2		
$Flanking\ STC_{lab,F2,f2}$	Report A1-007750.2 Appendix B,C and D	78
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,f2}$	RR-331 Eq. 1.5	85
Flanking Path Fd_2		
$Flanking\ STC_{lab,F2,d}$	Report A1-007750.2 Appendix B,C and D	73
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,d}$	RR-331 Eq. 1.5	80
Flanking Path Df_2		
$Flanking\ STC_{lab,D,f2}$	Report A1-007750.2 Appendix B,C and D	73
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,D,f2}$	RR-331 Eq. 1.5	80
Flanking STC for Junction 2		**76**
Junction 3 -Seperating wall and the ceiling assembly		
Flanking Path Ff_3		
$Flanking\ STC_{lab,F3,f3}$	Report A1-007750.2 Appendix B,C and D	66
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,f3}$	RR-331 Eq. 1.5	70
Flanking Path Fd_3		
$Flanking\ STC_{lab,F3,d}$	Report A1-007750.2 Appendix B,C and D	64
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,d}$	RR-331 Eq. 1.5	68
Flanking Path Df_3		
$Flanking\ STC_{lab,D,f3}$	Report A1-007750.2 Appendix B,C and D	64
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f3}$	RR-331 Eq. 1.5	68
Flanking STC for Junction 3		**64**
Junction 4 - Separating wall and the flanking wall assemblies		
Flanking STC for Junction 4 - Same as Junction 2		**76**
ASTC due to Direct plus Flanking Transmission	RR-331 Equation 1.4	**51**

Example 22: Rooms side-by-side - Loadbearing Separating Wall

- **Simplified Method.**
- **Common triple staggered wood stud wall.**
- **All other walls are single staggered wood stud walls.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to the wood studs in one room.**
- **One layer of 15.9 mm (5/8") CertainTeed Type X gypsum board directly attached to the wood studs in the other room.**
- **One layer of 15 mm OSB on the floors.**

Separating wall assembly (loadbearing) with:

- Triple staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to one side of the wood studs (D) and one layer of 15.9 mm . CertainTeed Type X gypsum board directly attached to the other side of the wood studs (d).
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 1: Bottom Junction (separating wall / floor) with:

- Joists oriented perpendicular to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Subfloor of one layer of 15 mm OSB directly attached to I-joists.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the floor cavity.

Junction 2 or 4: Each Side (separating wall /abutting side wall) with:

- Single staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to the wood studs in one room (F2 and F4).
- One layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the wood studs in the other room (f2 and f4).
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavities.

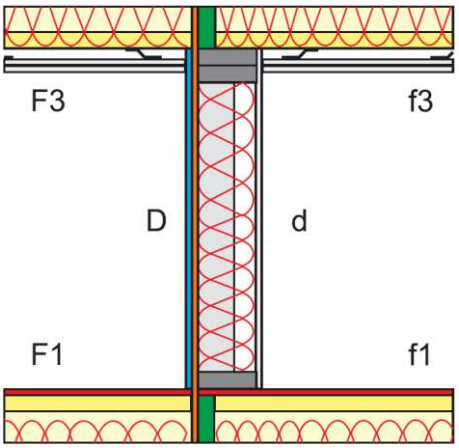
Junction 3: Top Junction (separating wall / ceiling) with:

- Joists oriented perpendicular to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Resilient channels installed perpendicular to wood I-joists and spaced 400 mm on center.
- Two layers of 12.7 mm CertainTeed Type X gypsum board installed on the resilient channels on the ceiling.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the ceiling cavity.

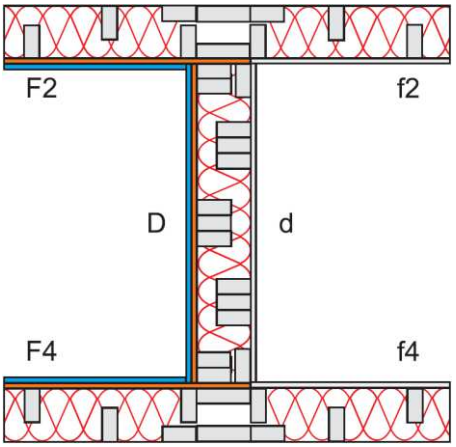
Room Parameters

- See Figure 2 of this report or Figure 1.3 of the National Research Council Report RR-331.
- The separating wall is 2.5 m high by 5 m wide.
- The flanking walls 2.5 m high by 4 m wide.
- The floor / ceilings are 4 m by 5 m.

Illustration for this case



Junction of triple staggered stud separating wall with one layer of 15.9 mm CertainTeed SilentFX® QuickCut gypsum board and 15.9 mm plywood directly attached on one side. CertainTeed Type X gypsum board directly attached to the other side. A floor of wood I-joists with one layer of 15 mm OSB in both rooms. The wall also connects with a ceiling of two layers of 12.7 mm CertainTeed Type X gypsum board installed on resilient channels. (Side view of Junctions 1 and 3).



Junction of a triple staggered stud separating wall with side walls of single staggered studs. One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm Plywood directly attached to the wood studs in one room. One layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the wood studs in the other room. (Plan view of Junction 2 or 4).

Example 22	Reference	Value
Direct STC Rating of Path Dd		
Laboratory Measured STC Rating		**48**
Junction 1 - Junction between the seperating wall and the floor assembly		
Flanking Path Ff_1		
$Flanking\ STC_{\ lab,F1,f1}$	Laboratory Measurement	66
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,F1,f1}$	RR-331 Eq. 1.5	70
Flanking Path Fd_1		
$Flanking\ STC_{\ lab,F1,d}$	Laboratory Measurement	63
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,F1,d}$	RR-331 Eq. 1.5	67
Flanking Path Df_1		
$Flanking\ STC_{\ lab,D,f1}$	Laboratory Measurement	64
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,D,f1}$	RR-331 Eq. 1.5	68
Flanking STC for Junction 1		**63**
Junction 2 - Junction between the separating wall and the flanking wall assemblies		
Flanking Path Ff_2		
$Flanking\ STC_{\ lab,F2,f2}$	Laboratory Measurement	72
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{\ situ,F2,f2}$	RR-331 Eq. 1.5	79
Flanking Path Fd_2		
$Flanking\ STC_{\ lab,F2,d}$	Laboratory Measurement	69
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{\ situ,F2,d}$	RR-331 Eq. 1.5	76
Flanking Path Df_2		
$Flanking\ STC_{\ lab,D,f2}$	Laboratory Measurement	68
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{\ situ,D,f2}$	RR-331 Eq. 1.5	75
Flanking STC for Junction 2		**72**
Junction 3 - Junction between the seperating wall and the ceiling assembly		
Flanking Path Ff_3		
$Flanking\ STC_{\ lab,F3,f3}$	Laboratory Measurement	66
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,F3,f3}$	RR-331 Eq. 1.5	70
Flanking Path Fd_3		
$Flanking\ STC_{\ lab,F3,d}$	Laboratory Measurement	62
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,F3,d}$	RR-331 Eq. 1.5	66
Flanking Path Df_3		
$Flanking\ STC_{\ lab,D,f3}$	Laboratory Measurement	63
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,D,f3}$	RR-331 Eq. 1.5	67
Flanking STC for Junction 3		**63**
Junction 4 - Junction between the separating wall and the flanking wall assemblies		
Flanking STC for Junction 4 - Same as Junction 2		**72**
ASTC due to Direct plus Flanking Transmission	RR-331 Section 1.4	**48**

Example 23: Rooms side-by-side - Loadbearing Separating Wall

- **Simplified Method.**
- **Common triple staggered wood stud wall.**
- **All other walls are single staggered wood stud walls.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to the wood studs in one room.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board directly attached to the wood studs in the other room.**
- **Topping of cementitious flooring in one room.**

Separating wall assembly (loadbearing) with:

- Triple staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to one side of the wood studs (D) and one layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the other side of the wood studs (d).
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 1: Bottom Junction (separating wall / floor) with:

- Joists oriented perpendicular to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Subfloor of one layer of 15 mm OSB directly attached to I-joists.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the floor cavity.

Junction 2 or 4: Each Side (separating wall /abutting side wall) with:

- Single staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to the wood studs in one room (F2 and F4).
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in the other room (f2 and f4).
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavities.

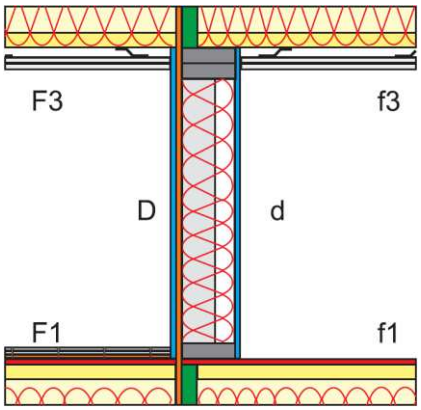
Junction 3: Top Junction (separating wall / ceiling) with:

- Joists oriented perpendicular to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Resilient channels installed perpendicular to wood I-joists and spaced 400 mm on center.
- Two layers of 12.7 mm CertainTeed Type X gypsum board installed on the resilient channels on the ceiling.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the ceiling cavity.

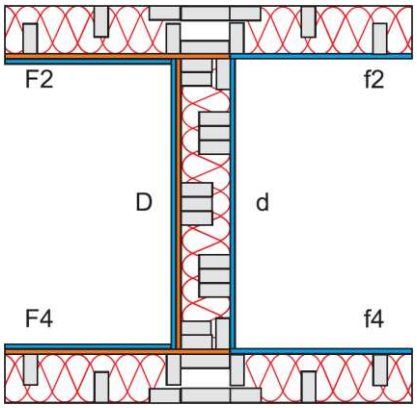
Room Parameters

- See Figure 2 of this report or Figure 1.3 of the National Research Council Report RR-331.
- The separating wall is 2.5 m high by 5 m wide.
- The flanking walls 2.5 m high by 4 m wide.
- The floor / ceilings are 4 m by 5 m.

Illustration for this case



Junction of a triple staggered stud separating wall with one layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9mm plywood directly attached to the wood studs on one side (D). One layer of 15.9 mm SilentFX® QuickCut gypsum board directly fixed to the wood studs on the other side (d). A floor of wood I-joists with one layer of 15 mm OSB in both rooms. Topping of two layers of 12 mm cementitious flooring underlayment installed on top of 12 mm wood fiber board underlayment in one room (F1). The wall also connects with a ceiling of two layers of 12.7 mm CertainTeed Type X gypsum board installed on resilient channels. (Side view of Junctions 1 and 3).



Junction of a triple staggered stud separating wall with side walls of single staggered studs. One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm Plywood directly attached to the wood studs in one room. One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in the other room. (Plan view of Junction 2 or 4).

Example 23 Error! Reference source not found.	Reference	Value
Direct STC Rating of Path Dd		
STC_{Dd}	Report A1-007750.2 Appendix B	**51**
Junction 1 - Seperating wall and the floor assembly		
Flanking Path Ff_1		
$Flanking\ STC_{lab,F1,f1}$	Report A1-007750.2 Appendix B,C and D	68
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,f1}$	RR-331 Eq. 1.5	72
Flanking Path Fd_1		
$Flanking\ STC_{lab,F1,d}$	Report A1-007750.2 Appendix B,C and D	67
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,d}$	RR-331 Eq. 1.5	71
Flanking Path Df_1		
$Flanking\ STC_{lab,D,f1}$	Report A1-007750.2 Appendix B,C and D	65
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f1}$	RR-331 Eq. 1.5	69
Flanking STC for Junction 1		**66**
Junction 2 - Separating wall and the flanking wall assemblies		
Flanking Path Ff_2		
$Flanking\ STC_{lab,F2,f2}$	Report A1-007750.2 Appendix B,C and D	78
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,f2}$	RR-331 Eq. 1.5	85
Flanking Path Fd_2		
$Flanking\ STC_{lab,F2,d}$	Report A1-007750.2 Appendix B,C and D	73
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,d}$	RR-331 Eq. 1.5	80
Flanking Path Df_2		
$Flanking\ STC_{lab,D,f2}$	Report A1-007750.2 Appendix B,C and D	73
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,D,f2}$	RR-331 Eq. 1.5	80
Flanking STC for Junction 2		**76**
Junction 3 -Seperating wall and the ceiling assembly		
Flanking Path Ff_3		
$Flanking\ STC_{lab,F3,f3}$	Report A1-007750.2 Appendix B,C and D	66
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,f3}$	RR-331 Eq. 1.5	70
Flanking Path Fd_3		
$Flanking\ STC_{lab,F3,d}$	Report A1-007750.2 Appendix B,C and D	64
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,d}$	RR-331 Eq. 1.5	68
Flanking Path Df_3		
$Flanking\ STC_{lab,D,f3}$	Report A1-007750.2 Appendix B,C and D	64
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f3}$	RR-331 Eq. 1.5	68
Flanking STC for Junction 3		**64**
Junction 4 - Separating wall and the flanking wall assemblies		
Flanking STC for Junction 4 - Same as Junction 2		**76**
ASTC due to Direct plus Flanking Transmission	RR-331 Equation 1.4	**51**

Example 24: Rooms side-by-side - Loadbearing Separating Wall

- **Simplified Method.**
- **Common triple staggered wood stud wall.**
- **All other walls are single staggered wood stud walls.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to the wood studs in one room.**
- **One layer of 15.9 mm (5/8") CertainTeed Type X gypsum board directly attached to the wood studs in the other room.**
- **Topping of cementitious flooring in one room.**

Separating wall assembly (loadbearing) with:

- Triple staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to one side of the wood studs (D) and one layer of 15.9 mm . CertainTeed Type X gypsum board directly attached to the other side of the wood studs (d).
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 1: Bottom Junction (separating wall / floor) with:

- Joists oriented perpendicular to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Subfloor of one layer of 15 mm OSB directly attached to I-joists.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the floor cavity.
- Topping of two layers of 12 mm cementitious flooring underlayment installed on top of 12 mm wood fiber board underlayment in one room (F1).

Junction 2 or 4: Each Side (separating wall /abutting side wall) with:

- Tipple staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to the wood studs in one room (F2 and F4).
- One layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the wood studs in the other room (f2 and f4).
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavities.

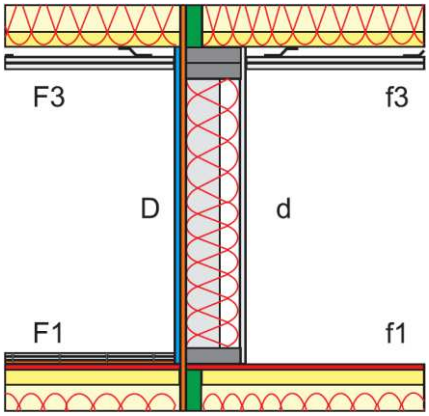
Junction 3: Top Junction (separating wall / ceiling) with:

- Joists oriented perpendicular to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Resilient channels installed perpendicular to wood I-joists and spaced 400 mm on center.
- Two layers of 12.7 mm CertainTeed Type X gypsum board installed on the resilient channels on the ceiling.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the ceiling cavity.

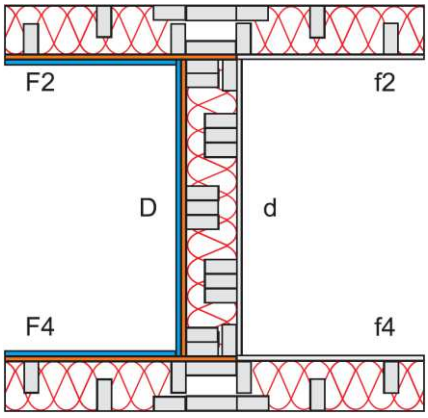
Room Parameters

- See Figure 2 of this report or Figure 1.3 of the National Research Council Report RR-331.
- The separating wall is 2.5 m high by 5 m wide.
- The flanking walls 2.5 m high by 4 m wide.
- The floor / ceilings are 4 m by 5 m.

Illustration for this case



Junction of a triple staggered stud separating wall with one layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9mm plywood directly attached to the wood studs on one side (D). One layer of 15.9 mm CertainTeed Type X gypsum board directly fixed to the wood studs on the other side (d). A floor of wood I-joists with one layer of 15 mm OSB in both rooms. Topping of two layers of 12 mm cementitious flooring underlayment installed on top of 12 mm wood fiber board underlayment in one room (F1). The wall also connects with a ceiling of two layers of 12.7 mm CertainTeed Type X gypsum board installed on resilient channels. (Side view of Junctions 1 and 3).



Junction of a triple staggered stud separating wall with side walls of single staggered studs. One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm Plywood directly attached to the wood studs in one room. One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in the other room. (Plan view of Junction 2 or 4).

Example 24 Error! Reference source not found.	Reference	Value
Direct STC Rating of Path Dd		
STC_{Dd}	Report A1-007750.2 Appendix B	**48**
Junction 1 - Seperating wall and the floor assembly		
Flanking Path Ff_1		
$Flanking\ STC_{lab,F1,f1}$	Report A1-007750.2 Appendix B,C and D	68
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,f1}$	RR-331 Eq. 1.5	72
Flanking Path Fd_1		
$Flanking\ STC_{lab,F1,d}$	Report A1-007750.2 Appendix B,C and D	65
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,d}$	RR-331 Eq. 1.5	69
Flanking Path Df_1		
$Flanking\ STC_{lab,D,f1}$	Report A1-007750.2 Appendix B,C and D	64
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f1}$	RR-331 Eq. 1.5	68
Flanking STC for Junction 1		**65**
Junction 2 - Separating wall and the flanking wall assemblies		
Flanking Path Ff_2		
$Flanking\ STC_{lab,F2,f2}$	Report A1-007750.2 Appendix B,C and D	72
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,f2}$	RR-331 Eq. 1.5	79
Flanking Path Fd_2		
$Flanking\ STC_{lab,F2,d}$	Report A1-007750.2 Appendix B,C and D	69
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,d}$	RR-331 Eq. 1.5	76
Flanking Path Df_2		
$Flanking\ STC_{lab,D,f2}$	Report A1-007750.2 Appendix B,C and D	68
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,D,f2}$	RR-331 Eq. 1.5	75
Flanking STC for Junction 2		**72**
Junction 3 -Seperating wall and the ceiling assembly		
Flanking Path Ff_3		
$Flanking\ STC_{lab,F3,f3}$	Report A1-007750.2 Appendix B,C and D	66
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,f3}$	RR-331 Eq. 1.5	70
Flanking Path Fd_3		
$Flanking\ STC_{lab,F3,d}$	Report A1-007750.2 Appendix B,C and D	62
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,d}$	RR-331 Eq. 1.5	66
Flanking Path Df_3		
$Flanking\ STC_{lab,D,f3}$	Report A1-007750.2 Appendix B,C and D	63
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f3}$	RR-331 Eq. 1.5	67
Flanking STC for Junction 3		**63**
Junction 4 - Separating wall and the flanking wall assemblies		
Flanking STC for Junction 4 - Same as Junction 2		**72**
ASTC due to Direct plus Flanking Transmission	RR-331 Equation 1.4	**48**

Example 25: Rooms side-by-side - Loadbearing Separating Wall

- **Simplified Method.**
- **Common triple staggered wood stud wall.**
- **All other walls are single staggered wood stud walls.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to the wood studs in one room.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board directly attached to the wood studs in the other room.**
- **Topping of 38 mm thick gypsum concrete in one room.**

Separating wall assembly (loadbearing) with:

- Triple staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to one side of the wood studs (D) and one layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the other side of the wood studs (d).
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 1: Bottom Junction (separating wall / floor) with:

- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Subfloor of one layer of 15 mm OSB directly attached to I-joists.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the floor cavity.
- Topping of 38 mm thick gypsum concrete on a 9 mm closed cell foam interlayer in one room (F1).

Junction 2 or 4: Each Side (separating wall /abutting side wall) with:

- Tipple staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to the wood studs in one room (F2 and F4).
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in the other room (f2 and f4).
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavities.

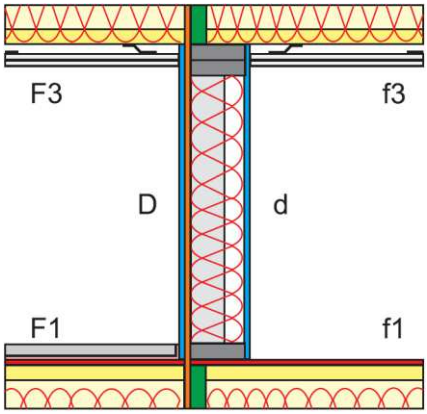
Junction 3: Top Junction (separating wall / ceiling) with:

- Joists oriented perpendicular to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Resilient channels installed perpendicular to wood I-joists and spaced 400 mm on center.
- Two layers of 12.7 mm CertainTeed Type X gypsum board installed on the resilient channels on the ceiling.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the ceiling cavity.

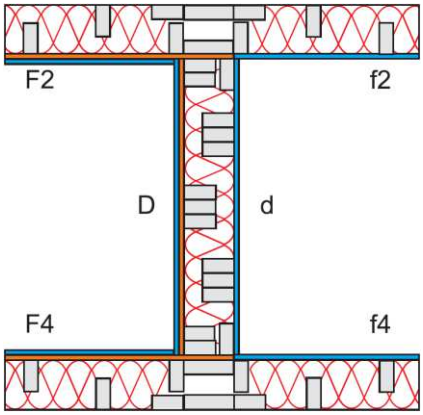
Room Parameters

- See Figure 2 of this report or Figure 1.3 of the National Research Council Report RR-331.
- The separating wall is 2.5 m high by 5 m wide.
- The flanking walls 2.5 m high by 4 m wide.
- The floor / ceilings are 4 m by 5 m.

Illustration for this case



Junction of a triple staggered stud separating wall with one layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9mm plywood directly attached to the wood studs on one side (D). One layer of 15.9 mm SilentFX® QuickCut gypsum board directly fixed to the wood studs on the other side (d). A floor of wood I-joists with one layer of 15 mm OSB in both rooms. Topping of 38 mm thick gypsum concrete on a 9 mm closed cell foam interlayer in one room (F1). The wall also connects with a ceiling of two layers of 12.7 mm CertainTeed Type X gypsum board installed on resilient channels. (Side view of Junctions 1 and 3).



Junction of a triple staggered stud separating wall with side walls of single staggered studs. One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm Plywood directly attached to the wood studs in one room. One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in the other room. (Plan view of Junction 2 or 4).

Example 25	Reference	Value
Direct STC Rating of Path Dd		
STC_{Dd}	Report A1-007750.2 Appendix B	**51**
Junction 1 - Seperating wall and the floor assembly		
Flanking Path Ff_1		
$Flanking\ STC_{lab,F1,f1}$	Report A1-007750.2 Appendix B,C and D	73
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,f1}$	RR-331 Eq. 1.5	77
Flanking Path Fd_1		
$Flanking\ STC_{lab,F1,d}$	Report A1-007750.2 Appendix B,C and D	73
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,d}$	RR-331 Eq. 1.5	77
Flanking Path Df_1		
$Flanking\ STC_{lab,D,f1}$	Report A1-007750.2 Appendix B,C and D	65
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f1}$	RR-331 Eq. 1.5	69
Flanking STC for Junction 1		**68**
Junction 2 - Separating wall and the flanking wall assemblies		
Flanking Path Ff_2		
$Flanking\ STC_{lab,F2,f2}$	Report A1-007750.2 Appendix B,C and D	78
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,f2}$	RR-331 Eq. 1.5	85
Flanking Path Fd_2		
$Flanking\ STC_{lab,F2,d}$	Report A1-007750.2 Appendix B,C and D	73
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,d}$	RR-331 Eq. 1.5	80
Flanking Path Df_2		
$Flanking\ STC_{lab,D,f2}$	Report A1-007750.2 Appendix B,C and D	73
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,D,f2}$	RR-331 Eq. 1.5	80
Flanking STC for Junction 2		**76**
Junction 3 -Seperating wall and the ceiling assembly		
Flanking Path Ff_3		
$Flanking\ STC_{lab,F3,f3}$	Report A1-007750.2 Appendix B,C and D	66
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,f3}$	RR-331 Eq. 1.5	70
Flanking Path Fd_3		
$Flanking\ STC_{lab,F3,d}$	Report A1-007750.2 Appendix B,C and D	64
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,d}$	RR-331 Eq. 1.5	68
Flanking Path Df_3		
$Flanking\ STC_{lab,D,f3}$	Report A1-007750.2 Appendix B,C and D	64
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f3}$	RR-331 Eq. 1.5	68
Flanking STC for Junction 3		**64**
Junction 4 - Separating wall and the flanking wall assemblies		
Flanking STC for Junction 4 - Same as Junction 2		**76**
ASTC due to Direct plus Flanking Transmission	RR-331 Equation 1.4	**51**

Example 26: Rooms side-by-side - Loadbearing Separating Wall

- **Simplified Method.**
- **Common triple staggered wood stud wall.**
- **All other walls are single staggered wood stud walls.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to the wood studs in one room.**
- **One layer of 15.9 mm (5/8") CertainTeed Type X gypsum board directly attached to the wood studs in the other room.**
- **Topping of 38 mm thick gypsum concrete in one room.**

Separating wall assembly (loadbearing) with:

- Staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm (2x6).
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to one side of the wood studs (D) and one layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the other side of the wood studs (d).
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 1: Bottom Junction (separating wall / floor) with:

- Joists oriented perpendicular to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Subfloor of one layer of 15 mm OSB directly attached to I-joists.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the floor cavity.
- Topping of 38 mm thick gypsum concrete on a 9 mm closed cell foam interlayer in one room (F1).

Junction 2 or 4: Each Side (separating wall /abutting side wall) with:

- Single staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to the wood studs in one room (F2 and F4).
- One layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the wood studs in the other room (f2 and f4).
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavities.

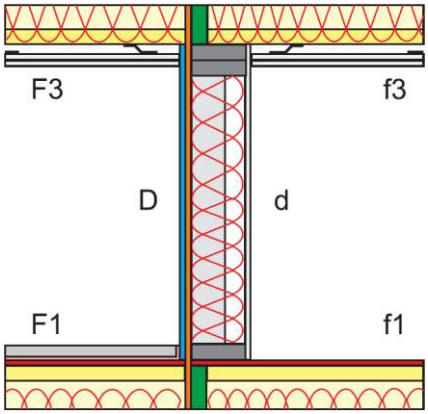
Junction 3: Top Junction (separating wall / ceiling) with:

- Joists oriented perpendicular to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Resilient channels installed perpendicular to wood I-joists and spaced 400 mm on center.
- Two layers of 12.7 mm CertainTeed Type X gypsum board installed on the resilient channels on the ceiling.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the ceiling cavity.

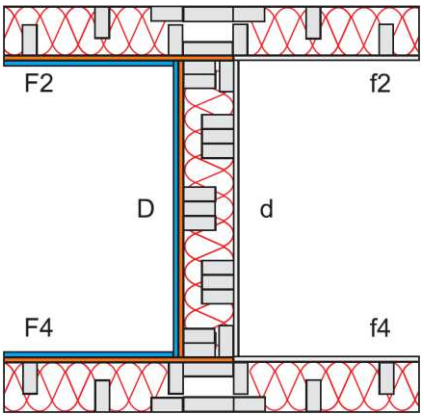
Room Parameters

- See Figure 2 of this report or Figure 1.3 of the National Research Council Report RR-331.
- The separating wall is 2.5 m high by 5 m wide.
- The flanking walls 2.5 m high by 4 m wide.
- The floor / ceilings are 4 m by 5 m.

Illustration for this case



Junction of a triple staggered stud separating wall with one layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9mm plywood directly attached to the wood studs on one side (D). One layer of 15.9 mm CertainTeed Type X gypsum board directly fixed to the wood studs on the other side (d). A floor of wood I-joists with one layer of 15 mm OSB in both rooms. Topping of 38 mm thick gypsum concrete on a 9 mm closed cell foam interlayer in one room (F1). The wall also connects with a ceiling of two layers of 12.7 mm CertainTeed Type X gypsum board installed on resilient channels. (Side view of Junctions 1 and 3).



Junction of a triple staggered stud separating wall with side walls of single staggered studs. One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm Plywood directly attached to the wood studs in one room. One layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the wood studs in the other room. (Plan view of Junction 2 or 4).

Example 26	Reference	Value
Direct STC Rating of Path Dd		
STC_{Dd}	Report A1-007750.2 Appendix B	**48**
Junction 1 - Seperating wall and the floor assembly		
Flanking Path Ff_1		
$Flanking\ STC_{lab,F1,f1}$	Report A1-007750.2 Appendix B,C and D	73
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,f1}$	RR-331 Eq. 1.5	77
Flanking Path Fd_1		
$Flanking\ STC_{lab,F1,d}$	Report A1-007750.2 Appendix B,C and D	70
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,d}$	RR-331 Eq. 1.5	74
Flanking Path Df_1		
$Flanking\ STC_{lab,D,f1}$	Report A1-007750.2 Appendix B,C and D	64
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f1}$	RR-331 Eq. 1.5	68
Flanking STC for Junction 1		**67**
Junction 2 - Separating wall and the flanking wall assemblies		
Flanking Path Ff_2		
$Flanking\ STC_{lab,F2,f2}$	Report A1-007750.2 Appendix B,C and D	72
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,f2}$	RR-331 Eq. 1.5	79
Flanking Path Fd_2		
$Flanking\ STC_{lab,F2,d}$	Report A1-007750.2 Appendix B,C and D	69
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,d}$	RR-331 Eq. 1.5	76
Flanking Path Df_2		
$Flanking\ STC_{lab,D,f2}$	Report A1-007750.2 Appendix B,C and D	68
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,D,f2}$	RR-331 Eq. 1.5	75
Flanking STC for Junction 2		**72**
Junction 3 -Seperating wall and the ceiling assembly		
Flanking Path Ff_3		
$Flanking\ STC_{lab,F3,f3}$	Report A1-007750.2 Appendix B,C and D	66
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,f3}$	RR-331 Eq. 1.5	70
Flanking Path Fd_3		
$Flanking\ STC_{lab,F3,d}$	Report A1-007750.2 Appendix B,C and D	62
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,d}$	RR-331 Eq. 1.5	66
Flanking Path Df_3		
$Flanking\ STC_{lab,D,f3}$	Report A1-007750.2 Appendix B,C and D	63
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f3}$	RR-331 Eq. 1.5	67
Flanking STC for Junction 3		**63**
Junction 4 - Separating wall and the flanking wall assemblies		
Flanking STC for Junction 4 - Same as Junction 2		**72**
ASTC due to Direct plus Flanking Transmission	RR-331 Equation 1.4	**48**

Example 50: Rooms side-by-side - Loadbearing Separating Wall

- **Simplified Method.**
- **Common triple staggered wood stud wall.**
- **All other walls are single staggered wood stud walls.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to the wood studs in one room.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board directly attached to the wood studs in the other room.**
- **Fire rated floor BXUV.M535[1] with a bare 15 mm OSB subfloor.[2]**

Separating wall assembly (loadbearing) with:

- Triple staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to one side of the wood studs (D) and one layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the other side of the wood studs (d).
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 1: Bottom Junction (separating wall / floor) with:

- Joists oriented perpendicular to the separating wall assembly.
- Wood I-joists 241 mm (9.5") deep spaced 406 mm (16") on center. Doubled rim boards (32 mm (1-1/4") thick and 241 mm deep) installed at each end of the I-joists.
- Subfloor of 15 mm (19/32") OSB directly attached to the I-joists.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the floor cavity.

Junction 2 or 4: Each Side (separating wall /abutting side wall) with:

- Single staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to the wood studs in one room (F2 and F4).
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in the other room (f2 and f4).
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavities.

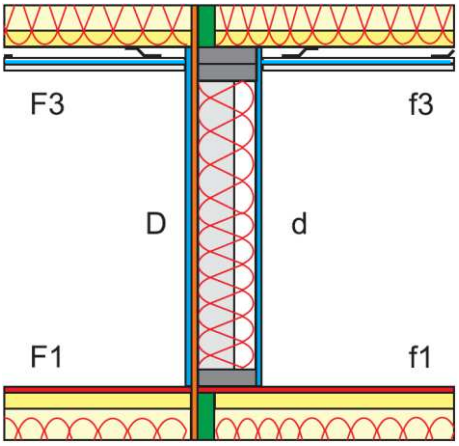
Junction 3: Top Junction (separating wall / ceiling) with:

- Joists oriented perpendicular to the separating wall assembly.
- Wood I-joists 241 mm (9.5") deep spaced 406 mm (16") on center. Doubled rim boards (32 mm (1-1/4") thick and 241 mm deep) installed at each end of the I-joists.
- Resilient channels installed perpendicular to wood I-joists and spaced 305 mm (12") on center.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the ceiling cavity.
- Base layer of layer of 15.9 mm SilentFX® QuickCut gypsum board and a face layer of 12.7 mm (1/2") CertainTeed Type C gypsum board installed on the resilient channels on the ceiling.

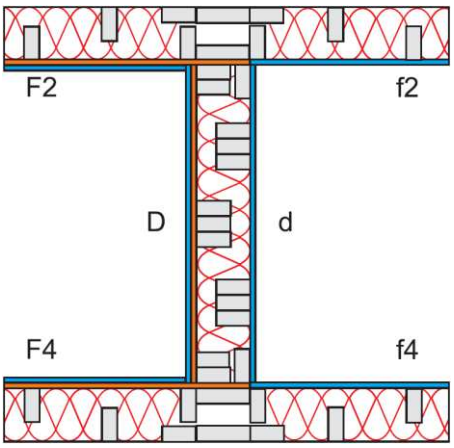
Room Parameters

- See Figure 2 of this report or Figure 1.3 of the National Research Council Report RR-331.
- The separating wall is 2.5 m high by 5 m wide.
- The flanking walls 2.5 m high by 4 m wide.
- The floor / ceilings are 4 m by 5 m.

Illustration for this case



Junction of a triple staggered stud separating wall with one layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9mm plywood directly attached to the wood studs on one side (D). One layer of 15.9 mm SilentFX® QuickCut gypsum board directly fixed to the wood studs on the other side (d). A floor of wood I-joists with one layer of 15 mm OSB in both rooms. The wall also connects with a ceiling of a base layer of layer of 15.9 mm SilentFX® QuickCut gypsum board and a face layer of 12.7 mm (1/2") CertainTeed Type C gypsum board installed on resilient channels. (Side view of Junctions 1 and 3).



Junction of a triple staggered stud separating wall with side walls of single staggered studs. One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm Plywood directly attached to the wood studs in one room. One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in the other room. (Plan view of Junction 2 or 4).

Example 50	Reference	Value
Direct STC Rating of Path Dd		
Laboratory Measured STC Rating	Report A1-007750.2 Appendix B	**51**
Junction 1 - Junction between the seperating wall and the floor assembly		
Flanking Path Ff_1		
$Flanking\ STC_{\ lab,F1,f1}$	Reports A1-007750.2 and A1-012057.1	63
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,F1,f1}$	RR-331 Eq. 1.5	67
Flanking Path Fd_1		
$Flanking\ STC_{\ lab,F1,d}$	Reports A1-007750.2 and A1-012057.1	64
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,F1,d}$	RR-331 Eq. 1.5	68
Flanking Path Df_1		
$Flanking\ STC_{\ lab,D,f1}$	Reports A1-007750.2 and A1-012057.1	63
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,D,f1}$	RR-331 Eq. 1.5	67
Flanking STC for Junction 1		**63**
Junction 2 - Junction between the separating wall and the flanking wall assemblies		
Flanking Path Ff_2		
$Flanking\ STC_{\ lab,F2,f2}$	Report A1-007750.2 Appendix B, C, and D	78
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{\ situ,F2,f2}$	RR-331 Eq. 1.5	85
Flanking Path Fd_2		
$Flanking\ STC_{\ lab,F2,d}$	Report A1-007750.2 Appendix B, C, and D	73
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{\ situ,F2,d}$	RR-331 Eq. 1.5	80
Flanking Path Df_2		
$Flanking\ STC_{\ lab,D,f2}$	Report A1-007750.2 Appendix B, C, and D	73
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{\ situ,D,f2}$	RR-331 Eq. 1.5	80
Flanking STC for Junction 2		**76**
Junction 3 - Junction between the seperating wall and the ceiling assembly		
Flanking Path Ff_3		
$Flanking\ STC_{\ lab,F3,f3}$	Reports A1-007750.2 and A1-012057.1	63
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,F3,f3}$	RR-331 Eq. 1.5	67
Flanking Path Fd_3		
$Flanking\ STC_{\ lab,F3,d}$	Reports A1-007750.2 and A1-012057.1	63
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,F3,d}$	RR-331 Eq. 1.5	67
Flanking Path Df_3		
$Flanking\ STC_{\ lab,D,f3}$	Reports A1-007750.2 and A1-012057.1	62
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,D,f3}$	RR-331 Eq. 1.5	66
Flanking STC for Junction 3		**62**
Junction 4 - Junction between the separating wall and the flanking wall assemblies		
Flanking STC for Junction 4 - Same as Junction 2		**76**
ASTC due to Direct plus Flanking Transmission	RR-331 Section 1.4	**50**

Example 51: Rooms side-by-side - Loadbearing Separating Wall

- **Simplified Method.**
- **Common triple staggered wood stud wall.**
- **All other walls are single staggered wood stud walls.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to the wood studs in one room.**
- **One layer of 15.9 mm (5/8") CertainTeed Type X gypsum board directly attached to the wood studs in the other room.**
- **Fire rated floor BXUV.M535[1] with a bare 15 mm OSB subfloor.[2]**

Separating wall assembly (loadbearing) with:

- Triple staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to one side of the wood studs (D) and one layer of 15.9 mm . CertainTeed Type X gypsum board directly attached to the other side of the wood studs (d).
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 1: Bottom Junction (separating wall / floor) with:

- Joists oriented perpendicular to the separating wall assembly.
- Wood I-joists 241 mm (9.5") deep spaced 406 mm (16") on center. Doubled rim boards (32 mm (1-1/4") thick and 241 mm deep) installed at each end of the I-joists.
- Subfloor of 15 mm (19/32") OSB directly attached to the I-joists.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the floor cavity.

Junction 2 or 4: Each Side (separating wall /abutting side wall) with:

- Single staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to the wood studs in one room (F2 and F4).
- One layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the wood studs in the other room (f2 and f4).
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavities.

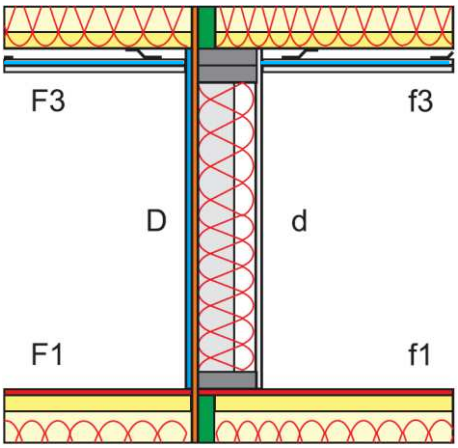
Junction 3: Top Junction (separating wall / ceiling) with:

- Joists oriented perpendicular to the separating wall assembly.
- Wood I-joists 241 mm (9.5") deep spaced 406 mm (16") on center. Doubled rim boards (32 mm (1-1/4") thick and 241 mm deep) installed at each end of the I-joists.
- Resilient channels installed perpendicular to wood I-joists and spaced 305 mm (12") on center.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the ceiling cavity.
- Base layer of layer of 15.9 mm SilentFX® QuickCut gypsum board and a face layer of 12.7 mm (1/2") CertainTeed Type C gypsum board installed on the resilient channels on the ceiling.

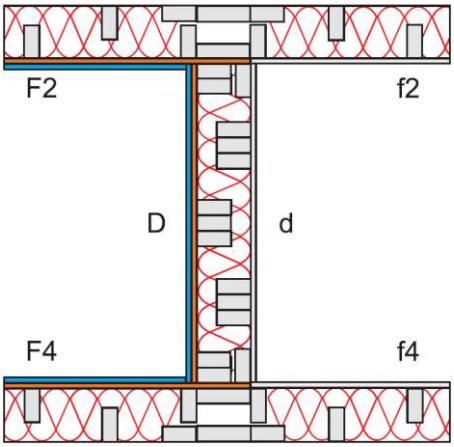
Room Parameters

- See Figure 2 of this report or Figure 1.3 of the National Research Council Report RR-331.
- The separating wall is 2.5 m high by 5 m wide.
- The flanking walls 2.5 m high by 4 m wide.
- The floor / ceilings are 4 m by 5 m.

Illustration for this case



Junction of triple staggered stud separating wall with one layer of 15.9 mm CertainTeed SilentFX® QuickCut gypsum board and 15.9 mm plywood directly attached on one side. CertainTeed Type X gypsum board directly attached to the other side. A floor of wood I-joists with one layer of 15 mm OSB in both rooms. The wall also connects with a ceiling of a base layer of layer of 15.9 mm SilentFX® QuickCut gypsum board and a face layer of 12.7 mm (1/2") CertainTeed Type C gypsum board installed on resilient channels. (Side view of Junctions 1 and 3).



Junction of a triple staggered stud separating wall with side walls of single staggered studs. One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm Plywood directly attached to the wood studs in one room. One layer of 15.9 mm CertainTeed Type X gypsum board directly attached to the wood studs in the other room. (Plan view of Junction 2 or 4).

Example 51	Reference	Value
Direct STC Rating of Path Dd		
Laboratory Measured STC Rating	Report A1-007750.2 Appendix B	**48**
Junction 1 - Junction between the seperating wall and the floor assembly		
Flanking Path Ff_1		
$Flanking\ STC_{\ lab,F1,f1}$	Reports A1-007750.2 and A1-012057.1	63
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,F1,f1}$	RR-331 Eq. 1.5	67
Flanking Path Fd_1		
$Flanking\ STC_{\ lab,F1,d}$	Reports A1-007750.2 and A1-012057.1	61
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,F1,d}$	RR-331 Eq. 1.5	65
Flanking Path Df_1		
$Flanking\ STC_{\ lab,D,f1}$	Reports A1-007750.2 and A1-012057.1	62
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,D,f1}$	RR-331 Eq. 1.5	66
Flanking STC for Junction 1		**61**
Junction 2 - Junction between the separating wall and the flanking wall assemblies		
Flanking Path Ff_2		
$Flanking\ STC_{\ lab,F2,f2}$	Report A1-007750.2 Appendix B, C, and D	72
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{\ situ,F2,f2}$	RR-331 Eq. 1.5	79
Flanking Path Fd_2		
$Flanking\ STC_{\ lab,F2,d}$	Report A1-007750.2 Appendix B, C, and D	69
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{\ situ,F2,d}$	RR-331 Eq. 1.5	76
Flanking Path Df_2		
$Flanking\ STC_{\ lab,D,f2}$	Report A1-007750.2 Appendix B, C, and D	68
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{\ situ,D,f2}$	RR-331 Eq. 1.5	75
Flanking STC for Junction 2		**72**
Junction 3 - Junction between the seperating wall and the ceiling assembly		
Flanking Path Ff_3		
$Flanking\ STC_{\ lab,F3,f3}$	Reports A1-007750.2 and A1-012057.1	63
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,F3,f3}$	RR-331 Eq. 1.5	67
Flanking Path Fd_3		
$Flanking\ STC_{\ lab,F3,d}$	Reports A1-007750.2 and A1-012057.1	60
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,F3,d}$	RR-331 Eq. 1.5	64
Flanking Path Df_3		
$Flanking\ STC_{\ lab,D,f3}$	Reports A1-007750.2 and A1-012057.1	61
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{\ situ,D,f3}$	RR-331 Eq. 1.5	65
Flanking STC for Junction 3		**60**
Junction 4 - Junction between the separating wall and the flanking wall assemblies		
Flanking STC for Junction 4 - Same as Junction 2		**72**
ASTC due to Direct plus Flanking Transmission	RR-331 Section 1.4	**48**

Example 27: Rooms side-by-side - Loadbearing Separating Wall

- **Simplified Method.**
- **Common triple staggered wood stud wall.**
- **All other walls are single staggered wood stud walls.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to the wood studs on one side of the separating wall.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board directly attached to the wood studs on the other side of the separating wall and the studs of the other walls.**
- **One layer of 15 mm OSB on the floors.**

Separating wall assembly (loadbearing) with:

- Staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm (2x6).
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to one side of the wood studs (D) and one layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the other side of the wood studs (d).
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 1: Bottom Junction (separating wall / floor) with:

- Joists oriented perpendicular to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Subfloor of one layer of 15 mm OSB directly attached to I-joists.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the floor cavity.

Junction 2 or 4: Each Side (separating wall /abutting side wall) with:

- Single staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to each side of the wood studs.
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

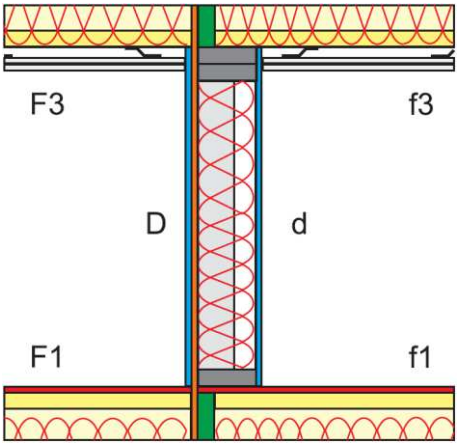
Junction 3: Top Junction (separating wall / ceiling) with:

- Joists oriented perpendicular to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Resilient channels installed perpendicular to wood I-joists and spaced 400 mm on center.
- Two layers of 12.7 mm CertainTeed Type X gypsum board installed on the resilient channels on the ceiling.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the ceiling cavity.

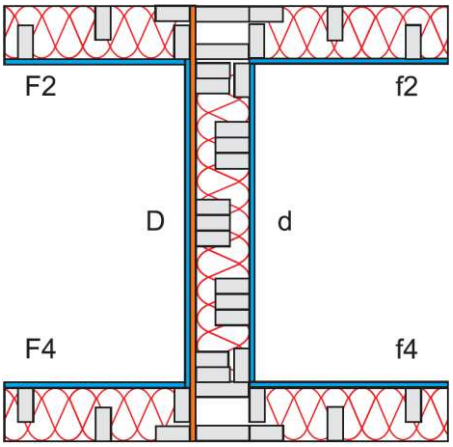
Room Parameters

- See Figure 2 of this report or Figure 1.3 of the National Research Council Report RR-331.
- The separating wall is 2.5 m high by 5 m wide.
- The flanking walls 2.5 m high by 4 m wide.
- The floor / ceilings are 4 m by 5 m.

Illustration for this case



Junction of a triple staggered stud separating wall with one layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9mm plywood directly attached to the wood studs on one side (D). One layer of 15.9 mm SilentFX® QuickCut gypsum board directly fixed to the wood studs on the other side (d). A floor of wood I-joists with one layer of 15 mm OSB in both rooms. The wall also connects with a ceiling of two layers of 12.7 mm CertainTeed Type X gypsum board installed on resilient channels. (Side view of Junctions 1 and 3).



Junction of a triple staggered stud separating wall with side walls of single staggered studs. One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm Plywood directly attached to the wood studs of one side of the common wall (D). One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to all other wood studs. (Plan view of Junction 2 or 4).

Example 27	Reference	Value
Direct STC Rating of Path Dd		
STC_{Dd}	Report A1-007750.2 Appendix B	**51**
Junction 1 - Seperating wall and the floor assembly		
Flanking Path Ff_1		
$Flanking\ STC_{lab,F1,f1}$	Report A1-007750.2 Appendix B,C and D	66
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,f1}$	RR-331 Eq. 1.5	70
Flanking Path Fd_1		
$Flanking\ STC_{lab,F1,d}$	Report A1-007750.2 Appendix B,C and D	65
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,d}$	RR-331 Eq. 1.5	69
Flanking Path Df_1		
$Flanking\ STC_{lab,D,f1}$	Report A1-007750.2 Appendix B,C and D	65
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f1}$	RR-331 Eq. 1.5	69
Flanking STC for Junction 1		**65**
Junction 2 - Separating wall and the flanking wall assemblies		
Flanking Path Ff_2		
$Flanking\ STC_{lab,F2,f2}$	Report A1-007750.2 Appendix B,C and D	78
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,f2}$	RR-331 Eq. 1.5	85
Flanking Path Fd_2		
$Flanking\ STC_{lab,F2,d}$	Report A1-007750.2 Appendix B,C and D	73
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,d}$	RR-331 Eq. 1.5	80
Flanking Path Df_2		
$Flanking\ STC_{lab,D,f2}$	Report A1-007750.2 Appendix B,C and D	73
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,D,f2}$	RR-331 Eq. 1.5	80
Flanking STC for Junction 2		**76**
Junction 3 -Seperating wall and the ceiling assembly		
Flanking Path Ff_3		
$Flanking\ STC_{lab,F3,f3}$	Report A1-007750.2 Appendix B,C and D	66
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,f3}$	RR-331 Eq. 1.5	70
Flanking Path Fd_3		
$Flanking\ STC_{lab,F3,d}$	Report A1-007750.2 Appendix B,C and D	64
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,d}$	RR-331 Eq. 1.5	68
Flanking Path Df_3		
$Flanking\ STC_{lab,D,f3}$	Report A1-007750.2 Appendix B,C and D	64
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f3}$	RR-331 Eq. 1.5	68
Flanking STC for Junction 3		**64**
Junction 4 - Separating wall and the flanking wall assemblies		
Flanking STC for Junction 4 - Same as Junction 2		**76**
ASTC due to Direct plus Flanking Transmission	RR-331 Equation 1.4	**51**

Example 28: Rooms side-by-side - Loadbearing Separating Wall

- **Simplified Method.**
- **Common triple staggered wood stud wall.**
- **All other walls are single staggered wood stud walls.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to the wood studs of walls F4 and f4.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board directly attached to the wood studs on the studs of the other walls**
- **One layer of 15 mm OSB on the floors.**

Separating wall assembly (non-loadbearing) with:

- Triple staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to each side of the wood studs.
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 1: Bottom Junction (separating wall / floor) with:

- Joists oriented perpendicular to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Subfloor of one layer of 15 mm OSB directly attached to I-joists.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the floor cavity.

Junction 2: (separating wall /abutting side wall) with:

- Single staggered 2x4 wood studs spaced 406 mm on center. Double 2x6 headers and a single 2x6 footer.
- One layer of 15.9 mm SilentFX® QuickCut Gypsum Board directly attached to the wood studs.
- CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 3: Top Junction (separating wall / ceiling) with:

- Joists oriented perpendicular to the separating wall assembly.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- Resilient channels installed perpendicular to wood I-joists and spaced 400 mm on center.
- Two layers of 12.7 mm CertainTeed Type X gypsum board installed on the resilient channels on the ceiling.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the ceiling cavity.

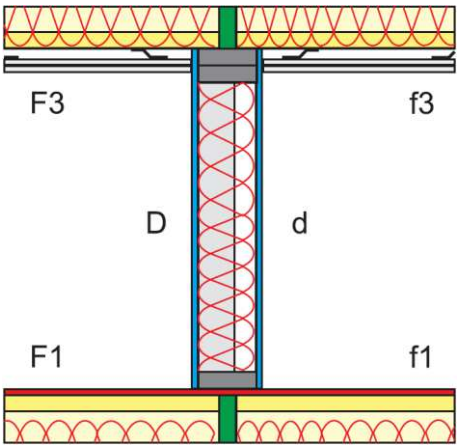
Junction 4: (separating wall /abutting side wall) with:

- Single staggered 2x4 wood studs spaced 406 mm on center. Double 2x6 headers and a single 2x6 footer.
- One layer of 15.9 mm SilentFX® QuickCut Gypsum Board and one layer of 15.9 mm plywood directly attached to the wood studs.
- CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

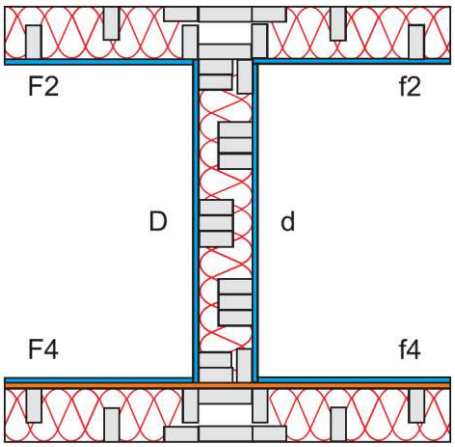
Room Parameters

- See Figure 2 of this report or Figure 1.3 of the National Research Council Report RR-331.
- The separating wall is 2.5 m high by 5 m wide.
- The flanking walls 2.5 m high by 4 m wide.
- The floor / ceilings are 4 m by 5 m.

Illustration for this case



Junction of a triple staggered stud separating wall with one layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs. A floor of wood I-joists with one layer of 15 mm OSB in both rooms. The wall also connects with a ceiling of two layers of 12.7 mm CertainTeed Type X gypsum board installed on resilient channels. (Side view of Junctions 1 and 3).



Junction of a triple staggered stud separating wall with side walls of single staggered studs. One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9mm plywood directly attached to the wood studs on walls F4 and f4. One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs on walls F2 and f2. (Plan view of Junction 2 or 4).

Example 28	Reference	Value
Direct STC Rating of Path Dd		
STC_{Dd}	Report A1-007750.2 Appendix B	**51**
Junction 1 - Seperating wall and the floor assembly		
Flanking Path Ff_1		
$Flanking\ STC_{lab,F1,f1}$	Report A1-007750.2 Appendix B,C and D	66
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,f1}$	RR-331 Eq. 1.5	70
Flanking Path Fd_1		
$Flanking\ STC_{lab,F1,d}$	Report A1-007750.2 Appendix B,C and D	65
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F1,d}$	RR-331 Eq. 1.5	69
Flanking Path Df_1		
$Flanking\ STC_{lab,D,f1}$	Report A1-007750.2 Appendix B,C and D	65
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f1}$	RR-331 Eq. 1.5	69
Flanking STC for Junction 1		**65**
Junction 2 - Separating wall and the flanking wall assemblies		
Flanking Path Ff_2		
$Flanking\ STC_{lab,F2,f2}$	Report A1-007750.2 Appendix B,C and D	78
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,f2}$	RR-331 Eq. 1.5	85
Flanking Path Fd_2		
$Flanking\ STC_{lab,F2,d}$	Report A1-007750.2 Appendix B,C and D	73
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,d}$	RR-331 Eq. 1.5	80
Flanking Path Df_2		
$Flanking\ STC_{lab,D,f2}$	Report A1-007750.2 Appendix B,C and D	73
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,D,f2}$	RR-331 Eq. 1.5	80
Flanking STC for Junction 2		**76**
Junction 3 -Seperating wall and the ceiling assembly		
Flanking Path Ff_3		
$Flanking\ STC_{lab,F3,f3}$	Report A1-007750.2 Appendix B,C and D	66
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,f3}$	RR-331 Eq. 1.5	70
Flanking Path Fd_3		
$Flanking\ STC_{lab,F3,d}$	Report A1-007750.2 Appendix B,C and D	64
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,F3,d}$	RR-331 Eq. 1.5	68
Flanking Path Df_3		
$Flanking\ STC_{lab,D,f3}$	Report A1-007750.2 Appendix B,C and D	64
Normalization Correction	RR-331 Eq. 1.5	3.98
$Flanking\ STC_{situ,D,f3}$	RR-331 Eq. 1.5	68
Flanking STC for Junction 3		**64**
Junction 4 - Separating wall and the flanking wall assemblies		
Flanking STC for Junction 4 - Same as Junction 2		**76**
ASTC due to Direct plus Flanking Transmission	RR-331 Equation 1.4	**51**

This page is intentionally left blank

4.5 Rooms One-above-the-Other

Example	ASTC	Floor System	Topping	Wallboard Room 1	Wallboard Room 2
29	52	1	None	One layer of 15.9 mm SilentFX® QuickCut gypsum board	One layer of 15.9 mm SilentFX® QuickCut gypsum board
30	52	"	"	"	One layer of 15.9 mm CertainTeed Type X gypsum board
31	56	"	Two layers of 12 mm cementitious flooring underlayment	"	One layer of 15.9 mm SilentFX® QuickCut gypsum board
32	55	"	"	"	One layer of 15.9 mm CertainTeed Type X gypsum board
33	63	"	38 mm thick gypsum concrete on a 9 mm closed cell foam	"	One layer of 15.9 mm SilentFX® QuickCut gypsum board
34	61	"	"	"	One layer of 15.9 mm CertainTeed Type X gypsum board
52	50	2	None	"	One layer of 15.9 mm SilentFX® QuickCut gypsum board
53	49		"	"	One layer of 15.9 mm CertainTeed Type X gypsum board

Example 29: Rooms one-above-the-other **SIMPLIFIED METHOD**

- **Wood framed walls and floors.**
- **Wood I-joists 302 mm deep spaced 406 mm on center.**
- **Wall framing includes single and triple staggered wood studs.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board directly attached to the wood studs in both the upper and the lower rooms.**
- **One layer of 15 mm OSB directly attached to the floor joists.**

Separating floor/ceiling assembly with:

- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- The joists are oriented perpendicular to the loadbearing walls but not continuous across the junction.
- Subfloor of one layer of 15 mm (19/32") OSB directly attached to wood I-joists.
- One layer of 152 mm thick CertainTeed Sustainable Insulation® R20 thermal insulation in the floor cavity.
- Ceiling of two layers of 12.7 mm CertainTeed Type X gypsum board installed on the resilient channels on the ceiling.
- Resilient channels installed perpendicular to wood I-joists and spaced 400 mm on center.

Junction 1&3: Loadbearing walls above and below the junction:

- Floor joists oriented perpendicular to these walls.
- Triple staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in both rooms.
- One layer of 89 mm CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 2&4: Non-loadbearing walls above and below the junction:

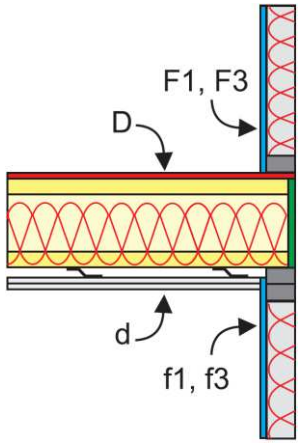
- Floor joists oriented parallel to these walls.
- Single staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in both rooms.
- One layer of 89 mm CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Note: For the path/surface designations in the calculations the upper room is treated as the source room (surfaces D and F)

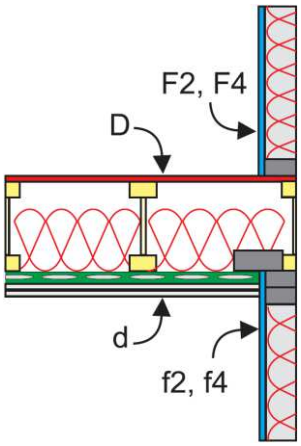
Room Parameters

- See Figure 3 of this report or Figure 1.4 of the National Research Council Report RR-331.
- The separating floor / ceiling is 4 m by 5 m.
- Walls 1 and 3 are 2.5 m high by 5 m wide.
- Walls 2 and 4 are 2.5 m high by 4 m wide.

Illustration for this case



Junction 1 or 3: Loadbearing side walls above and below the floor/ceiling assembly (wood I joists of floor are perpendicular to loadbearing wall). One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in both rooms. (Side view)



Junction 2 or 4: Non-loadbearing side walls above and below the floor/ceiling assembly (wood I joists of floor are parallel to the non-loadbearing wall). One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in both rooms. (Side view)

Example 29	Reference	Value
Direct STC Rating of Path Dd through the Separating Floor		
STC_{Dd}	Report A1-007750.2 Appendix B	**53**
Junction 1 - Separating floor and the flanking load bearing walls		
Flanking Path Ff_1		
$Flanking\ STC_{lab,F1,f1}$	Report A1-007750.2	64
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F1,f1}$	RR-331 Eq. 1.5	70
Flanking Path Fd_1		
$Flanking\ STC_{lab,F1,d}$	Report A1-007750.2	64
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F1,d}$	RR-331 Eq. 1.5	70
Flanking Path Df_1		
$Flanking\ STC_{lab,D,f1}$	Report A1-007750.2	63
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,D,f1}$	RR-331 Eq. 1.5	69
Flanking STC for Junction 1		**65**
Junction 1 - Separating floor and the flanking non-load bearing walls		
Flanking Path Ff_2		
$Flanking\ STC_{lab,F2,f2}$	Report A1-007750.2	70
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,f2}$	RR-331 Eq. 1.5	77
Flanking Path Fd_2		
$Flanking\ STC_{lab,F2,d}$	Report A1-007750.2	71
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,d}$	RR-331 Eq. 1.5	78
Flanking Path Df_2		
$Flanking\ STC_{lab,D,f2}$	Report A1-007750.2	66
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,D,f2}$	RR-331 Eq. 1.5	73
Flanking STC for Junction 2		**71**
Junction 1 - Separating floor and the flanking load bearing walls		
Flanking Path Ff_3		
$Flanking\ STC_{lab,F3,f3}$	Report A1-007750.2	64
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F3,f3}$	RR-331 Eq. 1.5	70
Flanking Path Fd_3		
$Flanking\ STC_{lab,F3,d}$	Report A1-007750.2	64
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F3,d}$	RR-331 Eq. 1.5	70
Flanking Path Df_3		
$Flanking\ STC_{lab,D,f3}$	Report A1-007750.2	63
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,D,f3}$	RR-331 Eq. 1.5	69
Flanking STC for Junction 3		**65**
Junction 1 - Separating floor and the flanking non-load bearing walls		
Flanking STC for Junction 4 - Same as Junction 2		**71**
ASTC due to Direct plus Flanking Transmission	**RR-331 Equation 1.4**	**52**

Example 30: Rooms one-above-the-other **SIMPLIFIED METHOD**

- **Wood framed walls and floors.**
- **Wood I-joists 302 mm deep spaced 406 mm on center.**
- **Wall framing includes single and triple staggered wood studs.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board directly attached to the wood studs in the upper room. One layer of 15.9 mm (5/8") CertainTeed Type X directly attached to the wood studs in the lower room.**
- **One layer of 15 mm OSB directly attached to the floor joists.**

Separating floor/ceiling assembly with:

- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- The joists are oriented perpendicular to the loadbearing walls but not continuous across the junction.
- Subfloor of one layer of 15 mm (19/32") OSB directly attached to wood I-joists.
- One layer of 152 mm thick CertainTeed Sustainable Insulation® R20 thermal insulation in the floor cavity.
- Ceiling of two layers of 12.7 mm CertainTeed Type X gypsum board installed on the resilient channels on the ceiling.
- Resilient channels installed perpendicular to wood I-joists and spaced 400 mm on center.

Junction 1&3: Loadbearing walls above and below the junction:

- Floor joists oriented perpendicular to these walls.
- Triple staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in the upper room (F1 and F3). One layer of 15.9 mm CertainTeed Type X directly attached to the wood studs in the lower room (f1 and f3).
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 2&4: Non-loadbearing walls above and below the junction:

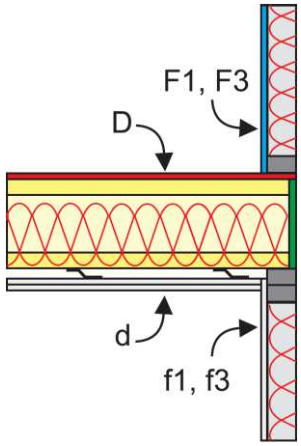
- Floor joists oriented parallel to these walls.
- Single staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in the upper room (F2 and F4). One layer of 15.9 mm CertainTeed Type X directly attached to the wood studs in the lower room (f2 and f4).
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Note: For the path/surface designations in the calculations the upper room is treated as the source room (surfaces D and F)

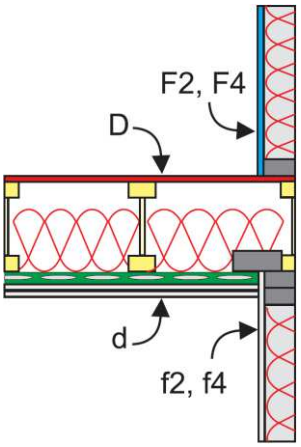
Room Parameters

- See Figure 3 of this report or Figure 1.4 of the National Research Council Report RR-331.
- The separating floor / ceiling is 4 m by 5 m.
- Walls 1 and 3 are 2.5 m high by 5 m wide.
- Walls 2 and 4 are 2.5 m high by 4 m wide

Illustration for this case



Junction 1 or 3: Loadbearing side walls above and below the floor/ceiling assembly (wood I joists of floor are perpendicular to loadbearing wall). One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in the upper room (F1 and F3). One layer of 15.9 mm CertainTeed Type X directly attached to the wood studs in the lower room (f1 and f3). (Side view)



Junction 2 or 4: Non-loadbearing side walls above and below the floor/ceiling assembly (wood I joists of floor are parallel to the non-loadbearing wall). One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in the upper room (F2 and F4). One layer of 15.9 mm CertainTeed Type X directly attached to the wood studs in the lower room (f2 and f4). (Side view)

Example 30	Reference	Value
Direct STC Rating of Path Dd through the Separating Floor		
STC_{Dd}	Report A1-007750.2 Appendix B	**53**
Junction 1 - Separating floor and the flanking load bearing walls		
Flanking Path Ff_1		
$Flanking\ STC_{lab,F1,f1}$	Report A1-007750.2	61
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F1,f1}$	RR-331 Eq. 1.5	67
Flanking Path Fd_1		
$Flanking\ STC_{lab,F1,d}$	Report A1-007750.2	63
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F1,d}$	RR-331 Eq. 1.5	69
Flanking Path Df_1		
$Flanking\ STC_{lab,D,f1}$	Report A1-007750.2	61
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,D,f1}$	RR-331 Eq. 1.5	67
Flanking STC for Junction 1		**63**
Junction 1 - Separating floor and the flanking non-load bearing walls		
Flanking Path Ff_2		
$Flanking\ STC_{lab,F2,f2}$	Report A1-007750.2	64
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,f2}$	RR-331 Eq. 1.5	71
Flanking Path Fd_2		
$Flanking\ STC_{lab,F2,d}$	Report A1-007750.2	69
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,d}$	RR-331 Eq. 1.5	76
Flanking Path Df_2		
$Flanking\ STC_{lab,D,f2}$	Report A1-007750.2	62
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,D,f2}$	RR-331 Eq. 1.5	69
Flanking STC for Junction 2		**66**
Junction 1 - Separating floor and the flanking load bearing walls		
Flanking Path Ff_3		
$Flanking\ STC_{lab,F3,f3}$	Report A1-007750.2	61
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F3,f3}$	RR-331 Eq. 1.5	67
Flanking Path Fd_3		
$Flanking\ STC_{lab,F3,d}$	Report A1-007750.2	63
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F3,d}$	RR-331 Eq. 1.5	69
Flanking Path Df_3		
$Flanking\ STC_{lab,D,f3}$	Report A1-007750.2	61
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,D,f3}$	RR-331 Eq. 1.5	67
Flanking STC for Junction 3		**63**
Junction 1 - Separating floor and the flanking non-load bearing walls		
Flanking STC for Junction 4 - Same as Junction 2		**66**
ASTC due to Direct plus Flanking Transmission	**RR-331 Equation 1.4**	**52**

Example 31: Rooms one-above-the-other **SIMPLIFIED METHOD**

- **Wood framed walls and floors.**
- **Wood I-joists 302 mm deep spaced 406 mm on center.**
- **Wall framing includes single and triple staggered wood studs.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board directly attached to the wood studs in both the upper and the lower rooms.**
- **One layer of 15 mm OSB directly attached to the floor joists.**
- **Topping of cementitious flooring.**

Separating floor/ceiling assembly with:

- Topping of two layers of 12 mm cementitious flooring underlayment installed on top of 12 mm wood fiber board.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- The joists are oriented perpendicular to the loadbearing walls but not continuous across the junction.
- Subfloor of one layer of 15 mm (19/32") OSB directly attached to wood I-joists.
- One layer of 152 mm thick CertainTeed Sustainable Insulation® R20 thermal insulation in the floor cavity.
- Ceiling of two layers of 12.7 mm CertainTeed Type X gypsum board installed on the resilient channels on the ceiling.
- Resilient channels installed perpendicular to wood I-joists and spaced 400 mm on center.

Junction 1&3: Loadbearing walls above and below the junction:

- Floor joists oriented perpendicular to these walls.
- Triple staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in both rooms.
- One layer of 89 mm CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 2&4: Non-loadbearing walls above and below the junction:

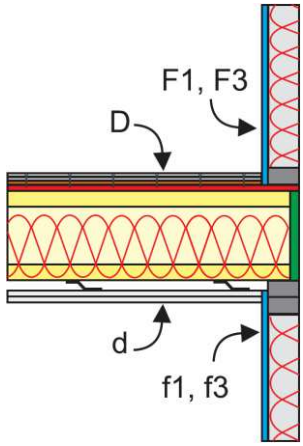
- Floor joists oriented parallel to these walls.
- Single staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in both rooms.
- One layer of 89 mm CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Note: For the path/surface designations in the calculations the upper room is treated as the source room (surfaces D and F)

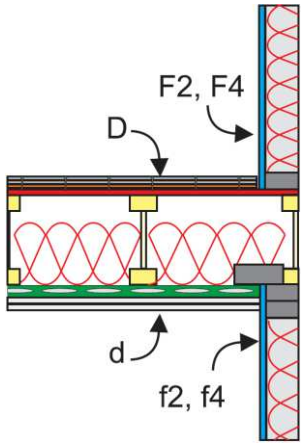
Room Parameters

- See Figure 3 of this report or Figure 1.4 of the National Research Council Report RR-331.
- The separating floor / ceiling is 4 m by 5 m.
- Walls 1 and 3 are 2.5 m high by 5 m wide.
- Walls 2 and 4 are 2.5 m high by 4 m wide

Illustration for this case



Junction 1 or 3: Loadbearing side walls above and below the floor/ceiling assembly (wood I joists of floor are perpendicular to loadbearing wall). One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in both rooms. (Side view)



Junction 2 or 4: Non-loadbearing side walls above and below the floor/ceiling assembly (wood I joists of floor are parallel to the non-loadbearing wall). One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in both rooms. (Side view)

Example 31	Reference	Value
Direct STC Rating of Path Dd through the Separating Floor		
STC_{Dd}	Report A1-007750.2 Appendix B	**57**
Junction 1 - Separating floor and the flanking load bearing walls		
Flanking Path Ff_1		
$Flanking\ STC_{lab,F1,f1}$	Report A1-007750.2	64
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F1,f1}$	RR-331 Eq. 1.5	70
Flanking Path Fd_1		
$Flanking\ STC_{lab,F1,d}$	Report A1-007750.2	66
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F1,d}$	RR-331 Eq. 1.5	72
Flanking Path Df_1		
$Flanking\ STC_{lab,D,f1}$	Report A1-007750.2	65
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,D,f1}$	RR-331 Eq. 1.5	71
Flanking STC for Junction 1		**66**
Junction 1 - Separating floor and the flanking non-load bearing walls		
Flanking Path Ff_2		
$Flanking\ STC_{lab,F2,f2}$	Report A1-007750.2	70
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,f2}$	RR-331 Eq. 1.5	77
Flanking Path Fd_2		
$Flanking\ STC_{lab,F2,d}$	Report A1-007750.2	73
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,d}$	RR-331 Eq. 1.5	80
Flanking Path Df_2		
$Flanking\ STC_{lab,D,f2}$	Report A1-007750.2	68
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,D,f2}$	RR-331 Eq. 1.5	75
Flanking STC for Junction 2		**72**
Junction 1 - Separating floor and the flanking load bearing walls		
Flanking Path Ff_3		
$Flanking\ STC_{lab,F3,f3}$	Report A1-007750.2	64
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F3,f3}$	RR-331 Eq. 1.5	70
Flanking Path Fd_3		
$Flanking\ STC_{lab,F3,d}$	Report A1-007750.2	66
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F3,d}$	RR-331 Eq. 1.5	72
Flanking Path Df_3		
$Flanking\ STC_{lab,D,f3}$	Report A1-007750.2	65
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,D,f3}$	RR-331 Eq. 1.5	71
Flanking STC for Junction 3		**66**
Junction 1 - Separating floor and the flanking non-load bearing walls		
Flanking STC for Junction 4 - Same as Junction 2		**72**
ASTC due to Direct plus Flanking Transmission	**RR-331 Equation 1.4**	**56**

Example 32: Rooms one-above-the-other **SIMPLIFIED METHOD**

- **Wood framed walls and floors.**
- **Wood I-joists 302 mm deep spaced 406 mm on center.**
- **Wall framing includes single and triple staggered wood studs.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board directly attached to the wood studs in the upper room. One layer of 15.9 mm (5/8") CertainTeed Type X directly attached to the wood studs in the lower room.**
- **One layer of 15 mm OSB directly attached to the floor joists.**
- **Topping of cementitious flooring.**

Separating floor/ceiling assembly with:

- Topping of two layers of 12 mm cementitious flooring underlayment installed on top of 12 mm wood fiber board.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- The joists are oriented perpendicular to the loadbearing walls but not continuous across the junction.
- Subfloor of one layer of 15 mm (19/32") OSB directly attached to wood I-joists.
- One layer of 152 mm thick CertainTeed Sustainable Insulation® R20 thermal insulation in the floor cavity.
- Ceiling of two layers of 12.7 mm CertainTeed Type X gypsum board installed on the resilient channels on the ceiling.
- Resilient channels installed perpendicular to wood I-joists and spaced 400 mm on center.

Junction 1&3: Loadbearing walls above and below the junction:

- Floor joists oriented perpendicular to these walls.
- Triple staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in the upper room (F1 and F3). One layer of 15.9 mm CertainTeed Type X directly attached to the wood studs in the lower room (f1 and f3).
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 2&4: Non-loadbearing walls above and below the junction:

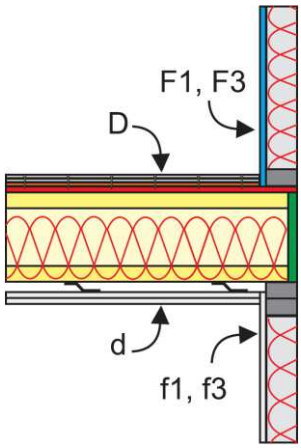
- Floor joists oriented parallel to these walls.
- Single staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in the upper room (F2 and F4). One layer of 15.9 mm CertainTeed Type X directly attached to the wood studs in the lower room (f2 and f4).
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Note: For the path/surface designations in the calculations the upper room is treated as the source room (surfaces D and F)

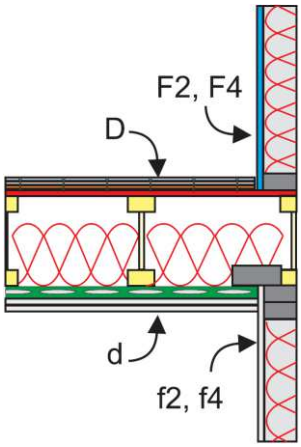
Room Parameters

- See Figure 3 of this report or Figure 1.4 of the National Research Council Report RR-331.
- The separating floor / ceiling is 4 m by 5 m.
- Walls 1 and 3 are 2.5 m high by 5 m wide.
- Walls 2 and 4 are 2.5 m high by 4 m wide

Illustration for this case



Junction 1 or 3: Loadbearing side walls above and below the floor/ceiling assembly (wood I joists of floor are perpendicular to loadbearing wall). One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in the upper room (F1 and F3). One layer of 15.9 mm CertainTeed Type X directly attached to the wood studs in the lower room (f1 and f3). (Side view)



Junction 2 or 4: Non-loadbearing side walls above and below the floor/ceiling assembly (wood I joists of floor are parallel to the non-loadbearing wall). One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in the upper room (F2 and F4). One layer of 15.9 mm CertainTeed Type X directly attached to the wood studs in the lower room (f2 and f4). (Side view)

Example 32	Reference	Value
Direct STC Rating of Path Dd through the Separating Floor		
STC_{Dd}	Report A1-007750.2 Appendix B	**57**
Junction 1 - Separating floor and the flanking load bearing walls		
Flanking Path Ff_1		
$Flanking\ STC_{lab,F1,f1}$	Report A1-007750.2	61
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F1,f1}$	RR-331 Eq. 1.5	67
Flanking Path Fd_1		
$Flanking\ STC_{lab,F1,d}$	Report A1-007750.2	65
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F1,d}$	RR-331 Eq. 1.5	71
Flanking Path Df_1		
$Flanking\ STC_{lab,D,f1}$	Report A1-007750.2	63
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,D,f1}$	RR-331 Eq. 1.5	69
Flanking STC for Junction 1		**64**
Junction 1 - Separating floor and the flanking non-load bearing walls		
Flanking Path Ff_2		
$Flanking\ STC_{lab,F2,f2}$	Report A1-007750.2	64
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,f2}$	RR-331 Eq. 1.5	71
Flanking Path Fd_2		
$Flanking\ STC_{lab,F2,d}$	Report A1-007750.2	71
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,d}$	RR-331 Eq. 1.5	78
Flanking Path Df_2		
$Flanking\ STC_{lab,D,f2}$	Report A1-007750.2	64
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,D,f2}$	RR-331 Eq. 1.5	71
Flanking STC for Junction 2		**68**
Junction 1 - Separating floor and the flanking load bearing walls		
Flanking Path Ff_3		
$Flanking\ STC_{lab,F3,f3}$	Report A1-007750.2	61
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F3,f3}$	RR-331 Eq. 1.5	67
Flanking Path Fd_3		
$Flanking\ STC_{lab,F3,d}$	Report A1-007750.2	65
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F3,d}$	RR-331 Eq. 1.5	71
Flanking Path Df_3		
$Flanking\ STC_{lab,D,f3}$	Report A1-007750.2	63
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,D,f3}$	RR-331 Eq. 1.5	69
Flanking STC for Junction 3		**64**
Junction 1 - Separating floor and the flanking non-load bearing walls		
Flanking STC for Junction 4 - Same as Junction 2		**68**
ASTC due to Direct plus Flanking Transmission	**RR-331 Equation 1.4**	**55**

Example 33: Rooms one-above-the-other **SIMPLIFIED METHOD**

- **Wood framed walls and floors.**
- **Wood I-joists 302 mm deep spaced 406 mm on center.**
- **Wall framing includes single and triple staggered wood studs.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board directly attached to the wood studs in both the upper and the lower rooms.**
- **One layer of 15 mm OSB directly attached to the floor joists.**
- **Topping of 38 mm thick gypsum concrete.**

Separating floor/ceiling assembly with:

- Topping of 38 mm thick gypsum concrete on a 9 mm closed cell foam interlayer.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- The joists are oriented perpendicular to the loadbearing walls but not continuous across the junction.
- Subfloor of one layer of 15 mm (19/32") OSB directly attached to wood I-joists.
- One layer of 152 mm thick CertainTeed Sustainable Insulation® R20 thermal insulation in the floor cavity.
- Ceiling of two layers of 12.7 mm CertainTeed Type X gypsum board installed on the resilient channels on the ceiling.
- Resilient channels installed perpendicular to wood I-joists and spaced 400 mm on center.

Junction 1&3: Loadbearing walls above and below the junction:

- Floor joists oriented perpendicular to these walls.
- Triple staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in both rooms.
- One layer of 89 mm CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 2&4: Non-loadbearing walls above and below the junction:

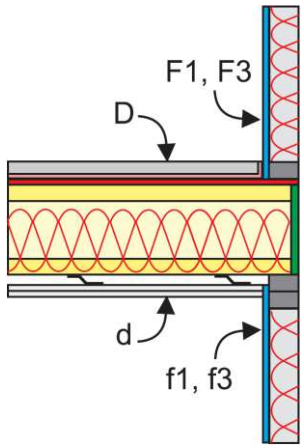
- Floor joists oriented parallel to these walls.
- Single staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in both rooms.
- One layer of 89 mm CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Note: For the path/surface designations in the calculations the upper room is treated as the source room (surfaces D and F)

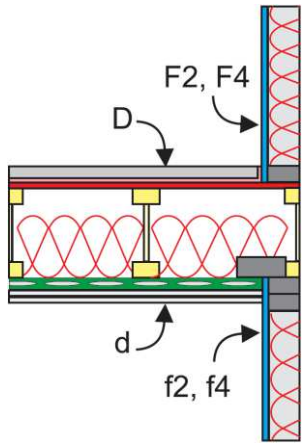
Room Parameters

- See Figure 3 of this report or Figure 1.4 of the National Research Council Report RR-331.
- The separating floor / ceiling is 4 m by 5 m.
- Walls 1 and 3 are 2.5 m high by 5 m wide.
- Walls 2 and 4 are 2.5 m high by 4 m wide

Illustration for this case



Junction 1 or 3: Loadbearing side walls above and below the floor/ceiling assembly (wood I joists of floor are perpendicular to loadbearing wall). One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in both rooms. (Side view)



Junction 2 or 4: Non-loadbearing side walls above and below the floor/ceiling assembly (wood I joists of floor are parallel to the non-loadbearing wall). One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in both rooms. (Side view)

Example 33	Reference	Value
Direct STC Rating of Path Dd through the Separating Floor		
STC_{Dd}	Report A1-007750.2 Appendix B	**68**
Junction 1 - Separating floor and the flanking load bearing walls		
Flanking Path Ff_1		
$Flanking\ STC_{lab,F1,f1}$	Report A1-007750.2	64
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F1,f1}$	RR-331 Eq. 1.5	70
Flanking Path Fd_1		
$Flanking\ STC_{lab,F1,d}$	Report A1-007750.2	72
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F1,d}$	RR-331 Eq. 1.5	78
Flanking Path Df_1		
$Flanking\ STC_{lab,D,f1}$	Report A1-007750.2	71
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,D,f1}$	RR-331 Eq. 1.5	77
Flanking STC for Junction 1		**69**
Junction 1 - Separating floor and the flanking non-load bearing walls		
Flanking Path Ff_2		
$Flanking\ STC_{lab,F2,f2}$	Report A1-007750.2	70
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,f2}$	RR-331 Eq. 1.5	77
Flanking Path Fd_2		
$Flanking\ STC_{lab,F2,d}$	Report A1-007750.2	79
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,d}$	RR-331 Eq. 1.5	86
Flanking Path Df_2		
$Flanking\ STC_{lab,D,f2}$	Report A1-007750.2	74
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,D,f2}$	RR-331 Eq. 1.5	81
Flanking STC for Junction 2		**75**
Junction 1 - Separating floor and the flanking load bearing walls		
Flanking Path Ff_3		
$Flanking\ STC_{lab,F3,f3}$	Report A1-007750.2	64
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F3,f3}$	RR-331 Eq. 1.5	70
Flanking Path Fd_3		
$Flanking\ STC_{lab,F3,d}$	Report A1-007750.2	72
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F3,d}$	RR-331 Eq. 1.5	78
Flanking Path Df_3		
$Flanking\ STC_{lab,D,f3}$	Report A1-007750.2	71
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,D,f3}$	RR-331 Eq. 1.5	77
Flanking STC for Junction 3		**69**
Junction 1 - Separating floor and the flanking non-load bearing walls		
Flanking STC for Junction 4 - Same as Junction 2		**75**
ASTC due to Direct plus Flanking Transmission	**RR-331 Equation 1.4**	**63**

Example 34: Rooms one-above-the-other **SIMPLIFIED METHOD**

- **Wood framed walls and floors.**
- **Wood I-joists 302 mm deep spaced 406 mm on center.**
- **Wall framing includes single and triple staggered wood studs.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board directly attached to the wood studs in the upper room. One layer of 15.9 mm (5/8") CertainTeed Type X directly attached to the wood studs in the lower room.**
- **One layer of 15 mm OSB directly attached to the floor joists.**
- **Topping of 38 mm thick gypsum concrete.**

Separating floor/ceiling assembly with:

- Topping of 38 mm thick gypsum concrete on a 9 mm closed cell foam interlayer.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- The joists are oriented perpendicular to the loadbearing walls but not continuous across the junction.
- Subfloor of one layer of 15 mm (19/32") OSB directly attached to wood I-joists.
- One layer of 152 mm thick CertainTeed Sustainable Insulation® R20 thermal insulation in the floor cavity.
- Ceiling of two layers of 12.7 mm CertainTeed Type X gypsum board installed on the resilient channels on the ceiling.
- Resilient channels installed perpendicular to wood I-joists and spaced 400 mm on center.

Junction 1&3: Loadbearing walls above and below the junction:

- Floor joists oriented perpendicular to these walls.
- Triple staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in the upper room (F1 and F3). One layer of 15.9 mm CertainTeed Type X directly attached to the wood studs in the lower room (f1 and f3).
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 2&4: Non-loadbearing walls above and below the junction:

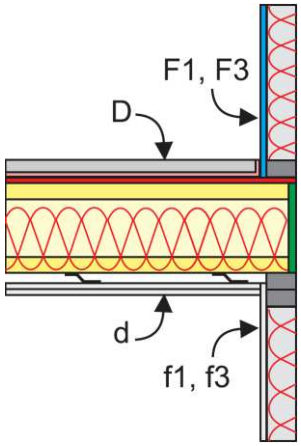
- Floor joists oriented parallel to these walls.
- Single staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in the upper room (F2 and F4). One layer of 15.9 mm CertainTeed Type X directly attached to the wood studs in the lower room (f2 and f4).
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Note: For the path/surface designations in the calculations the upper room is treated as the source room (surfaces D and F)

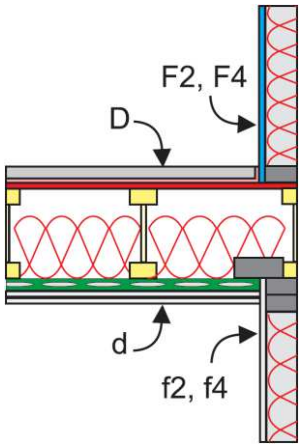
Room Parameters

- See Figure 3 of this report or Figure 1.4 of the National Research Council Report RR-331.
- The separating floor / ceiling is 4 m by 5 m.
- Walls 1 and 3 are 2.5 m high by 5 m wide.
- Walls 2 and 4 are 2.5 m high by 4 m wide

Illustration for this case



Junction 1 or 3: Loadbearing side walls above and below the floor/ceiling assembly (wood I joists of floor are perpendicular to loadbearing wall). One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in the upper room (F1 and F3). One layer of 15.9 mm CertainTeed Type X directly attached to the wood studs in the lower room (f1 and f3). (Side view)



Junction 2 or 4: Non-loadbearing side walls above and below the floor/ceiling assembly (wood I joists of floor are parallel to the non-loadbearing wall). One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in the upper room (F2 and F4). One layer of 15.9 mm CertainTeed Type X directly attached to the wood studs in the lower room (f2 and f4). (Side view)

Example 34	Reference	Value
Direct STC Rating of Path Dd through the Separating Floor		
STC_{Dd}	Report A1-007750.2 Appendix B	**68**
Junction 1 - Separating floor and the flanking load bearing walls		
Flanking Path Ff_1		
$Flanking\ STC_{lab,F1,f1}$	Report A1-007750.2	61
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F1,f1}$	RR-331 Eq. 1.5	67
Flanking Path Fd_1		
$Flanking\ STC_{lab,F1,d}$	Report A1-007750.2	71
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F1,d}$	RR-331 Eq. 1.5	77
Flanking Path Df_1		
$Flanking\ STC_{lab,D,f1}$	Report A1-007750.2	69
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,D,f1}$	RR-331 Eq. 1.5	75
Flanking STC for Junction 1		**66**
Junction 1 - Separating floor and the flanking non-load bearing walls		
Flanking Path Ff_2		
$Flanking\ STC_{lab,F2,f2}$	Report A1-007750.2	64
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,f2}$	RR-331 Eq. 1.5	71
Flanking Path Fd_2		
$Flanking\ STC_{lab,F2,d}$	Report A1-007750.2	77
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,d}$	RR-331 Eq. 1.5	84
Flanking Path Df_2		
$Flanking\ STC_{lab,D,f2}$	Report A1-007750.2	70
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,D,f2}$	RR-331 Eq. 1.5	77
Flanking STC for Junction 2		**70**
Junction 1 - Separating floor and the flanking load bearing walls		
Flanking Path Ff_3		
$Flanking\ STC_{lab,F3,f3}$	Report A1-007750.2	61
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F3,f3}$	RR-331 Eq. 1.5	67
Flanking Path Fd_3		
$Flanking\ STC_{lab,F3,d}$	Report A1-007750.2	71
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F3,d}$	RR-331 Eq. 1.5	77
Flanking Path Df_3		
$Flanking\ STC_{lab,D,f3}$	Report A1-007750.2	69
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,D,f3}$	RR-331 Eq. 1.5	75
Flanking STC for Junction 3		**66**
Junction 1 - Separating floor and the flanking non-load bearing walls		
Flanking STC for Junction 4 - Same as Junction 2		**70**
ASTC due to Direct plus Flanking Transmission	**RR-331 Equation 1.4**	**61**

Example 52: Rooms one-above-the-other **SIMPLIFIED METHOD**

- **Wood framed walls and floors.**
- **Fire rated floor BXUV.M535[1] with a bare 15 mm OSB subfloor.[2]**
- **Wall framing includes single and triple staggered wood studs.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board directly attached to the wood studs in both the upper and the lower rooms.**

Separating floor/ceiling assembly with:

- The joists are oriented perpendicular to the loadbearing walls but not continuous across the junction.
- Wood I-joists 241 mm (9.5") deep spaced 406 mm (16") on center. Doubled rim boards (32 mm (1-1/4") thick and 241 mm deep) installed at each end of the I-joists.
- Subfloor of 15 mm (19/32") OSB directly attached to the I-joists.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the floor cavity.
- Resilient channels installed perpendicular to wood I-joists and spaced 305 mm (12") on center.
- Base layer of layer of 15.9 mm SilentFX® QuickCut gypsum board and a face layer of 12.7 mm (1/2") CertainTeed Type C gypsum board installed on the resilient channels on the ceiling.

Junction 1&3: Loadbearing walls above and below the junction:

- Floor joists oriented perpendicular to these walls.
- Triple staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in both rooms.
- One layer of 89 mm CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 2&4: Non-loadbearing walls above and below the junction:

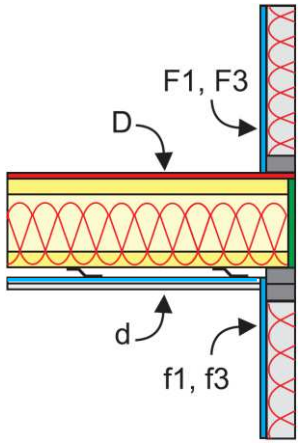
- Floor joists oriented parallel to these walls.
- Single staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in both rooms.
- One layer of 89 mm CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Note: For the path/surface designations in the calculations the upper room is treated as the source room (surfaces D and F)

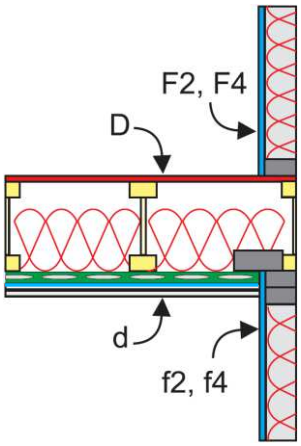
Room Parameters

- See Figure 3 of this report or Figure 1.4 of the National Research Council Report RR-331.
- The separating floor / ceiling is 4 m by 5 m.
- Walls 1 and 3 are 2.5 m high by 5 m wide.
- Walls 2 and 4 are 2.5 m high by 4 m wide.

Illustration for this case



Junction 1 or 3: Loadbearing side walls above and below the floor/ceiling assembly (wood I joists of floor are perpendicular to loadbearing wall). One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in both rooms. (Side view)



Junction 2 or 4: Non-loadbearing side walls above and below the floor/ceiling assembly (wood I joists of floor are parallel to the non-loadbearing wall). One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in both rooms. (Side view)

Example 52	Reference	Value
Direct STC Rating of Path Dd through the Separating Floor		
Laboratory Measured STC Rating	Report A1-012057.1	**50**
Junction 1 - Junction between the separating floor and the flanking load bearing walls		
Flanking Path Ff_1		
$Flanking\ STC_{\ lab,F1,f1}$	Reports A1-007750.2 and A1-012057.1	64
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{\ situ,F1,f1}$	RR-331 Eq. 1.5	70
Flanking Path Fd_1		
$Flanking\ STC_{\ lab,F1,d}$	Reports A1-007750.2 and A1-012057.1	63
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{\ situ,F1,d}$	RR-331 Eq. 1.5	69
Flanking Path Df_1		
$Flanking\ STC_{\ lab,D,f1}$	Reports A1-007750.2 and A1-012057.1	62
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{\ situ,D,f1}$	RR-331 Eq. 1.5	68
Flanking STC for Junction 1		**64**
Junction 2 - Junction between the separating floor and the flanking non-load bearing walls		
Flanking Path Ff_2		
$Flanking\ STC_{\ lab,F2,f2}$	Reports A1-007750.2 and A1-012057.1	70
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{\ situ,F2,f2}$	RR-331 Eq. 1.5	77
Flanking Path Fd_2		
$Flanking\ STC_{\ lab,F2,d}$	Reports A1-007750.2 and A1-012057.1	74
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{\ situ,F2,d}$	RR-331 Eq. 1.5	81
Flanking Path Df_2		
$Flanking\ STC_{\ lab,D,f2}$	Reports A1-007750.2 and A1-012057.1	65
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{\ situ,D,f2}$	RR-331 Eq. 1.5	72
Flanking STC for Junction 2		**70**
Junction 3 - Junction between the separating floor and the flanking load bearing walls		
Flanking Path Ff_3		
$Flanking\ STC_{\ lab,F3,f3}$	Reports A1-007750.2 and A1-012057.1	64
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{\ situ,F3,f3}$	RR-331 Eq. 1.5	70
Flanking Path Fd_3		
$Flanking\ STC_{\ lab,F3,d}$	Reports A1-007750.2 and A1-012057.1	63
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{\ situ,F3,d}$	RR-331 Eq. 1.5	69
Flanking Path Df_3		
$Flanking\ STC_{\ lab,D,f3}$	Reports A1-007750.2 and A1-012057.1	62
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{\ situ,D,f3}$	RR-331 Eq. 1.5	68
Flanking STC for Junction 3		**64**
Junction 4 - Junction between the separating floor and the flanking non-load bearing walls		
Flanking STC for Junction 4 - Same as Junction 2		**70**
ASTC due to Direct plus Flanking Transmission	RR-331 Section 1.4	**50**

Example 53: Rooms one-above-the-other **SIMPLIFIED METHOD**

- **Wood framed walls and floors.**
- **Fire rated floor BXUV.M535[1] with a bare 15 mm OSB subfloor.[2]**
- **Wall framing includes single and triple staggered wood studs.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board directly attached to the wood studs in the upper room. One layer of 15.9 mm (5/8") CertainTeed Type X directly attached to the wood studs in the lower room.**

Separating floor/ceiling assembly with:

- The joists are oriented perpendicular to the loadbearing walls but not continuous across the junction.
- Wood I-joists 241 mm (9.5") deep spaced 406 mm (16") on center. Doubled rim boards (32 mm (1-1/4") thick and 241 mm deep) installed at each end of the I-joists.
- Subfloor of 15 mm (19/32") OSB directly attached to the I-joists.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the floor cavity.
- Resilient channels installed perpendicular to wood I-joists and spaced 305 mm (12") on center.
- Base layer of layer of 15.9 mm SilentFX® QuickCut gypsum board and a face layer of 12.7 mm (1/2") CertainTeed Type C gypsum board installed on the resilient channels on the ceiling.

Junction 1&3: Loadbearing walls above and below the junction:

- Floor joists oriented perpendicular to these walls.
- Triple staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in the upper room (F1 and F3). One layer of 15.9 mm CertainTeed Type X directly attached to the wood studs in the lower room (f1 and f3).
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 2&4: Non-loadbearing walls above and below the junction:

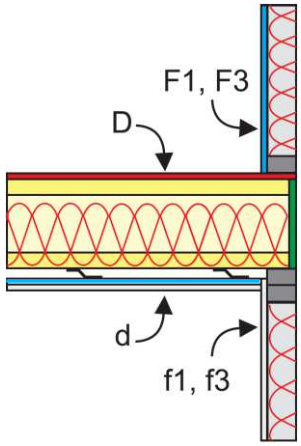
- Floor joists oriented parallel to these walls.
- Single staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in the upper room (F2 and F4). One layer of 15.9 mm CertainTeed Type X directly attached to the wood studs in the lower room (f2 and f4).
- One layer of 89 mm thick CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Note: For the path/surface designations in the calculations the upper room is treated as the source room (surfaces D and F)

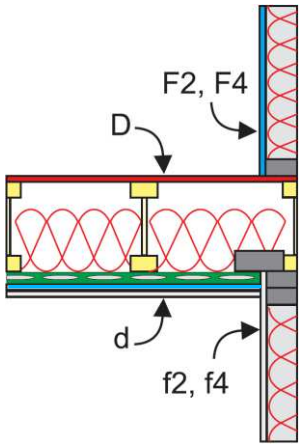
Room Parameters

- See Figure 3 of this report or Figure 1.4 of the National Research Council Report RR-331.
- The separating floor / ceiling is 4 m by 5 m.
- Walls 1 and 3 are 2.5 m high by 5 m wide.
- Walls 2 and 4 are 2.5 m high by 4 m wide

Illustration for this case



Junction 1 or 3: Loadbearing side walls above and below the floor/ceiling assembly (wood I joists of floor are perpendicular to loadbearing wall). One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in the upper room (F1 and F3). One layer of 15.9 mm CertainTeed Type X directly attached to the wood studs in the lower room (f1 and f3). (Side view)



Junction 2 or 4: Non-loadbearing side walls above and below the floor/ceiling assembly (wood I joists of floor are parallel to the non-loadbearing wall). One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in the upper room (F2 and F4). One layer of 15.9 mm CertainTeed Type X directly attached to the wood studs in the lower room (f2 and f4). (Side view)

Example 53	Reference	Value
Direct STC Rating of Path Dd through the Separating Floor		
Laboratory Measured STC Rating	Report A1-012057.1	**50**
Junction 1 - Junction between the separating floor and the flanking load bearing walls		
Flanking Path Ff_1		
$Flanking\ STC_{\ lab,F1,f1}$	Reports A1-007750.2 and A1-012057.1	61
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{\ situ,F1,f1}$	RR-331 Eq. 1.5	67
Flanking Path Fd_1		
$Flanking\ STC_{\ lab,F1,d}$	Reports A1-007750.2 and A1-012057.1	62
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{\ situ,F1,d}$	RR-331 Eq. 1.5	68
Flanking Path Df_1		
$Flanking\ STC_{\ lab,D,f1}$	Reports A1-007750.2 and A1-012057.1	60
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{\ situ,D,f1}$	RR-331 Eq. 1.5	66
Flanking STC for Junction 1		**62**
Junction 2 - Junction between the separating floor and the flanking non-load bearing walls		
Flanking Path Ff_2		
$Flanking\ STC_{\ lab,F2,f2}$	Reports A1-007750.2 and A1-012057.1	64
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{\ situ,F2,f2}$	RR-331 Eq. 1.5	71
Flanking Path Fd_2		
$Flanking\ STC_{\ lab,F2,d}$	Reports A1-007750.2 and A1-012057.1	72
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{\ situ,F2,d}$	RR-331 Eq. 1.5	79
Flanking Path Df_2		
$Flanking\ STC_{\ lab,D,f2}$	Reports A1-007750.2 and A1-012057.1	61
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{\ situ,D,f2}$	RR-331 Eq. 1.5	68
Flanking STC for Junction 2		**66**
Junction 3 - Junction between the separating floor and the flanking load bearing walls		
Flanking Path Ff_3		
$Flanking\ STC_{\ lab,F3,f3}$	Reports A1-007750.2 and A1-012057.1	61
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{\ situ,F3,f3}$	RR-331 Eq. 1.5	67
Flanking Path Fd_3		
$Flanking\ STC_{\ lab,F3,d}$	Reports A1-007750.2 and A1-012057.1	62
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{\ situ,F3,d}$	RR-331 Eq. 1.5	68
Flanking Path Df_3		
$Flanking\ STC_{\ lab,D,f3}$	Reports A1-007750.2 and A1-012057.1	60
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{\ situ,D,f3}$	RR-331 Eq. 1.5	66
Flanking STC for Junction 3		**62**
Junction 4 - Junction between the separating floor and the flanking non-load bearing walls		
Flanking STC for Junction 4 - Same as Junction 2		**66**
ASTC due to Direct plus Flanking Transmission	RR-331 Section 1.4	**49**

4.6 Rooms One-above-the-Other - Assemblies with Shear Elements

Example	ASTC	Floor System	Topping	Shear Element Room 1	Shear Element Room 1	Wallboard Room 1 - Directly Fixed to the Plywood	Wallboard Room 2 - Directly Fixed to the Plywood
35	52	1	None	15.9 mm plywood directly attached to the studs of all walls	15.9 mm plywood directly attached to the studs of all walls	One layer of 15.9 mm SilentFX® QuickCut gypsum board	One layer of 15.9 mm SilentFX® QuickCut gypsum board
36	52	"	"	"	"	"	One layer of 15.9 mm CertainTeed Type X gypsum board
37	56	"	Two layers of 12 mm cementitious flooring underlayment	"	"	"	One layer of 15.9 mm SilentFX® QuickCut gypsum board
38	55	"	"	"	"	"	One layer of 15.9 mm CertainTeed Type X gypsum board
39	63	"	38 mm thick gypsum concrete on a 9 mm closed cell foam	"	"	"	One layer of 15.9 mm SilentFX® QuickCut gypsum board
40	61	"	"	"	"	"	One layer of 15.9 mm CertainTeed Type X gypsum board
54	50	2	None	"	"	"	One layer of 15.9 mm SilentFX® QuickCut gypsum board
55	49	"	"	"	"	"	One layer of 15.9 mm CertainTeed Type X gypsum board

Example	ASTC	Floor System	Topping	Shear Element Room 1	Shear Element Room 1	Wallboard Room 1 - Directly Fixed to the Plywood	Wallboard Room 2 - Directly Fixed to the Plywood
41	52	1	None	15.9 mm plywood attached to studs of one loadbearing wall.	15.9 mm plywood attached to studs of one loadbearing wall.	One layer of 15.9 mm SilentFX® QuickCut gypsum board	One layer of 15.9 mm SilentFX® QuickCut gypsum board
42	52	"	"	15.9 mm plywood attached to studs of one non-loadbearing wall.	15.9 mm plywood attached to studs of one non-loadbearing wall	"	"

Example 35: Rooms one-above-the-other **SIMPLIFIED METHOD**

- **Wood framed walls and floors.**
- **Wood I-joists 302 mm deep spaced 406 mm on center.**
- **Wall framing includes single and triple staggered wood studs.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board and 15.9 mm plywood directly attached to the wood studs in both the upper and the lower rooms.**
- **One layer of 15 mm OSB directly attached to the floor joists.**

Separating floor/ceiling assembly with:

- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- The joists are oriented perpendicular to the loadbearing walls but not continuous across the junction.
- Subfloor of one layer of 15 mm (19/32") OSB directly attached to wood I-joists.
- One layer of 152 mm thick CertainTeed Sustainable Insulation® R20 thermal insulation in the floor cavity.
- Ceiling of two layers of 12.7 mm CertainTeed Type X gypsum board installed on the resilient channels on the ceiling.
- Resilient channels installed perpendicular to wood I-joists and spaced 400 mm on center.

Junction 1&3: Loadbearing walls above and below the junction:

- Floor joists oriented perpendicular to these walls.
- Triple staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and 15.9 mm plywood directly attached to the wood studs in both rooms.
- One layer of 89 mm CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 2&4: Non-loadbearing walls above and below the junction:

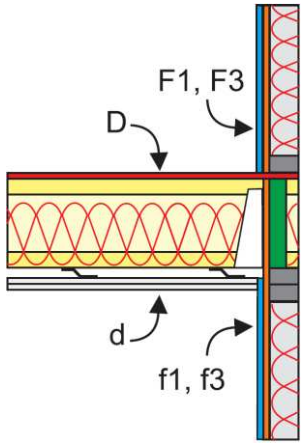
- Floor joists oriented parallel to these walls.
- Single staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and 15.9 mm plywood directly attached to the wood studs in both rooms.
- One layer of 89 mm CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Note: For the path/surface designations in the calculations the upper room is treated as the source room (surfaces D and F)

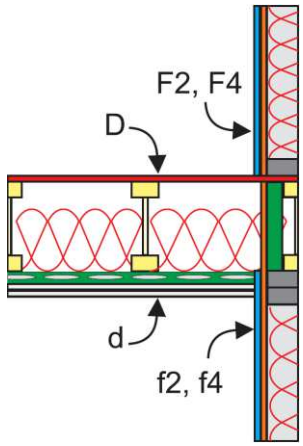
Room Parameters

- See Figure 3 of this report or Figure 1.4 of the National Research Council Report RR-331.
- The separating floor / ceiling is 4 m by 5 m.
- Walls 1 and 3 are 2.5 m high by 5 m wide.
- Walls 2 and 4 are 2.5 m high by 4 m wide

Illustration for this case



Junction 1 or 3: Loadbearing side walls above and below the floor/ceiling assembly (wood I joists of floor are perpendicular to loadbearing wall). One layer of 15.9 mm SilentFX® QuickCut gypsum board and 15.9 mm plywood directly attached to the wood studs in both rooms. (Side view)



Junction 2 or 4: Non-loadbearing side walls above and below the floor/ceiling assembly (wood I joists of floor are parallel to the non-loadbearing wall). One layer of 15.9 mm SilentFX® QuickCut gypsum board and 15.9 mm plywood directly attached to the wood studs in both rooms. (Side view)

Example 35	Reference	Value
Direct STC Rating of Path Dd through the Separating Floor		
Laboratory Measured STC Rating		**53**
Junction 1 - Junction between the separating floor and the flanking load bearing walls		
Flanking Path Ff_1		
$Flanking\ STC_{\ lab,F1,f1}$	Laboratory Measurement	63
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{\ situ,F1,f1}$	RR-331 Eq. 1.5	69
Flanking Path Fd_1		
$Flanking\ STC_{\ lab,F1,d}$	Laboratory Measurement	64
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{\ situ,F1,d}$	RR-331 Eq. 1.5	70
Flanking Path Df_1		
$Flanking\ STC_{\ lab,D,f1}$	Laboratory Measurement	63
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{\ situ,D,f1}$	RR-331 Eq. 1.5	69
Flanking STC for Junction 1		**65**
Junction 2 - Junction between the separating floor and the flanking non-load bearing walls		
Flanking Path Ff_2		
$Flanking\ STC_{\ lab,F2,f2}$	Laboratory Measurement	70
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{\ situ,F2,f2}$	RR-331 Eq. 1.5	77
Flanking Path Fd_2		
$Flanking\ STC_{\ lab,F2,d}$	Laboratory Measurement	76
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{\ situ,F2,d}$	RR-331 Eq. 1.5	83
Flanking Path Df_2		
$Flanking\ STC_{\ lab,D,f2}$	Laboratory Measurement	66
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{\ situ,D,f2}$	RR-331 Eq. 1.5	73
Flanking STC for Junction 2		**71**
Junction 3 - Junction between the separating floor and the flanking load bearing walls		
Flanking Path Ff_3		
$Flanking\ STC_{\ lab,F3,f3}$	Laboratory Measurement	63
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{\ situ,F3,f3}$	RR-331 Eq. 1.5	69
Flanking Path Fd_3		
$Flanking\ STC_{\ lab,F3,d}$	Laboratory Measurement	64
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{\ situ,F3,d}$	RR-331 Eq. 1.5	70
Flanking Path Df_3		
$Flanking\ STC_{\ lab,D,f3}$	Laboratory Measurement	63
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{\ situ,D,f3}$	RR-331 Eq. 1.5	69
Flanking STC for Junction 3		**65**
Junction 4 - Junction between the separating floor and the flanking non-load bearing walls		
Flanking STC for Junction 4 - Same as Junction 2		**71**
ASTC due to Direct plus Flanking Transmission	RR-331 Section 1.4	**52**

Example 36: Rooms one-above-the-other **SIMPLIFIED METHOD**

- **Wood framed walls and floors.**
- **Wood I-joists 302 mm deep spaced 406 mm on center.**
- **Wall framing includes single and triple staggered wood studs.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board and 15.9 mm plywood directly attached to the wood studs in the upper room. One layer of 15.9 mm (5/8") CertainTeed Type X and 15.9 mm plywood directly attached to the wood studs in the lower room.**
- **One layer of 15 mm OSB directly attached to the floor joists.**

Separating floor/ceiling assembly with:

- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- The joists are oriented perpendicular to the loadbearing walls but not continuous across the junction.
- Subfloor of one layer of 15 mm (19/32") OSB directly attached to wood I-joists.
- One layer of 152 mm thick CertainTeed Sustainable Insulation® R20 thermal insulation in the floor cavity.
- Ceiling of two layers of 12.7 mm CertainTeed Type X gypsum board installed on the resilient channels on the ceiling.
- Resilient channels installed perpendicular to wood I-joists and spaced 400 mm on center.

Junction 1&3: Loadbearing walls above and below the junction:

- Floor joists oriented perpendicular to these walls.
- Triple staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and 15.9 mm plywood directly attached to the wood studs in the upper room (F1 and F3). CertainTeed Type X and 15.9 mm plywood directly attached to the wood studs in the lower room (f1 and f3).
- CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 2&4: Non-loadbearing walls above and below the junction:

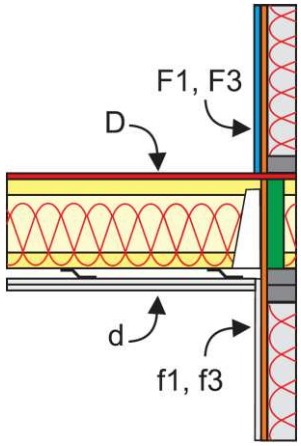
- Floor joists oriented parallel to these walls.
- Single staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and 15.9 mm plywood directly attached to the wood studs in the upper room (F2 and F4). One layer of 15.9 mm CertainTeed Type X and 15.9 mm plywood directly attached to the wood studs in the lower room (f2 and f4).
- CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity

Note: For the path/surface designations in the calculations the upper room is treated as the source room (surfaces D and F)

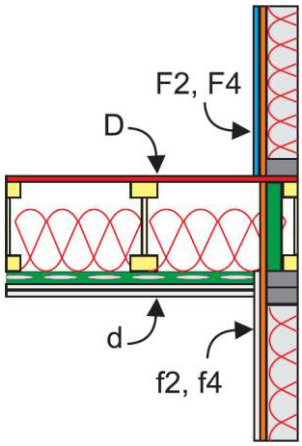
Room Parameters

- See Figure 3 of this report or Figure 1.4 of the National Research Council Report RR-331.
- The separating floor / ceiling is 4 m by 5 m.
- Walls 1 and 3 are 2.5 m high by 5 m wide.
- Walls 2 and 4 are 2.5 m high by 4 m wide

Illustration for this case



Junction 1 or 3: Loadbearing side walls above and below the floor/ceiling assembly (wood I joists of floor are perpendicular to loadbearing wall). One layer of 15.9 mm SilentFX® QuickCut gypsum board directly and 15.9 mm plywood attached to the wood studs in the upper room (F1 and F3). One layer of 15.9 mm CertainTeed Type X and 15.9 mm plywood directly attached to the wood studs in the lower room (f1 and f3). (Side view)



Junction 2 or 4: Non-loadbearing side walls above and below the floor/ceiling assembly (wood I joists of floor are parallel to the non-loadbearing wall). One layer of 15.9 mm SilentFX® QuickCut gypsum board and 15.9 mm plywood directly attached to the wood studs in the upper room (F2 and F4). One layer of 15.9 mm CertainTeed Type X and 15.9 mm plywood directly attached to the wood studs in the lower room (f2 and f4). (Side view)

Example 36	Reference	Value
Direct STC Rating of Path Dd through the Separating Floor		
STC_{Dd}	Report A1-007750.2 Appendix B	**53**
Junction 1 - Separating floor and the flanking load bearing walls		
Flanking Path Ff_1		
$Flanking\ STC_{lab,F1,f1}$	Report A1-007750.2	61
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F1,f1}$	RR-331 Eq. 1.5	67
Flanking Path Fd_1		
$Flanking\ STC_{lab,F1,d}$	Report A1-007750.2	63
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F1,d}$	RR-331 Eq. 1.5	69
Flanking Path Df_1		
$Flanking\ STC_{lab,D,f1}$	Report A1-007750.2	62
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,D,f1}$	RR-331 Eq. 1.5	68
Flanking STC for Junction 1		**63**
Junction 1 - Separating floor and the flanking non-load bearing walls		
Flanking Path Ff_2		
$Flanking\ STC_{lab,F2,f2}$	Report A1-007750.2	65
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,f2}$	RR-331 Eq. 1.5	72
Flanking Path Fd_2		
$Flanking\ STC_{lab,F2,d}$	Report A1-007750.2	69
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,d}$	RR-331 Eq. 1.5	76
Flanking Path Df_2		
$Flanking\ STC_{lab,D,f2}$	Report A1-007750.2	63
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,D,f2}$	RR-331 Eq. 1.5	70
Flanking STC for Junction 2		**67**
Junction 1 - Separating floor and the flanking load bearing walls		
Flanking Path Ff_3		
$Flanking\ STC_{lab,F3,f3}$	Report A1-007750.2	61
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F3,f3}$	RR-331 Eq. 1.5	67
Flanking Path Fd_3		
$Flanking\ STC_{lab,F3,d}$	Report A1-007750.2	63
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F3,d}$	RR-331 Eq. 1.5	69
Flanking Path Df_3		
$Flanking\ STC_{lab,D,f3}$	Report A1-007750.2	62
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,D,f3}$	RR-331 Eq. 1.5	68
Flanking STC for Junction 3		**63**
Junction 1 - Separating floor and the flanking non-load bearing walls		
Flanking STC for Junction 4 - Same as Junction 2		**67**
ASTC due to Direct plus Flanking Transmission	**RR-331 Equation 1.4**	**52**

Example 37: Rooms one-above-the-other **SIMPLIFIED METHOD**

- **Wood framed walls and floors.**
- **Wood I-joists 302 mm deep spaced 406 mm on center.**
- **Wall framing includes single and triple staggered wood studs.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board and 15.9 mm plywood directly attached to the wood studs in both the upper and the lower rooms.**
- **One layer of 15 mm OSB directly attached to the floor joists.**
- **Topping of cementitious flooring.**

Separating floor/ceiling assembly with:

- Topping of two layers of 12 mm cementitious flooring underlayment installed on top of 12 mm wood fiber board.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- The joists are oriented perpendicular to the loadbearing walls but not continuous across the junction.
- Subfloor of one layer of 15 mm (19/32") OSB directly attached to wood I-joists.
- One layer of 152 mm thick CertainTeed Sustainable Insulation® R20 thermal insulation in the floor cavity.
- Ceiling of two layers of 12.7 mm CertainTeed Type X gypsum board installed on the resilient channels on the ceiling.
- Resilient channels installed perpendicular to wood I-joists and spaced 400 mm on center.

Junction 1&3: Loadbearing walls above and below the junction:

- Floor joists oriented perpendicular to these walls.
- Triple staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and 15.9 mm plywood directly attached to the wood studs in both rooms.
- One layer of 89 mm CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 2&4: Non-loadbearing walls above and below the junction:

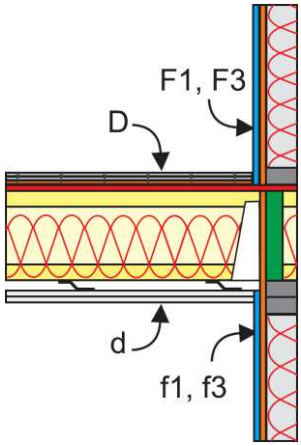
- Floor joists oriented parallel to these walls.
- Single staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and 15.9 mm plywood directly attached to the wood studs in both rooms.
- One layer of 89 mm CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Note: For the path/surface designations in the calculations the upper room is treated as the source room (surfaces D and F)

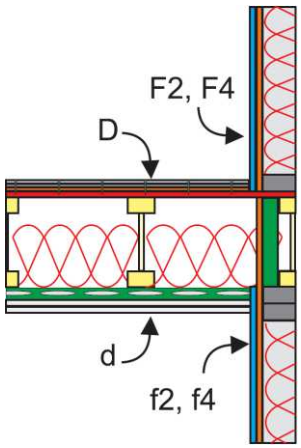
Room Parameters

- See Figure 3 of this report or Figure 1.4 of the National Research Council Report RR-331.
- The separating floor / ceiling is 4 m by 5 m.
- Walls 1 and 3 are 2.5 m high by 5 m wide.
- Walls 2 and 4 are 2.5 m high by 4 m wide

Illustration for this case



Junction 1 or 3: Loadbearing side walls above and below the floor/ceiling assembly (wood I joists of floor are perpendicular to loadbearing wall). One layer of 15.9 mm SilentFX® QuickCut gypsum board and 15.9 mm plywood directly attached to the wood studs in both rooms. (Side view)



Junction 2 or 4: Non-loadbearing side walls above and below the floor/ceiling assembly (wood I joists of floor are parallel to the non-loadbearing wall). One layer of 15.9 mm SilentFX® QuickCut gypsum board and 15.9 mm plywood directly attached to the wood studs in both rooms. (Side view)

Example 37	Reference	Value
Direct STC Rating of Path Dd through the Separating Floor		
STC_{Dd}	Report A1-007750.2 Appendix B	**57**
Junction 1 - Separating floor and the flanking load bearing walls		
Flanking Path Ff_1		
$Flanking\ STC_{lab,F1,f1}$	Report A1-007750.2	64
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F1,f1}$	RR-331 Eq. 1.5	70
Flanking Path Fd_1		
$Flanking\ STC_{lab,F1,d}$	Report A1-007750.2	66
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F1,d}$	RR-331 Eq. 1.5	72
Flanking Path Df_1		
$Flanking\ STC_{lab,D,f1}$	Report A1-007750.2	65
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,D,f1}$	RR-331 Eq. 1.5	71
Flanking STC for Junction 1		**66**
Junction 1 - Separating floor and the flanking non-load bearing walls		
Flanking Path Ff_2		
$Flanking\ STC_{lab,F2,f2}$	Report A1-007750.2	70
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,f2}$	RR-331 Eq. 1.5	77
Flanking Path Fd_2		
$Flanking\ STC_{lab,F2,d}$	Report A1-007750.2	73
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,d}$	RR-331 Eq. 1.5	80
Flanking Path Df_2		
$Flanking\ STC_{lab,D,f2}$	Report A1-007750.2	68
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,D,f2}$	RR-331 Eq. 1.5	75
Flanking STC for Junction 2		**72**
Junction 1 - Separating floor and the flanking load bearing walls		
Flanking Path Ff_3		
$Flanking\ STC_{lab,F3,f3}$	Report A1-007750.2	63
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F3,f3}$	RR-331 Eq. 1.5	69
Flanking Path Fd_3		
$Flanking\ STC_{lab,F3,d}$	Report A1-007750.2	66
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F3,d}$	RR-331 Eq. 1.5	72
Flanking Path Df_3		
$Flanking\ STC_{lab,D,f3}$	Report A1-007750.2	65
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,D,f3}$	RR-331 Eq. 1.5	71
Flanking STC for Junction 3		**66**
Junction 1 - Separating floor and the flanking non-load bearing walls		
Flanking STC for Junction 4 - Same as Junction 2		**72**
ASTC due to Direct plus Flanking Transmission	**RR-331 Equation 1.4**	**56**

Example 38: Rooms one-above-the-other **SIMPLIFIED METHOD**

- **Wood framed walls and floors.**
- **Wood I-joists 302 mm deep spaced 406 mm on center.**
- **Wall framing includes single and triple staggered wood studs.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board and 15.9 mm plywood directly attached to the wood studs in the upper room. One layer of 15.9 mm (5/8") CertainTeed Type X and 15.9 mm plywood directly attached to the wood studs in the lower room.**
- **One layer of 15 mm OSB directly attached to the floor joists.**
- **Topping of cementitious flooring.**

Separating floor/ceiling assembly with:

- Topping of two layers of 12 mm cementitious flooring underlayment installed on top of 12 mm wood fiber board.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- The joists are oriented perpendicular to the loadbearing walls but not continuous across the junction.
- Subfloor of one layer of 15 mm (19/32") OSB directly attached to wood I-joists.
- One layer of 152 mm thick CertainTeed Sustainable Insulation® R20 thermal insulation in the floor cavity.
- Ceiling of two layers of 12.7 mm CertainTeed Type X gypsum board installed on the resilient channels on the ceiling.
- Resilient channels installed perpendicular to wood I-joists and spaced 400 mm on center.

Junction 1&3: Loadbearing walls above and below the junction:

- Floor joists oriented perpendicular to these walls.
- Triple staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and 15.9 mm plywood directly attached to the wood studs in the upper room (F1 and F3). CertainTeed Type X and 15.9 mm plywood directly attached to the wood studs in the lower room (f1 and f3).
- CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 2&4: Non-loadbearing walls above and below the junction:

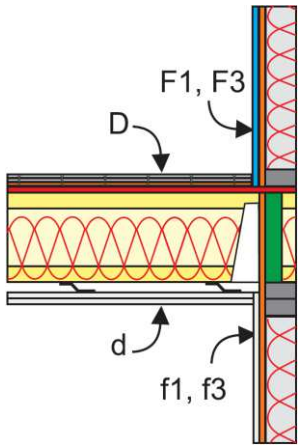
- Floor joists oriented parallel to these walls.
- Single staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and 15.9 mm plywood directly attached to the wood studs in the upper room (F2 and F4). One layer of 15.9 mm CertainTeed Type X and 15.9 mm plywood directly attached to the wood studs in the lower room (f2 and f4).
- CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity

Note: For the path/surface designations in the calculations the upper room is treated as the source room (surfaces D and F)

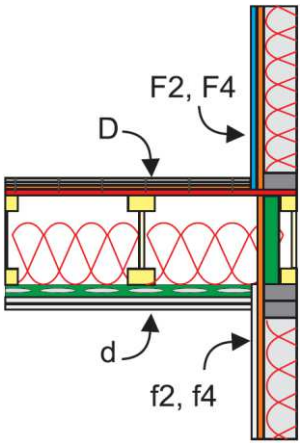
Room Parameters

- See Figure 3 of this report or Figure 1.4 of the National Research Council Report RR-331.
- The separating floor / ceiling is 4 m by 5 m.
- Walls 1 and 3 are 2.5 m high by 5 m wide.
- Walls 2 and 4 are 2.5 m high by 4 m wide

Illustration for this case



Junction 1 or 3: Loadbearing side walls above and below the floor/ceiling assembly (wood I joists of floor are perpendicular to loadbearing wall). One layer of 15.9 mm SilentFX® QuickCut gypsum board directly and 15.9 mm plywood attached to the wood studs in the upper room (F1 and F3). One layer of 15.9 mm CertainTeed Type X and 15.9 mm plywood directly attached to the wood studs in the lower room (f1 and f3). (Side view)



Junction 2 or 4: Non-loadbearing side walls above and below the floor/ceiling assembly (wood I joists of floor are parallel to the non-loadbearing wall). One layer of 15.9 mm SilentFX® QuickCut gypsum board and 15.9 mm plywood directly attached to the wood studs in the upper room (F2 and F4). One layer of 15.9 mm CertainTeed Type X and 15.9 mm plywood directly attached to the wood studs in the lower room (f2 and f4). (Side view)

Example 38	Reference	Value
Direct STC Rating of Path Dd through the Separating Floor		
STC_{Dd}	Report A1-007750.2 Appendix B	**57**
Junction 1 - Separating floor and the flanking load bearing walls		
Flanking Path Ff_1		
$Flanking\ STC_{lab,F1,f1}$	Report A1-007750.2	61
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F1,f1}$	RR-331 Eq. 1.5	67
Flanking Path Fd_1		
$Flanking\ STC_{lab,F1,d}$	Report A1-007750.2	65
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F1,d}$	RR-331 Eq. 1.5	71
Flanking Path Df_1		
$Flanking\ STC_{lab,D,f1}$	Report A1-007750.2	64
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,D,f1}$	RR-331 Eq. 1.5	70
Flanking STC for Junction 1		**64**
Junction 1 - Separating floor and the flanking non-load bearing walls		
Flanking Path Ff_2		
$Flanking\ STC_{lab,F2,f2}$	Report A1-007750.2	65
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,f2}$	RR-331 Eq. 1.5	72
Flanking Path Fd_2		
$Flanking\ STC_{lab,F2,d}$	Report A1-007750.2	71
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,d}$	RR-331 Eq. 1.5	78
Flanking Path Df_2		
$Flanking\ STC_{lab,D,f2}$	Report A1-007750.2	65
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,D,f2}$	RR-331 Eq. 1.5	72
Flanking STC for Junction 2		**68**
Junction 1 - Separating floor and the flanking load bearing walls		
Flanking Path Ff_3		
$Flanking\ STC_{lab,F3,f3}$	Report A1-007750.2	61
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F3,f3}$	RR-331 Eq. 1.5	67
Flanking Path Fd_3		
$Flanking\ STC_{lab,F3,d}$	Report A1-007750.2	65
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F3,d}$	RR-331 Eq. 1.5	71
Flanking Path Df_3		
$Flanking\ STC_{lab,D,f3}$	Report A1-007750.2	64
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,D,f3}$	RR-331 Eq. 1.5	70
Flanking STC for Junction 3		**64**
Junction 1 - Separating floor and the flanking non-load bearing walls		
Flanking STC for Junction 4 - Same as Junction 2		**68**
ASTC due to Direct plus Flanking Transmission	**RR-331 Equation 1.4**	**55**

Example 39: Rooms one-above-the-other **SIMPLIFIED METHOD**

- **Wood framed walls and floors.**
- **Wood I-joists 302 mm deep spaced 406 mm on center.**
- **Wall framing includes single and triple staggered wood studs.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board and 15.9 mm plywood directly attached to the wood studs in both the upper and the lower rooms.**
- **One layer of 15 mm OSB directly attached to the floor joists.**
- **Topping of 38 mm thick gypsum concrete.**

Separating floor/ceiling assembly with:

- Topping of 38 mm thick gypsum concrete on a 9 mm closed cell foam interlayer.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- The joists are oriented perpendicular to the loadbearing walls but not continuous across the junction.
- Subfloor of one layer of 15 mm (19/32") OSB directly attached to wood I-joists.
- One layer of 152 mm thick CertainTeed Sustainable Insulation® R20 thermal insulation in the floor cavity.
- Ceiling of two layers of 12.7 mm CertainTeed Type X gypsum board installed on the resilient channels on the ceiling.
- Resilient channels installed perpendicular to wood I-joists and spaced 400 mm on center.

Junction 1&3: Loadbearing walls above and below the junction:

- Floor joists oriented perpendicular to these walls.
- Triple staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and 15.9 mm plywood directly attached to the wood studs in both rooms.
- One layer of 89 mm CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 2&4: Non-loadbearing walls above and below the junction:

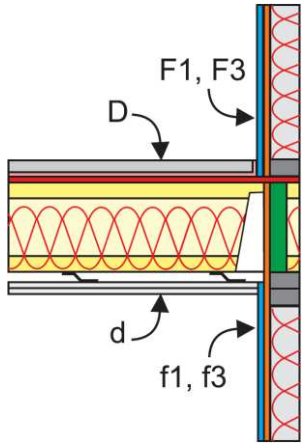
- Floor joists oriented parallel to these walls.
- Single staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and 15.9 mm plywood directly attached to the wood studs in both rooms.
- One layer of 89 mm CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Note: For the path/surface designations in the calculations the upper room is treated as the source room (surfaces D and F)

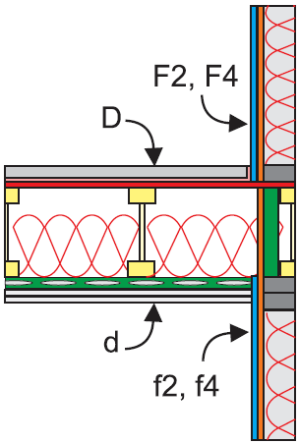
Room Parameters

- See Figure 3 of this report or Figure 1.4 of the National Research Council Report RR-331.
- The separating floor / ceiling is 4 m by 5 m.
- Walls 1 and 3 are 2.5 m high by 5 m wide.
- Walls 2 and 4 are 2.5 m high by 4 m wide

Illustration for this case



Junction 1 or 3: Loadbearing side walls above and below the floor/ceiling assembly (wood I joists of floor are perpendicular to loadbearing wall). One layer of 15.9 mm SilentFX® QuickCut gypsum board and 15.9 mm plywood directly attached to the wood studs in both rooms. (Side view)



Junction 2 or 4: Non-loadbearing side walls above and below the floor/ceiling assembly (wood I joists of floor are parallel to the non-loadbearing wall). One layer of 15.9 mm SilentFX® QuickCut gypsum board and 15.9 mm plywood directly attached to the wood studs in both rooms. (Side view)

Example 39	Reference	Value
Direct STC Rating of Path Dd through the Separating Floor		
STC_{Dd}	Report A1-007750.2 Appendix B	**68**
Junction 1 - Separating floor and the flanking load bearing walls		
Flanking Path Ff_1		
$Flanking\ STC_{lab,F1,f1}$	Report A1-007750.2	64
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F1,f1}$	RR-331 Eq. 1.5	70
Flanking Path Fd_1		
$Flanking\ STC_{lab,F1,d}$	Report A1-007750.2	72
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F1,d}$	RR-331 Eq. 1.5	78
Flanking Path Df_1		
$Flanking\ STC_{lab,D,f1}$	Report A1-007750.2	71
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,D,f1}$	RR-331 Eq. 1.5	77
Flanking STC for Junction 1		**69**
Junction 1 - Separating floor and the flanking non-load bearing walls		
Flanking Path Ff_2		
$Flanking\ STC_{lab,F2,f2}$	Report A1-007750.2	70
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,f2}$	RR-331 Eq. 1.5	77
Flanking Path Fd_2		
$Flanking\ STC_{lab,F2,d}$	Report A1-007750.2	79
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,d}$	RR-331 Eq. 1.5	86
Flanking Path Df_2		
$Flanking\ STC_{lab,D,f2}$	Report A1-007750.2	74
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,D,f2}$	RR-331 Eq. 1.5	81
Flanking STC for Junction 2		**75**
Junction 1 - Separating floor and the flanking load bearing walls		
Flanking Path Ff_3		
$Flanking\ STC_{lab,F3,f3}$	Report A1-007750.2	63
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F3,f3}$	RR-331 Eq. 1.5	69
Flanking Path Fd_3		
$Flanking\ STC_{lab,F3,d}$	Report A1-007750.2	71
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F3,d}$	RR-331 Eq. 1.5	77
Flanking Path Df_3		
$Flanking\ STC_{lab,D,f3}$	Report A1-007750.2	70
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,D,f3}$	RR-331 Eq. 1.5	76
Flanking STC for Junction 3		**68**
Junction 1 - Separating floor and the flanking non-load bearing walls		
Flanking STC for Junction 4 - Same as Junction 2		**75**
ASTC due to Direct plus Flanking Transmission	**RR-331 Equation 1.4**	**63**

Example 40: Rooms one-above-the-other **SIMPLIFIED METHOD**

- **Wood framed walls and floors.**
- **Wood I-joists 302 mm deep spaced 406 mm on center.**
- **Wall framing includes single and triple staggered wood studs.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board and 15.9 mm plywood directly attached to the wood studs in the upper room. One layer of 15.9 mm (5/8") CertainTeed Type X and 15.9 mm plywood directly attached to the wood studs in the lower room.**
- **One layer of 15 mm OSB directly attached to the floor joists.**
- **Topping of 38 mm thick gypsum concrete.**

Separating floor/ceiling assembly with:

- Topping of 38 mm thick gypsum concrete on a 9 mm closed cell foam interlayer.
- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- The joists are oriented perpendicular to the loadbearing walls but not continuous across the junction.
- Subfloor of one layer of 15 mm (19/32") OSB directly attached to wood I-joists.
- One layer of 152 mm thick CertainTeed Sustainable Insulation® R20 thermal insulation in the floor cavity.
- Ceiling of two layers of 12.7 mm CertainTeed Type X gypsum board installed on the resilient channels on the ceiling.
- Resilient channels installed perpendicular to wood I-joists and spaced 400 mm on center.

Junction 1&3: Loadbearing walls above and below the junction:

- Floor joists oriented perpendicular to these walls.
- Triple staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and 15.9 mm plywood directly attached to the wood studs in the upper room (F1 and F3). CertainTeed Type X and 15.9 mm plywood directly attached to the wood studs in the lower room (f1 and f3).
- CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 2&4: Non-loadbearing walls above and below the junction:

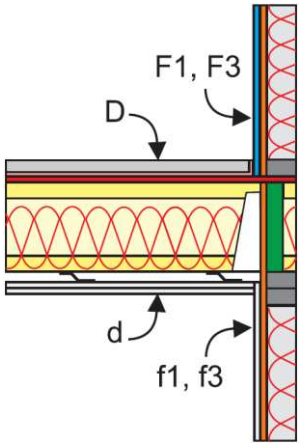
- Floor joists oriented parallel to these walls.
- Single staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and 15.9 mm plywood directly attached to the wood studs in the upper room (F2 and F4). One layer of 15.9 mm CertainTeed Type X and 15.9 mm plywood directly attached to the wood studs in the lower room (f2 and f4).
- CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity

Note: For the path/surface designations in the calculations the upper room is treated as the source room (surfaces D and F)

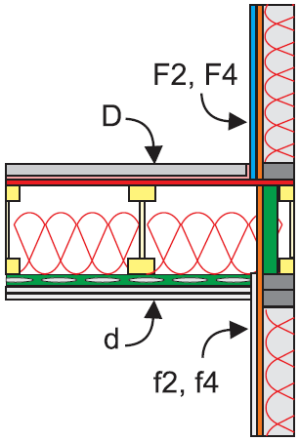
Room Parameters

- See Figure 3 of this report or Figure 1.4 of the National Research Council Report RR-331.
- The separating floor / ceiling is 4 m by 5 m.
- Walls 1 and 3 are 2.5 m high by 5 m wide.
- Walls 2 and 4 are 2.5 m high by 4 m wide

Illustration for this case



Junction 1 or 3: Loadbearing side walls above and below the floor/ceiling assembly (wood I joists of floor are perpendicular to loadbearing wall). One layer of 15.9 mm SilentFX® QuickCut gypsum board directly and 15.9 mm plywood attached to the wood studs in the upper room (F1 and F3). One layer of 15.9 mm CertainTeed Type X and 15.9 mm plywood directly attached to the wood studs in the lower room (f1 and f3). (Side view)



Junction 2 or 4: Non-loadbearing side walls above and below the floor/ceiling assembly (wood I joists of floor are parallel to the non-loadbearing wall). One layer of 15.9 mm SilentFX® QuickCut gypsum board and 15.9 mm plywood directly attached to the wood studs in the upper room (F2 and F4). One layer of 15.9 mm CertainTeed Type X and 15.9 mm plywood directly attached to the wood studs in the lower room (f2 and f4). (Side view)

Example 40	Reference	Value
Direct STC Rating of Path Dd through the Separating Floor		
STC_{Dd}	Report A1-007750.2 Appendix B	**68**
Junction 1 - Separating floor and the flanking load bearing walls		
Flanking Path Ff_1		
$Flanking\ STC_{lab,F1,f1}$	Report A1-007750.2	61
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F1,f1}$	RR-331 Eq. 1.5	67
Flanking Path Fd_1		
$Flanking\ STC_{lab,F1,d}$	Report A1-007750.2	70
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F1,d}$	RR-331 Eq. 1.5	76
Flanking Path Df_1		
$Flanking\ STC_{lab,D,f1}$	Report A1-007750.2	69
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,D,f1}$	RR-331 Eq. 1.5	75
Flanking STC for Junction 1		**66**
Junction 1 - Separating floor and the flanking non-load bearing walls		
Flanking Path Ff_2		
$Flanking\ STC_{lab,F2,f2}$	Report A1-007750.2	65
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,f2}$	RR-331 Eq. 1.5	72
Flanking Path Fd_2		
$Flanking\ STC_{lab,F2,d}$	Report A1-007750.2	77
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,d}$	RR-331 Eq. 1.5	84
Flanking Path Df_2		
$Flanking\ STC_{lab,D,f2}$	Report A1-007750.2	71
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,D,f2}$	RR-331 Eq. 1.5	78
Flanking STC for Junction 2		**71**
Junction 1 - Separating floor and the flanking load bearing walls		
Flanking Path Ff_3		
$Flanking\ STC_{lab,F3,f3}$	Report A1-007750.2	61
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F3,f3}$	RR-331 Eq. 1.5	67
Flanking Path Fd_3		
$Flanking\ STC_{lab,F3,d}$	Report A1-007750.2	70
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F3,d}$	RR-331 Eq. 1.5	76
Flanking Path Df_3		
$Flanking\ STC_{lab,D,f3}$	Report A1-007750.2	69
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,D,f3}$	RR-331 Eq. 1.5	75
Flanking STC for Junction 3		**66**
Junction 1 - Separating floor and the flanking non-load bearing walls		
Flanking STC for Junction 4 - Same as Junction 2		**71**
ASTC due to Direct plus Flanking Transmission	**RR-331 Equation 1.4**	**61**

Example 54: Rooms one-above-the-other **SIMPLIFIED METHOD**

- **Wood framed walls and floors.**
- **Fire rated floor BXUV.M535[1] with a bare 15 mm OSB subfloor.[2]**
- **Wall framing includes single and triple staggered wood studs.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board and 15.9 mm plywood directly attached to the wood studs in both the upper and the lower rooms.**

Separating floor/ceiling assembly with:

- The joists are oriented perpendicular to the loadbearing walls but not continuous across the junction.
- Wood I-joists 241 mm (9.5") deep spaced 406 mm (16") on center. Doubled rim boards (32 mm (1-1/4") thick and 241 mm deep) installed at each end of the I-joists.
- Subfloor of 15 mm (19/32") OSB directly attached to the I-joists.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the floor cavity.
- Resilient channels installed perpendicular to wood I-joists and spaced 305 mm (12") on center.
- Base layer of layer of 15.9 mm SilentFX® QuickCut gypsum board and a face layer of 12.7 mm (1/2") CertainTeed Type C gypsum board installed on the resilient channels on the ceiling.

Junction 1&3: Loadbearing walls above and below the junction:

- Floor joists oriented perpendicular to these walls.
- Triple staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and 15.9 mm plywood directly attached to the wood studs in both rooms.
- One layer of 89 mm CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 2&4: Non-loadbearing walls above and below the junction:

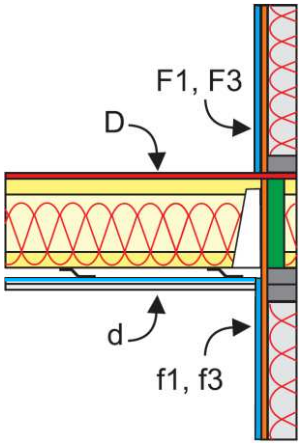
- Floor joists oriented parallel to these walls.
- Single staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and 15.9 mm plywood directly attached to the wood studs in both rooms.
- One layer of 89 mm CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Note: For the path/surface designations in the calculations the upper room is treated as the source room (surfaces D and F)

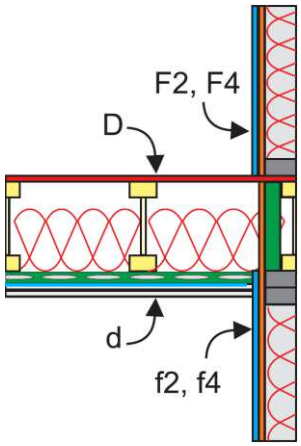
Room Parameters

- See Figure 3 of this report or Figure 1.4 of the National Research Council Report RR-331.
- The separating floor / ceiling is 4 m by 5 m.
- Walls 1 and 3 are 2.5 m high by 5 m wide.
- Walls 2 and 4 are 2.5 m high by 4 m wide

Illustration for this case



Junction 1 or 3: Loadbearing side walls above and below the floor/ceiling assembly (wood I joists of floor are perpendicular to loadbearing wall). One layer of 15.9 mm SilentFX® QuickCut gypsum board and 15.9 mm plywood directly attached to the wood studs in both rooms. (Side view)



Junction 2 or 4: Non-loadbearing side walls above and below the floor/ceiling assembly (wood I joists of floor are parallel to the non-loadbearing wall). One layer of 15.9 mm SilentFX® QuickCut gypsum board and 15.9 mm plywood directly attached to the wood studs in both rooms. (Side view)

Example 54	Reference	Value
Direct STC Rating of Path Dd through the Separating Floor		
Laboratory Measured STC Rating	Report A1-012057.1	**50**
Junction 1 - Junction between the separating floor and the flanking load bearing walls		
Flanking Path Ff_1		
$Flanking\ STC_{\ lab,F1,f1}$	Reports A1-007750.2 and A1-012057.1	63
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{\ situ,F1,f1}$	RR-331 Eq. 1.5	69
Flanking Path Fd_1		
$Flanking\ STC_{\ lab,F1,d}$	Reports A1-007750.2 and A1-012057.1	62
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{\ situ,F1,d}$	RR-331 Eq. 1.5	68
Flanking Path Df_1		
$Flanking\ STC_{\ lab,D,f1}$	Reports A1-007750.2 and A1-012057.1	61
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{\ situ,D,f1}$	RR-331 Eq. 1.5	67
Flanking STC for Junction 1		**63**
Junction 2 - Junction between the separating floor and the flanking non-load bearing walls		
Flanking Path Ff_2		
$Flanking\ STC_{\ lab,F2,f2}$	Reports A1-007750.2 and A1-012057.1	70
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{\ situ,F2,f2}$	RR-331 Eq. 1.5	77
Flanking Path Fd_2		
$Flanking\ STC_{\ lab,F2,d}$	Reports A1-007750.2 and A1-012057.1	74
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{\ situ,F2,d}$	RR-331 Eq. 1.5	81
Flanking Path Df_2		
$Flanking\ STC_{\ lab,D,f2}$	Reports A1-007750.2 and A1-012057.1	65
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{\ situ,D,f2}$	RR-331 Eq. 1.5	72
Flanking STC for Junction 2		**70**
Junction 3 - Junction between the separating floor and the flanking load bearing walls		
Flanking Path Ff_3		
$Flanking\ STC_{\ lab,F3,f3}$	Reports A1-007750.2 and A1-012057.1	63
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{\ situ,F3,f3}$	RR-331 Eq. 1.5	69
Flanking Path Fd_3		
$Flanking\ STC_{\ lab,F3,d}$	Reports A1-007750.2 and A1-012057.1	62
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{\ situ,F3,d}$	RR-331 Eq. 1.5	68
Flanking Path Df_3		
$Flanking\ STC_{\ lab,D,f3}$	Reports A1-007750.2 and A1-012057.1	61
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{\ situ,D,f3}$	RR-331 Eq. 1.5	67
Flanking STC for Junction 3		**63**
Junction 4 - Junction between the separating floor and the flanking non-load bearing walls		
Flanking STC for Junction 4 - Same as Junction 2		**70**
ASTC due to Direct plus Flanking Transmission	RR-331 Section 1.4	**50**

Example 55: Rooms one-above-the-other **SIMPLIFIED METHOD**

- **Wood framed walls and floors.**
- **Fire rated floor BXUV.M535[1] with a bare 15 mm OSB subfloor.[2]**
- **Wall framing includes single and triple staggered wood studs.**
- **One layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board and 15.9 mm plywood directly attached to the wood studs in the upper room. One layer of 15.9 mm (5/8") CertainTeed Type X and 15.9 mm plywood directly attached to the wood studs in the lower room.**

Separating floor/ceiling assembly with:

- The joists are oriented perpendicular to the loadbearing walls but not continuous across the junction.
- Wood I-joists 241 mm (9.5") deep spaced 406 mm (16") on center. Doubled rim boards (32 mm (1-1/4") thick and 241 mm deep) installed at each end of the I-joists.
- Subfloor of 15 mm (19/32") OSB directly attached to the I-joists.
- One layer of 152 mm thick CertainTeed R20 Sustainable Insulation® in the floor cavity.
- Resilient channels installed perpendicular to wood I-joists and spaced 305 mm (12") on center.
- Base layer of layer of 15.9 mm SilentFX® QuickCut gypsum board and a face layer of 12.7 mm (1/2") CertainTeed Type C gypsum board installed on the resilient channels on the ceiling.

Junction 1&3: Loadbearing walls above and below the junction:

- Floor joists oriented perpendicular to these walls.
- Triple staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and 15.9 mm plywood directly attached to the wood studs in the upper room (F1 and F3). CertainTeed Type X and 15.9 mm plywood directly attached to the wood studs in the lower room (f1 and f3).
- CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 2&4: Non-loadbearing walls above and below the junction:

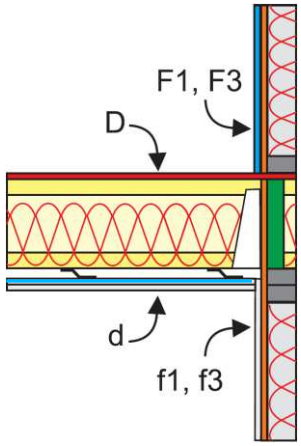
- Floor joists oriented parallel to these walls.
- Single staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and 15.9 mm plywood directly attached to the wood studs in the upper room (F2 and F4). One layer of 15.9 mm CertainTeed Type X and 15.9 mm plywood directly attached to the wood studs in the lower room (f2 and f4).
- CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity

Note: For the path/surface designations in the calculations the upper room is treated as the source room (surfaces D and F)

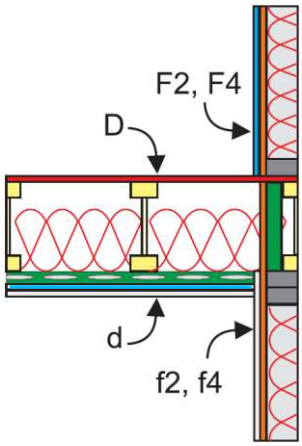
Room Parameters

- See Figure 3 of this report or Figure 1.4 of the National Research Council Report RR-331.
- The separating floor / ceiling is 4 m by 5 m.
- Walls 1 and 3 are 2.5 m high by 5 m wide.
- Walls 2 and 4 are 2.5 m high by 4 m wide

Illustration for this case



Junction 1 or 3: Loadbearing side walls above and below the floor/ceiling assembly (wood I joists of floor are perpendicular to loadbearing wall). One layer of 15.9 mm SilentFX® QuickCut gypsum board directly and 15.9 mm plywood attached to the wood studs in the upper room (F1 and F3). One layer of 15.9 mm CertainTeed Type X and 15.9 mm plywood directly attached to the wood studs in the lower room (f1 and f3). (Side view)



Junction 2 or 4: Non-loadbearing side walls above and below the floor/ceiling assembly (wood I joists of floor are parallel to the non-loadbearing wall). One layer of 15.9 mm SilentFX® QuickCut gypsum board and 15.9 mm plywood directly attached to the wood studs in the upper room (F2 and F4). One layer of 15.9 mm CertainTeed Type X and 15.9 mm plywood directly attached to the wood studs in the lower room (f2 and f4). (Side view)

Example 55	Reference	Value
Direct STC Rating of Path Dd through the Separating Floor		
Laboratory Measured STC Rating	Report A1-012057.1	**50**
Junction 1 - Junction between the separating floor and the flanking load bearing walls		
Flanking Path Ff_1		
$Flanking\ STC_{\ lab,F1,f1}$	Reports A1-007750.2 and A1-012057.1	61
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{\ situ,F1,f1}$	RR-331 Eq. 1.5	67
Flanking Path Fd_1		
$Flanking\ STC_{\ lab,F1,d}$	Reports A1-007750.2 and A1-012057.1	61
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{\ situ,F1,d}$	RR-331 Eq. 1.5	67
Flanking Path Df_1		
$Flanking\ STC_{\ lab,D,f1}$	Reports A1-007750.2 and A1-012057.1	60
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{\ situ,D,f1}$	RR-331 Eq. 1.5	66
Flanking STC for Junction 1		**62**
Junction 2 - Junction between the separating floor and the flanking non-load bearing walls		
Flanking Path Ff_2		
$Flanking\ STC_{\ lab,F2,f2}$	Reports A1-007750.2 and A1-012057.1	65
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{\ situ,F2,f2}$	RR-331 Eq. 1.5	72
Flanking Path Fd_2		
$Flanking\ STC_{\ lab,F2,d}$	Reports A1-007750.2 and A1-012057.1	72
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{\ situ,F2,d}$	RR-331 Eq. 1.5	79
Flanking Path Df_2		
$Flanking\ STC_{\ lab,D,f2}$	Reports A1-007750.2 and A1-012057.1	62
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{\ situ,D,f2}$	RR-331 Eq. 1.5	69
Flanking STC for Junction 2		**67**
Junction 3 - Junction between the separating floor and the flanking load bearing walls		
Flanking Path Ff_3		
$Flanking\ STC_{\ lab,F3,f3}$	Reports A1-007750.2 and A1-012057.1	61
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{\ situ,F3,f3}$	RR-331 Eq. 1.5	67
Flanking Path Fd_3		
$Flanking\ STC_{\ lab,F3,d}$	Reports A1-007750.2 and A1-012057.1	61
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{\ situ,F3,d}$	RR-331 Eq. 1.5	67
Flanking Path Df_3		
$Flanking\ STC_{\ lab,D,f3}$	Reports A1-007750.2 and A1-012057.1	60
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{\ situ,D,f3}$	RR-331 Eq. 1.5	66
Flanking STC for Junction 3		**62**
Junction 4 - Junction between the separating floor and the flanking non-load bearing walls		
Flanking STC for Junction 4 - Same as Junction 2		**67**
ASTC due to Direct plus Flanking Transmission	RR-331 Section 1.4	**49**

Example 41: Rooms one-above-the-other **SIMPLIFIED METHOD**

- **Wood framed walls and floors.**
- **Walls F1 and f1 have one layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to the wood studs.**
- **All other walls have one layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board directly attached to the wood studs.**
- **One layer of 15 mm OSB directly attached to the floor joists.**

Separating floor/ceiling assembly with:

- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- The joists are oriented perpendicular to the loadbearing walls but not continuous across the junction.
- Subfloor of one layer of 15 mm (19/32") OSB directly attached to wood I-joists.
- One layer of 152 mm thick CertainTeed Sustainable Insulation® R20 thermal insulation in the floor cavity.
- Ceiling of two layers of 12.7 mm CertainTeed Type X gypsum board installed on the resilient channels on the ceiling.
- Resilient channels installed perpendicular to wood I-joists and spaced 400 mm on center.

Junction 1: Loadbearing walls above and below the junction:

- Floor joists oriented perpendicular to the wall.
- Triple staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to the wood studs in both rooms.
- One layer of 89 mm CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 3: Loadbearing wall above and below the junction:

- Floor joists oriented perpendicular to the wall.
- Triple staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in both rooms.
- One layer of 89 mm CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 2&4: Non-loadbearing walls above and below the junction:

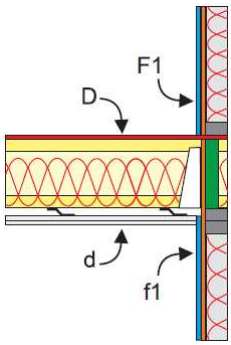
- Floor joists oriented parallel to these walls.
- Single staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in both rooms.
- One layer of 89 mm CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Note: For the path/surface designations in the calculations the upper room is treated as the source room (surfaces D and F)

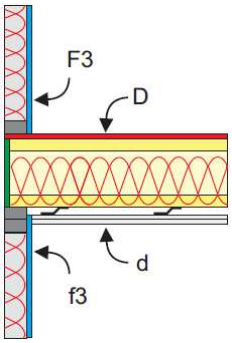
Room Parameters

- See Figure 3 of this report or Figure 1.4 of the National Research Council Report RR-331.
- The separating floor / ceiling is 4 m by 5 m.
- Walls 1 and 3 are 2.5 m high by 5 m wide.
- Walls 2 and 4 are 2.5 m high by 4 m wide

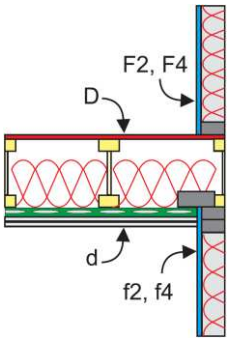
Illustration for this case



Junction 1: loadbearing side walls above and below the floor/ceiling assembly (joists are perpendicular to loadbearing wall). One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to the wood studs. (Side view)



Junction 3: loadbearing side walls above and below the floor/ceiling assembly (joists are perpendicular to loadbearing wall). One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs. (Side view)



Junction 2 or 4: Non-loadbearing side walls above and below the floor/ceiling assembly (wood I joists of floor are parallel to the non-loadbearing wall). One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in both rooms. (Side view)

Example 41	Reference	Value
Direct STC Rating of Path Dd through the Separating Floor		
STC_{Dd}	Report A1-007750.2 Appendix B	**53**
Junction 1 - Separating floor and the flanking load bearing walls		
Flanking Path Ff_1		
$Flanking\ STC_{lab,F1,f1}$	Report A1-007750.2	63
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F1,f1}$	RR-331 Eq. 1.5	69
Flanking Path Fd_1		
$Flanking\ STC_{lab,F1,d}$	Report A1-007750.2	64
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F1,d}$	RR-331 Eq. 1.5	70
Flanking Path Df_1		
$Flanking\ STC_{lab,D,f1}$	Report A1-007750.2	63
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,D,f1}$	RR-331 Eq. 1.5	69
Flanking STC for Junction 1		**65**
Junction 1 - Separating floor and the flanking non-load bearing walls		
Flanking Path Ff_2		
$Flanking\ STC_{lab,F2,f2}$	Report A1-007750.2	70
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,f2}$	RR-331 Eq. 1.5	77
Flanking Path Fd_2		
$Flanking\ STC_{lab,F2,d}$	Report A1-007750.2	71
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,d}$	RR-331 Eq. 1.5	78
Flanking Path Df_2		
$Flanking\ STC_{lab,D,f2}$	Report A1-007750.2	66
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,D,f2}$	RR-331 Eq. 1.5	73
Flanking STC for Junction 2		**71**
Junction 1 - Separating floor and the flanking load bearing walls		
Flanking Path Ff_3		
$Flanking\ STC_{lab,F3,f3}$	Report A1-007750.2	64
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F3,f3}$	RR-331 Eq. 1.5	70
Flanking Path Fd_3		
$Flanking\ STC_{lab,F3,d}$	Report A1-007750.2	64
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F3,d}$	RR-331 Eq. 1.5	70
Flanking Path Df_3		
$Flanking\ STC_{lab,D,f3}$	Report A1-007750.2	63
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,D,f3}$	RR-331 Eq. 1.5	69
Flanking STC for Junction 3		**65**
Junction 1 - Separating floor and the flanking non-load bearing walls		
Flanking STC for Junction 4 - Same as Junction 2		**71**
ASTC due to Direct plus Flanking Transmission	**RR-331 Equation 1.4**	**52**

Example 42: Rooms one-above-the-other **SIMPLIFIED METHOD**

- **Wood framed walls and floors.**
- **Walls F1 and f1 have one layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to the wood studs.**
- **All other walls have one layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut gypsum board directly attached to the wood studs.**
- **One layer of 15 mm OSB directly attached to the floor joists.**

Separating floor/ceiling assembly with:

- Wood I-joists 302 mm deep spaced 400 mm on center. Rim boards (45 mm thick and 302 mm deep) installed at each end of the I-joists.
- The joists are oriented perpendicular to the loadbearing walls but not continuous across the junction.
- Subfloor of one layer of 15 mm (19/32") OSB directly attached to wood I-joists.
- One layer of 152 mm thick CertainTeed Sustainable Insulation® R20 thermal insulation in the floor cavity.
- Ceiling of two layers of 12.7 mm CertainTeed Type X gypsum board installed on the resilient channels on the ceiling.
- Resilient channels installed perpendicular to wood I-joists and spaced 400 mm on center.

Junction 1&3: Loadbearing walls above and below the junction:

- Floor joists oriented perpendicular to these walls.
- Triple staggered 38 mm x 89 mm (2x4) wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and 15.9 mm plywood directly attached to the wood studs in both rooms.
- One layer of 89 mm CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 2: Non-loadbearing wall above and below the junction:

- Floor joists oriented parallel to the wall.
- Triple staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in both rooms.
- One layer of 89 mm CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Junction 4: Non-loadbearing walls above and below the junction:

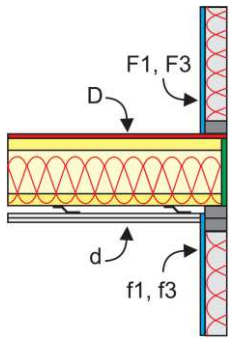
- Floor joists oriented parallel to the walls.
- Single staggered 38 mm x 89 mm wood studs spaced 400 mm on center. Double headers and a single footer 38 mm x 140 mm.
- One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to the wood studs in both rooms.
- One layer of 89 mm CertainTeed Sustainable Insulation® R12 thermal insulation in the wall cavity.

Note: For the path/surface designations in the calculations the upper room is treated as the source room (surfaces D and F)

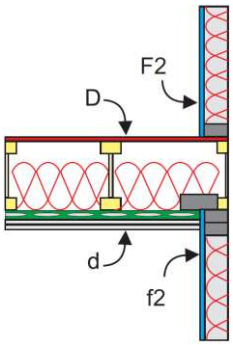
Room Parameters

- See Figure 3 of this report or Figure 1.4 of the National Research Council Report RR-331.
- The separating floor / ceiling is 4 m by 5 m.
- Walls 1 and 3 are 2.5 m high by 5 m wide.
- Walls 2 and 4 are 2.5 m high by 4 m wide

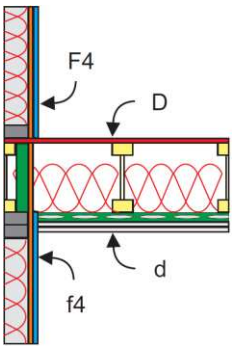
Illustration for this case



Junction 1 or 3: Loadbearing side walls above and below the floor/ceiling assembly (wood I joists of floor are perpendicular to loadbearing wall). One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs in both rooms. (Side view)



Junction 2: non-loadbearing walls above and below the floor/ceiling assembly (joists are parallel to the non-loadbearing wall). One layer of 15.9 mm SilentFX® QuickCut gypsum board directly attached to the wood studs. (Side view)



Junction 4: non-loadbearing walls above and below the floor/ceiling assembly (joists are parallel to loadbearing wall). One layer of 15.9 mm SilentFX® QuickCut gypsum board and one layer of 15.9 mm plywood directly attached to the wood studs. (Side view)

Example 42	Reference	Value
Direct STC Rating of Path Dd through the Separating Floor		
STC_{Dd}	Report A1-007750.2 Appendix B	**53**
Junction 1 - Separating floor and the flanking load bearing walls		
Flanking Path Ff_1		
$Flanking\ STC_{lab,F1,f1}$	Report A1-007750.2	64
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F1,f1}$	RR-331 Eq. 1.5	70
Flanking Path Fd_1		
$Flanking\ STC_{lab,F1,d}$	Report A1-007750.2	64
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F1,d}$	RR-331 Eq. 1.5	70
Flanking Path Df_1		
$Flanking\ STC_{lab,D,f1}$	Report A1-007750.2	63
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,D,f1}$	RR-331 Eq. 1.5	69
Flanking STC for Junction 1		**65**
Junction 1 - Separating floor and the flanking non-load bearing walls		
Flanking Path Ff_2		
$Flanking\ STC_{lab,F2,f2}$	Report A1-007750.2	70
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,f2}$	RR-331 Eq. 1.5	77
Flanking Path Fd_2		
$Flanking\ STC_{lab,F2,d}$	Report A1-007750.2	71
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,F2,d}$	RR-331 Eq. 1.5	78
Flanking Path Df_2		
$Flanking\ STC_{lab,D,f2}$	Report A1-007750.2	66
Normalization Correction	RR-331 Eq. 1.5	6.99
$Flanking\ STC_{situ,D,f2}$	RR-331 Eq. 1.5	73
Flanking STC for Junction 2		**71**
Junction 1 - Separating floor and the flanking load bearing walls		
Flanking Path Ff_3		
$Flanking\ STC_{lab,F3,f3}$	Report A1-007750.2	64
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F3,f3}$	RR-331 Eq. 1.5	70
Flanking Path Fd_3		
$Flanking\ STC_{lab,F3,d}$	Report A1-007750.2	64
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,F3,d}$	RR-331 Eq. 1.5	70
Flanking Path Df_3		
$Flanking\ STC_{lab,D,f3}$	Report A1-007750.2	63
Normalization Correction	RR-331 Eq. 1.5	6.02
$Flanking\ STC_{situ,D,f3}$	RR-331 Eq. 1.5	69
Flanking STC for Junction 3		**65**
Junction 1 - Separating floor and the flanking non-load bearing walls		
Flanking STC for Junction 4		**71**
ASTC due to Direct plus Flanking Transmission	**RR-331 Equation 1.4**	**52**

5. Linings for Cross-Laminated Timber (CLT) Walls and Floors

Mid-rise wood constructions can include not only walls and floors with timber framing, but also walls and floors made of cross-laminated timber[3] (CLT) elements. CLT elements are fabricated by laminating timber elements together into panels with layers of alternating grain orientation. Typical CLT elements have three or more layers with an overall thickness ranging from 75 mm to 250 mm.

It is common practice, especially in residential buildings, to add finishing surfaces to the basic structural floor or wall assemblies – for example, gypsum board wall and ceiling surfaces that conceal both the bare CLT surfaces and building services such as electrical wiring, water pipes and ventilation ducts. The finish on walls or ceilings commonly comprises gypsum board panels, framing used to support them, and often sound absorptive material filling the inter-framing cavities between the gypsum board and the face of the CLT. On floors the finish may include toppings on the CLT such as concrete or a floating floor as well as flooring such as hardwood or tiles. These elements are described in ISO 15712-1 as “linings” or “liners” or “layers” or “coverings”. The term “linings” is used in this report.

To characterize the change in sound transmission loss due to adding a specific lining to a CLT wall, celling or floor, a single-number rating called ΔSTC is used. The procedure used to calculate the ΔSTC rating is explained in Appendix A2 of the NRC Report RR-335 *Apparent Sound Insulation in Cross-Laminated Timber Buildings*.

Some key points about the ΔSTC rating include:

- The ΔSTC rating is a required input for calculation of the ASTC ratings using the Simplified Method.
- The values of the ΔSTC rating are calculated from experimental data
- The ΔSTC ratings for 5 ply CLT elements can also be applied to 7 ply CLT elements and vice versa.
- The ΔSTC ratings for 3 ply CLT elements can not be applied to 5 ply or 7 ply elements and vice versa. The reason is that 3 ply CLT elements have more leakage through the panels than 5 ply or 7 ply panels and the leakage is taken into account in the calculation of the ΔSTC ratings.
- The ΔSTC rating and ΔTL data can be used for walls, floors or ceilings.

The ΔSTC rating for a lining of 15.9 mm SilentFX® QuickCut gypsum fixed to 38 mm x 38 mm furring strips spaced 610 mm on center and with fiberglass insulation between the furring strips are shown in Table 1 and Table 2. The one-third octave band ΔTL data for each lining for the calculation of the ASTC ratings using the Detailed Method are presented in Table 3.

5.1 ΔSTC Ratings for CLT Linings with SilentFX® QuickCut Gypsum Board

The ΔSTC ratings are used for the calculation of the ASTC rating using the simplified method. Details about the calculation of the ΔSTC ratings can be found in Appendix A2 of the NRC Report RR-335 *Apparent Sound Insulation in Cross-Laminated Timber Buildings*.

Table 1: ΔSTC values for linings on 3 ply CLT walls or floors

Descriptive Short Code	Description of lining	ΔSTC
SilentFX(15.9)_WFUR38(600)_GFB38	One layer of 15.9 mm SilentFX® QuickCut™ Gypsum Board on 38 mm x 38 mm Furring Strips Spaced 610 mm on Center with 38 mm CertainTeed Fiberglass Insulation in the Cavity.	10

Table 2: ΔSTC values for linings on 5, 7 or 9 ply CLT walls or floors

Descriptive Short Code	Description of lining	ΔSTC
SilentFX(15.9)_WFUR38(600)_GFB38	One layer of 15.9 mm SilentFX® QuickCut™ Gypsum Board on 38 mm x 38 mm Furring Strips Spaced 610 mm on Center with 38 mm CertainTeed Fiberglass Insulation in the Cavity.	7
G13_SilentFX(15.9)	Base layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut™ Gypsum Board installed perpendicular to the orientation of the face layer of the CLT panel with 63.5 mm (2-1/2") coarse (wood) drywall screws at 304.8 mm (12") on center. No parallel edge closer to the CLT panel joint than 76.2 mm (3”). Gypsum board butt joints offset 1.219 m (4’) from each other. Face layer of 12.7 mm (1/2") CertainTeed Type C Fire Resistant Gypsum Board installed perpendicular to the CLT panels and offset from the base layer so that no seams overlapped. The face layer attached with 76.2 mm (3") coarse (wood) drywall screws at 304.8 mm (12") on center.	1

5.2 Change in transmission loss (ΔTL) due to linings on CLT Panels

The ΔTL ratings are used for the calculation of the ASTC rating using the detailed method.

Table 3: ΔTL values for linings on CLT walls or floors

1/3 Octave Band Center Frequency (Hz)	One layer of 15.9 mm SilentFX® QuickCut™Gypsum Board on 38 mm x 38 mm Furring Strips Spaced 610 mm on Center with 38 mm CertainTeed Fiberglass Insulation in the Cavity		Base layer of 15.9 mm (5/8") CertainTeed SilentFX® QuickCut™ Gypsum Board installed perpendicular to the orientation of the face layer of the CLT panel with 63.5 mm (2-1/2") coarse (wood) drywall screws at 304.8 mm (12") on center. No parallel edge closer to the CLT panel joint than 76.2 mm (3”). Gypsum board butt joints offset 1.219 m (4’) from each other. Face layer of 12.7 mm (1/2") CertainTeed Type C Fire Resistant Gypsum Board installed perpendicular to the CLT panels and offset from the base layer so that no seams overlapped. The face layer attached with 76.2 mm (3") coarse (wood) drywall screws at 304.8 mm (12") on center.
	SilentFX(15.9)_WFUR38(600)_GFB38		G13_SilentFX(15.9)
	3-Ply CLT	5-Ply, 7-Ply or 9-Ply CLT	5-Ply, 7-Ply or 9-Ply CLT
100	-6	-6	1
125	3	0	1
160	8	7	1
200	8	9	1
250	9	12	1
315	10	11	0
400	10	10	-1
500	10	8	0
630	10	8	1
800	11	9	2
1000	11	9	4
1250	12	11	4
1600	13	11	4
2000	13	10	3
2500	12	10	5
3150	12	12	7
4000	13	15	7
5000	15	15	7

5.3 Examples of CLT Constructions with Linings

The following are examples of the calculation of the ASTC ratings of a CLT construction with the linings described in Section 5.2.

Example 43: CLT Construction - Rooms side-by-side

- **CLT Floors and CLT Walls[3]**
- **Walls and ceiling include linings of 15.9 mm SilentFX® QuickCut gypsum board**
- **Topping of 38 mm thick gypsum concrete over 13 mm wood fiber board in both rooms.**

Separating wall assembly (loadbearing) with:

- CLT89(3) wall assembly[3] with mass per unit area 42.4 kg/m^2
- CLT wall panels oriented so face ply strands are vertical
- Lining on each side of one layer of 15.9 mm SilentFX® QuickCut gypsum board on 38 mm x 38 mm furring Strips Spaced 610 mm on Center with 38 mm CertainTeed Fiberglass Insulation in the Cavity.

Junction 1: Bottom Junction (separating wall / floor) with:

- CLT175(5) floor assembly[3] with a mass per unit area of 92.1 kg/m^2, continuous through cross-junction with a CLT89(3) wall assembly.
- CLT floor/ceiling are panels oriented so that the face ply strands are perpendicular to the load bearing CLT panels of junction 1 and 3.
- The CLT panels are connected with 90 mm equal leg angle brackets spaced 300 mm on center and nailed/screwed to both sides of separating element.
- Floor lining of 38 mm concrete over 13 mm wood fiber board.

Junction 2 or 4: Each Side (separating wall / abutting side wall) with:

- Abutting side walls of CLT89(3) assemblies with a mass per unit area of 42.4 kg/m^2 continuous through T-junctions with the separating CLT wall panel.
- CLT side wall panels oriented so the face ply strands are vertical
- The CLT panels are connected with 90 mm equal leg angle brackets nailed/screwed to both sides of the separating element and spaced 600 mm on center.
- Lining on each side of one layer of 15.9 mm SilentFX® QuickCut gypsum board on 38 mm x 38 mm furring Strips Spaced 610 mm on Center with 38 mm CertainTeed Fiberglass Insulation in the Cavity.

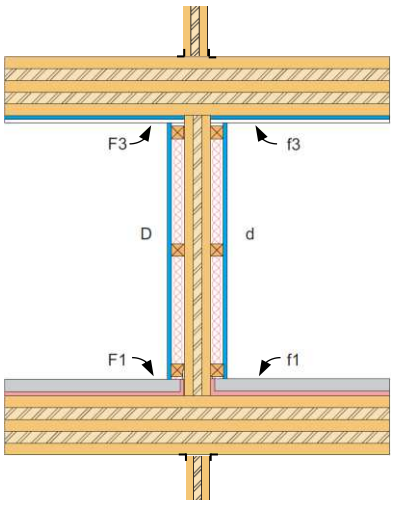
Junction 3: Top Junction (separating wall / ceiling) with:

- CLT175(5) ceiling assembly with a mass per unit area of 92.1 kg/m^2, continuous through cross-junction with CLT separating wall.
- CLT floor/ceiling panels are oriented so that the face ply strands are perpendicular to the load bearing CLT panels of junction 1 and 3.
- The CLT panels are connected with 90 mm equal leg angle brackets spaced 300 mm on center and nailed/screwed to both sides of separating element.
- Lining on each ceiling of base layer of 15.9 mm SilentFX® QuickCut gypsum board directly fixed to the CLT and a face layer of CertainTeed Type C gypsum board.

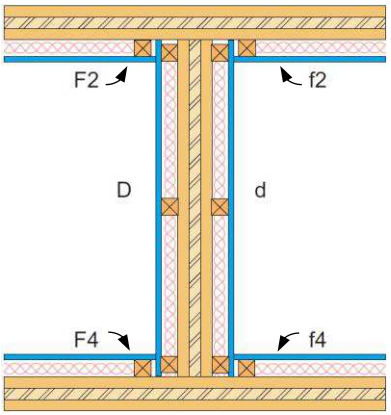
Room Parameters

- See Figure 2 of this report or Figure 1.3 of the National Research Council Report RR-331.
- The separating wall is 2.5 m high by 5 m wide.
- The flanking walls 2.5 m high by 4 m wide.
- The floor / ceilings are 4 m by 5 m.

Illustration for this case



Junctions 1 and 3: Cross junctions of a CLT89(3) wall assembly with a CLT175(5) floor and ceiling assembly. The walls include a lining of one layer of 15.9 mm SilentFX® QuickCut gypsum board on 38 mm x 38 mm furring strips spaced 610 mm on center with 38 mm CertainTeed Fiberglass Insulation in the cavity. Ceiling lining of a base layer of 15.9 mm SilentFX® QuickCut gypsum board and a face layer of CertainTeed Type C gypsum baord. Floor lining of 38 mm concrete over 13 mm wood fiber board. (Side View)



Junctions 2 and 4: T-junction of a separating wall with side walls, all CLT89(3) wall assemblies. The walls have a lining of one layer of 15.9 mm SilentFX® QuickCut gypsum board on 38 mm x 38 mm furring strips spaced 610 mm on center with 38 mm CertainTeed Fiberglass Insulation in the cavity. (Plan View)

Example 43	ISO Symbol	Reference	125	250	500	1000	2000	4000	STC or ASTC
Separating Partition (78 mm 3-ply CLT)									
Laboratory Transmission Loss	R_D,lab	RR-335, Base CLT78(3)	26	28	31	37	46	50	36
Correction Resonant Transmission		N/A	0	0	0	0	0	0	
ΔTL change by lining on D	ΔR_D	SilentFX(15.9)_WFUR38(600)_GFB38	3	9	10	11	13	13	
ΔTL change by lining on d	ΔR_d	SilentFX(15.9)_WFUR38(600)_GFB38	3	9	10	11	13	13	
Correction		N/A	0	0	0	0	0	0	
Direct TL in-situ	R_D,situ	ISO 15712-1, Eq. 24	**32**	**46**	**51**	**59**	**72**	**76**	**55**
Junction 1 (Cross-Junction, 78 mm 3-ply CLT Separating Wall / 175 mm 5-ply CLT Floor)									
Transmission Loss of Flanking Elements									
TL of element F1, laboratory	R_F1,lab	RR-335, Base-CLT175(5)	32	30	39	43	52	49	42
TL of element f1, laboratory	R_f1,lab	RR-335, Base-CLT175(5)	32	30	39	43	52	49	42
Correction Resonant Transmission F1		N/A	0	0	0	0	0	0	
Correction Resonant Transmission f1		N/A	0	0	0	0	0	0	
TL of element F1, in-situ	R_F1,situ	ISO 15712-1, Eq. 19, T_s,situ = T_s,lab	32	30	39	43	52	49	42
TL of element f1, in-situ	R_f1,situ	ISO 15712-1, Eq. 19, T_s,situ = T_s,lab	32	30	39	43	52	49	42
ΔTL change by lining on F	ΔR_F1	RR-335, ΔTL-CLT-F02	6	10	12	22	27	32	
ΔTL change by lining on f	ΔR_f1	RR-335, ΔTL-CLT-F02	6	10	12	22	27	32	
Junction Coupling									
Vibration Reduction Index for Ff	K_Ff,1	RR-335, CLT-WF-Xa-01	1.1	1.1	1.1	1.1	1.1	1.1	
Vibration Reduction Index for Fd	K_Fd,1	RR-335, CLT-WF-Xa-01	10.5	10.5	10.5	10.5	10.5	10.5	
Vibration Reduction Index for Df	K_Df,1	RR-335, CLT-WF-Xa-01	10.5	10.5	10.5	10.5	10.5	10.5	
Flanking Transmission Loss									
Flanking TL for path Ff_1	R_ Ff	ISO 15712-1, Eq. 25b	**49**	**55**	**68**	**90**	**90**	**90**	**66**
Flanking TL for path Fd_1	R_ Fd	ISO 15712-1, Eq. 25b	**53**	**63**	**72**	**88**	**90**	**90**	**75**
Flanking TL for path Df_1	R_ Df	ISO 15712-1, Eq. 25b	**53**	**63**	**72**	**88**	**90**	**90**	**75**
Junction 1: Flanking TL for all paths			46	54	65	84	85	85	65
Junction 2 (T-Junction, 78 mm 3-ply CLT Separating Wall / 78 mm 3-ply CLT Flanking Wall)									
Transmission Loss of Flanking Elements									
TL of element F2, laboratory	R_F2,lab	RR-335, Base-CLT178(3)	26	28	31	37	46	50	36
TL of element f2, laboratory	R_f2,lab	RR-335, Base-CLT178(3)	26	28	31	37	46	50	36
Correction Resonant Transmission F2		N/A	0	0	0	0	0	0	
Correction Resonant Transmission f2		N/A	0	0	0	0	0	0	
TL of element F2, in-situ	R_F2,situ	ISO 15712-1, Eq. 19, T_s,situ = T_s,lab	26	28	31	37	46	50	36
TL of element f2, in-situ	R_f2,situ	ISO 15712-1, Eq. 19, T_s,situ = T_s,lab	26	28	31	37	46	50	36
ΔTL change by lining on F	ΔR_F2	SilentFX(15.9)_WFUR38(600)_GFB38	3	9	10	11	13	13	
ΔTL change by lining on f	ΔR_f2	SilentFX(15.9)_WFUR38(600)_GFB38	3	9	10	11	13	13	
Junction Coupling									
Vibration Reduction Index for Ff	K_Ff,2	RR-335, CLT-WW-Tb-01	3.5	3.5	3.5	3.5	3.5	3.5	
Vibration Reduction Index for Fd	K_Fd,2	RR-335, CLT-WW-Tb-01	5.7	5.7	5.7	5.7	5.7	5.7	
Vibration Reduction Index for Df	K_Df,2	RR-335, CLT-WW-Tb-01	5.7	5.7	5.7	5.7	5.7	5.7	
Flanking Transmission Loss									
Flanking TL for path Ff_2	R_ Ff	ISO 15712-1, Eq. 25b	**43**	**57**	**62**	**70**	**83**	**87**	**66**
Flanking TL for path Fd_2	R_ Fd	ISO 15712-1, Eq. 25b	**45**	**59**	**64**	**72**	**85**	**89**	**68**
Flanking TL for path Df_2	R_ Df	ISO 15712-1, Eq. 25b	**45**	**59**	**64**	**72**	**85**	**89**	**68**
Junction 2: Flanking TL for all paths			39	53	58	66	79	83	62
Junction 3 (Cross-Junction, 78 mm 3-ply CLT Separating Wall / 175 mm 5-ply CLT Ceiling)									
All values the same as for Junction 1 except linings									
ΔTL change by lining on F	ΔR_F3	G13_SilentFX(15.9)	1	1	0	4	3	7	
ΔTL change by lining on f	ΔR_f3	G13_SilentFX(15.9)	1	1	0	4	3	7	
Junction Coupling									
Vibration Reduction Index for Ff	K_Ff,3	RR-335, CLT-WF-Xa-01	1.1	1.1	1.1	1.1	1.1	1.1	
Vibration Reduction Index for Fd	K_Fd,3	RR-335, CLT-WF-Xa-01	10.5	10.5	10.5	10.5	10.5	10.5	
Vibration Reduction Index for Df	K_Df,3	RR-335, CLT-WF-Xa-01	10.5	10.5	10.5	10.5	10.5	10.5	
Flanking Transmission Loss									
Flanking TL for path Ff_3	R_ Ff	ISO 15712-1, Eq. 25b	**39**	**37**	**44**	**56**	**63**	**68**	**47**
Flanking TL for path Fd_3	R_ Fd	ISO 15712-1, Eq. 25b	**48**	**54**	**60**	**70**	**80**	**84**	**65**
Flanking TL for path Df_3	R_ Df	ISO 15712-1, Eq. 25b	**48**	**54**	**60**	**70**	**80**	**84**	**65**
Junction 3: Flanking TL for all paths			38	37	44	56	63	68	47
Junction 4 (T-Junction, 78 mm 3-ply CLT Separating Wall / 78 mm 3-ply CLT Flanking Wall)									
All values the same as for Junction 2									
Flanking TL for path Ff_4	R_ Ff	ISO 15712-1, Eq. 25b	**43**	**57**	**62**	**70**	**83**	**87**	**66**
Flanking TL for path Fd_4	R_ Fd	ISO 15712-1, Eq. 25b	**45**	**59**	**64**	**72**	**85**	**89**	**68**
Flanking TL for path Df_4	R_ Df	ISO 15712-1, Eq. 25b	**45**	**59**	**64**	**72**	**85**	**89**	**68**
Junction 4: Flanking TL for all paths			39	53	58	66	79	83	62
Total Flanking (for all 4 junctions)			34	37	43	55	63	67	47
ASTC due to Direct plus Flanking Paths		RR-335, Eq. 1.1	**30**	**36**	**43**	**54**	**62**	**67**	**47**

Example 56: CLT Construction - Rooms one-above-the-other

- **CLT Floors and CLT Walls[3]**
- **Walls have a lining of one layer of 15.9 mm SilentFX® QuickCut gypsum board on 38 mm x 38 mm furring strips spaced 610 mm on center with 38 mm CertainTeed Fiberglass Insulation in the cavity.**
- **Ceiling of a base layer of 15.9 mm SilentFX® QuickCut gypsum board and a face layer of CertainTeed 12.7 mm Type C board.**
- **Topping of 38 mm thick gypsum concrete over 8 mm closed cell foam in both rooms.**

Separating floor assembly with:

- CLT175(5) floor assembly with mass per unit area 91.4 kg/m^2, continuous through cross-junction with CLT wall assemblies at Junctions 1 and 3 and oriented so that face ply strands are perpendicular to loadbearing Junctions 1 and 3.
- The CLT panels are connected with 90 mm equal leg angle brackets spaced 300 mm on center and nailed/screwed to both sides of separating element.
- Floor lining of 38 mm concrete over 8 mm closed cell foam
- Ceiling of a base layer of 15.9 mm SilentFX® QuickCut gypsum board and a face layer of CertainTeed 12.7 mm Type C board directly fixed to the CLT.

Junction 1, 3 or 4: (separating floor / flanking walls) with:

- CLT89(3) wall assembly with mass per unit area 42.4 kg/m^2, above and below cross-junctions with separating assembly that is continuous or lapped and glued across these junctions
- CLT wall assembly oriented so face ply strands are vertical
- The CLT panels are connected with 90 mm equal leg angle brackets spaced 300 mm on center and nailed/screwed to both sides of separating element.
- Lining of 15.9 mm SilentFX® QuickCut gypsum board on 38 mm x 38 mm furring Strips Spaced 610 mm on Center with 38 mm CertainTeed Fiberglass Insulation in the cavity.

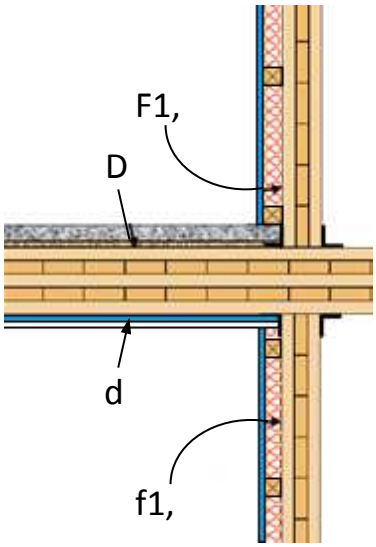
Junction 2: Each Side (separating floor / flanking walls) with:

- CLT89(3) wall assembly with mass per unit area 42.4 kg/m^2, above and below T-junction with separating assembly that terminates at this junction
- CLT wall assembly oriented so face ply strands are vertical
- Connected with 90 mm equal leg angle brackets nailed/screwed at 300 mm o.c. to one side of the wall assembly and to the abutting floor assemblies
- Lining of 15.9 mm SilentFX® QuickCut gypsum board on 38 mm x 38 mm furring Strips Spaced 610 mm on Center with 38 mm CertainTeed Fiberglass Insulation in the cavity.

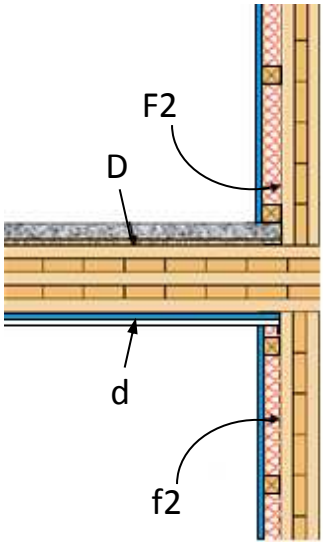
Room Parameters

- See Figure 2 of this report or Figure 1.3 of the National Research Council Report RR-331.
- The separating floor is 4 m by 5 m.
- The flanking walls 1 and 3 are 2.5 m high by 4 m wide.
- The flanking walls 2 and 4 are 2.5 m high by 5 m wide.

Illustration for this case



Cross-junctions of a separating floor of CLT175(5) with CLT175(3) wall assemblies above and below. (Side view of Junctions 1, 3 and 4, except the orientation of the floor assemblies differs for Junction 4)



T-junction of a CLT175(5) floor with CLT175(3) wall assemblies above and below. (Side view of Junction 2)

Example 56	ISO Symbol	Reference	125	250	500	1000	2000	4000	STC or ASTC
Separating Partition									
Laboratory Transmission Loss	R_D,lab	RR-335, Base CLT175(5)	32	30	39	43	52	49	42
Correction Resonant Transmission		N/A	0	0	0	0	0	0	
ΔTL change by lining on D	ΔR_D	CON38_FOAM08	6	10	12	22	27	32	
ΔTL change by lining on d	ΔR_d	TypeC(12.7)_SilentFX(15.9)	1	1	0	4	3	7	
Correction		N/A	0	0	0	0	0	0	
Direct TL in-situ	R_D,situ	ISO 15712-1, Eq. 24	**39**	**41**	**51**	**69**	**82**	**88**	**54**
Junction 1: Side Junction									
Transmission Loss of Flanking Elements									
TL of element F1, laboratory	R_F1,lab	RR-335, Base CLT78(3)	26	28	31	37	46	50	36
TL of element f1, laboratory	R_f1,lab	RR-335, Base CLT78(3)	26	28	31	37	46	50	36
Correction Resonant Transmission F1		N/A	0	0	0	0	0	0	
Correction Resonant Transmission f1		N/A	0	0	0	0	0	0	
TL of element F1, in-situ	R_F1,situ	ISO 15712-1, Eq. 19, T_s,situ = T_s,lab	26	28	31	37	46	50	36
TL of element f1, in-situ	R_f1,situ	ISO 15712-1, Eq. 19, T_s,situ = T_s,lab	26	28	31	37	46	50	36
ΔTL change by lining on F	ΔR_F1	SilentFX(15.9)_WFUR38(600)_GFB38	3	8	5	11	10	11	
ΔTL change by lining on f	ΔR_f1	SilentFX(15.9)_WFUR38(600)_GFB38	3	8	5	11	10	11	
Junction Coupling									
Vibration Reduction Index for Ff	K_Ff,1	RR-335, CLT-FW-Xa-05	19.4	19.4	19.4	19.4	19.4	19.4	
Vibration Reduction Index for Fd	K_Fd,1	RR-335, CLT-FW-Xa-05	10.5	10.5	10.5	10.5	10.5	10.5	
Vibration Reduction Index for Df	K_Df,1	RR-335, CLT-FW-Xa-05	10.5	10.5	10.5	10.5	10.5	10.5	
Flanking Transmission Loss									
Flanking TL for path Ff_1	R_ Ff	ISO 15712-1, Eq. 25b	**57**	**69**	**66**	**84**	**90**	**90**	**74**
Flanking TL for path Fd_1	R_ Fd	ISO 15712-1, Eq. 25b	**50**	**55**	**57**	**72**	**79**	**84**	**63**
Flanking TL for path Df_1	R_ Df	ISO 15712-1, Eq. 25b	**55**	**64**	**69**	**90**	**90**	**90**	**75**
Junction 1: Flanking TL for all paths			48	54	56	72	78	82	63
Junction 2: Side Junction									
Transmission Loss of Flanking Elements									
TL of element F2, laboratory	R_F2,lab	RR-335, Base CLT78(3)	26	28	31	37	46	50	36
TL of element f2, laboratory	R_f2,lab	RR-335, Base CLT78(3)	26	28	31	37	46	50	36
Correction Resonant Transmission F2		N/A	0	0	0	0	0	0	
Correction Resonant Transmission f2		N/A	0	0	0	0	0	0	
TL of element F2, in-situ	R_F2,situ	ISO 15712-1, Eq. 19, T_s,situ = T_s,lab	26	28	31	37	46	50	36
TL of element f2, in-situ	R_f2,situ	ISO 15712-1, Eq. 19, T_s,situ = T_s,lab	26	28	31	37	46	50	36
ΔTL change by lining on F	ΔR_F2	SilentFX(15.9)_WFUR38(600)_GFB38	3	9	10	11	13	13	
ΔTL change by lining on f	ΔR_f2	SilentFX(15.9)_WFUR38(600)_GFB38	3	9	10	11	13	13	
Junction Coupling									
Vibration Reduction Index for Ff	K_Ff,2	RR-335, CLT-FW-Ta-05	15.7	15.7	15.7	15.7	15.7	15.7	
Vibration Reduction Index for Fd	K_Fd,2	RR-335, CLT-FW-Ta-05	7.2	7.2	7.2	7.2	7.2	7.2	
Vibration Reduction Index for Df	K_Df,2	RR-335, CLT-FW-Ta-05	7.2	7.2	7.2	7.2	7.2	7.2	
Flanking Transmission Loss									
Flanking TL for path Ff_2	R_ Ff	ISO 15712-1, Eq. 25b	**55**	**69**	**74**	**82**	**90**	**90**	**78**
Flanking TL for path Fd_2	R_ Fd	ISO 15712-1, Eq. 25b	**47**	**53**	**59**	**69**	**79**	**84**	**64**
Flanking TL for path Df_2	R_ Df	ISO 15712-1, Eq. 25b	**52**	**62**	**71**	**87**	**90**	**90**	**74**
Junction 2: Flanking TL for all paths			45	52	59	69	78	82	63
Junction 3: Side Junction									
All values the same as for Junction 1									
Flanking Transmission Loss									
Flanking TL for path Ff_3	R_ Ff	ISO 15712-1, Eq. 25b	**57**	**71**	**76**	**84**	**90**	**90**	**80**
Flanking TL for path Fd_3	R_ Fd	ISO 15712-1, Eq. 25b	**50**	**56**	**62**	**72**	**82**	**86**	**67**
Flanking TL for path Df_3	R_ Df	ISO 15712-1, Eq. 25b	**55**	**65**	**74**	**90**	**90**	**90**	**77**
Junction 3: Flanking TL for all paths			48	55	62	72	81	83	66
Junction 4: Side Junction									
Transmission loss values of flanking elements are the same as for Junction 2, but Kij values are the same as for Junction 1 or 3.									
Flanking Transmission Loss									
Flanking TL for path Ff_4	R_ Ff	ISO 15712-1, Eq. 25b	**58**	**72**	**77**	**85**	**90**	**90**	**81**
Flanking TL for path Fd_4	R_ Fd	ISO 15712-1, Eq. 25b	**51**	**57**	**63**	**73**	**83**	**87**	**68**
Flanking TL for path Df_4	R_ Df	ISO 15712-1, Eq. 25b	**56**	**66**	**75**	**90**	**90**	**90**	**78**
Junction 4: Flanking TL for all paths			49	56	63	73	82	84	67
Total Flanking (for all 4 junctions)			41	48	53	65	74	77	59
ASTC due to Direct plus Flanking Paths		RR-335, Eq. 1.1	**37**	**40**	**49**	**63**	**73**	**77**	**53**

Example 57: CLT Construction - Rooms side-by-side

- **CLT Floors and CLT Walls[3]**
- **Walls and ceiling include linings of 15.9 mm SilentFX® QuickCut gypsum board**
- **Topping of 38 mm thick gypsum concrete over 13 mm wood fiber board in both rooms.**

Separating wall assembly (loadbearing) with:

- CLT175(5) wall assembly[3] with mass per unit area 92.1 kg/m^2
- CLT wall panels oriented so face ply strands are vertical
- Lining on each side of one layer of 15.9 mm SilentFX® QuickCut gypsum board on 38 mm x 38 mm furring Strips Spaced 610 mm on Center with 38 mm CertainTeed Fiberglass Insulation in the Cavity.

Junction 1: Bottom Junction (separating wall / floor) with:

- CLT175(5) floor assembly[3] with a mass per unit area of 92.1 kg/m^2, continuous through cross-junction with a CLT89(3) wall assembly.
- CLT floor/ceiling are panels oriented so that the face ply strands are perpendicular to the load bearing CLT panels of junction 1 and 3.
- The CLT panels are connected with 90 mm equal leg angle brackets spaced 300 mm on center and nailed/screwed to both sides of separating element.
- Floor lining of 38 mm concrete over 13 mm wood fiber board.

Junction 2 or 4: Each Side (separating wall / abutting side wall) with:

- Abutting side walls of CLT175(5) assemblies with a mass per unit area of 92.1 kg/m^2 continuous through T-junctions with the separating CLT wall panel.
- CLT side wall panels oriented so the face ply strands are vertical
- The CLT panels are connected with 90 mm equal leg angle brackets nailed/screwed to both sides of the separating element and spaced 600 mm on center.
- Lining on each side of one layer of 15.9 mm SilentFX® QuickCut gypsum board on 38 mm x 38 mm furring Strips Spaced 610 mm on Center with 38 mm CertainTeed Fiberglass Insulation in the Cavity.

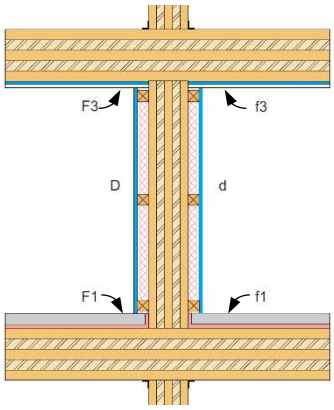
Junction 3: Top Junction (separating wall / ceiling) with:

- CLT175(5) ceiling assembly with a mass per unit area of 92.1 kg/m^2, continuous through cross-junction with CLT separating wall.
- CLT floor/ceiling panels are oriented so that the face ply strands are perpendicular to the load bearing CLT panels of junction 1 and 3.
- The CLT panels are connected with 90 mm equal leg angle brackets spaced 300 mm on center and nailed/screwed to both sides of separating element.
- Lining on each ceiling of base layer of 15.9 mm SilentFX® QuickCut gypsum board directly fixed to the CLT and a face layer of CertainTeed Type C gypsum board.

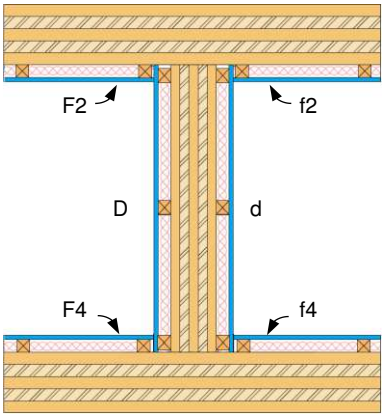
Room Parameters

- See Figure 2 of this report or Figure 1.3 of the National Research Council Report RR-331.
- The separating wall is 2.5 m high by 5 m wide.
- The flanking walls 2.5 m high by 4 m wide.
- The floor / ceilings are 4 m by 5 m.

Illustration for this case



Junctions 1 and 3: Cross junctions of a CLT175(5) wall assembly with a CLT175(5) floor and ceiling assembly. The walls include a lining of one layer of 15.9 mm SilentFX® QuickCut gypsum board on 38 mm x 38 mm furring strips spaced 610 mm on center with 38 mm CertainTeed Fiberglass Insulation in the cavity. Ceiling lining of a base layer of 15.9 mm SilentFX® QuickCut gypsum board and a face layer of CertainTeed Type C gypsum baord. Floor lining of 38 mm concrete over 13 mm wood fiber board. (Side View)



Junctions 2 and 4: T-junction of a separating wall with side walls, all CLT175(5) wall assemblies. The walls have a lining of one layer of 15.9 mm SilentFX® QuickCut gypsum board on 38 mm x 38 mm furring strips spaced 610 mm on center with 38 mm CertainTeed Fiberglass Insulation in the cavity. (Plan View)

Example 57	ISO Symbol	Reference	125	250	500	1000	2000	4000	STC or ASTC
Separating Partition									
Laboratory Transmission Loss	R_D,lab	RR-335, Base CLT175(5)	32	30	39	43	52	49	42
Correction Resonant Transmission		N/A	0	0	0	0	0	0	
ΔTL change by lining on D	ΔR_D	SilentFX(15.9)_WFUR38(600)_GFB38	1	12	6	11	14	25	
ΔTL change by lining on d	ΔR_d	SilentFX(15.9)_WFUR38(600)_GFB38	1	12	6	11	14	25	
Correction		N/A	0	0	0	0	0	0	
Direct TL in-situ	R_D,situ	ISO 15712-1, Eq. 24	**34**	**54**	**51**	**65**	**80**	**90**	**58**
Junction 1: Bottom Junction									
Transmission Loss of Flanking Elements									
TL of element F1, laboratory	R_F1,lab	RR-335, Base-CLT175(5)	32	30	39	43	52	49	42
TL of element f1, laboratory	R_f1,lab	RR-335, Base-CLT175(5)	32	30	39	43	52	49	42
Correction Resonant Transmission F1		N/A	0	0	0	0	0	0	
Correction Resonant Transmission f1		N/A	0	0	0	0	0	0	
TL of element F1, in-situ	R_F1,situ	ISO 15712-1, Eq. 19, T_s,situ = T_s,lab	32	30	39	43	52	49	42
TL of element f1, in-situ	R_f1,situ	ISO 15712-1, Eq. 19, T_s,situ = T_s,lab	32	30	39	43	52	49	42
ΔTL change by lining on F	ΔR_F1	RR-335, ΔTL-CLT-F02	6	10	12	22	27	32	
ΔTL change by lining on f	ΔR_f1	RR-335, ΔTL-CLT-F02	6	10	12	22	27	32	
Junction Coupling									
Vibration Reduction Index for Ff	K_Ff,1	RR-335, CLT-WF-Xa-01	0.6	0.6	0.6	0.6	0.6	0.6	
Vibration Reduction Index for Fd	K_Fd,1	RR-335, CLT-WF-Xa-01	10.2	10.2	10.2	10.2	10.2	10.2	
Vibration Reduction Index for Df	K_Df,1	RR-335, CLT-WF-Xa-01	10.2	10.2	10.2	10.2	10.2	10.2	
Flanking Transmission Loss									
Flanking TL for path Ff_1	R_ Ff	ISO 15712-1, Eq. 25b	**49**	**55**	**68**	**90**	**90**	**90**	**66**
Flanking TL for path Fd_1	R_ Fd	ISO 15712-1, Eq. 25b	**53**	**66**	**71**	**90**	**90**	**90**	**76**
Flanking TL for path Df_1	R_ Df	ISO 15712-1, Eq. 25b	**53**	**66**	**71**	**90**	**90**	**90**	**76**
Junction 1: Flanking TL for all paths			46	54	65	85	85	85	66
Junction 2: Side Junction									
Transmission Loss of Flanking Elements									
TL of element F2, laboratory	R_F2,lab	RR-335, Base CLT175(5)	32	30	39	43	52	49	42
TL of element f2, laboratory	R_f2,lab	RR-335, Base CLT175(5)	32	30	39	43	52	49	42
Correction Resonant Transmission F2		N/A	0	0	0	0	0	0	
Correction Resonant Transmission f2		N/A	0	0	0	0	0	0	
TL of element F2, in-situ	R_F2,situ	ISO 15712-1, Eq. 19, T_s,situ = T_s,lab	32	30	39	43	52	49	42
TL of element f2, in-situ	R_f2,situ	ISO 15712-1, Eq. 19, T_s,situ = T_s,lab	32	30	39	43	52	49	42
ΔTL change by lining on F	ΔR_F2	SilentFX(15.9)_WFUR38(600)_GFB38	1	12	6	11	14	25	
ΔTL change by lining on f	ΔR_f2	SilentFX(15.9)_WFUR38(600)_GFB38	1	12	6	11	14	25	
Junction Coupling									
Vibration Reduction Index for Ff	K_Ff,2	RR-335, CLT-WW-Tb-01	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	
Vibration Reduction Index for Fd	K_Fd,2	RR-335, CLT-WW-Tb-01	10.1	10.1	10.1	10.1	10.1	10.1	
Vibration Reduction Index for Df	K_Df,2	RR-335, CLT-WW-Tb-01	10.1	10.1	10.1	10.1	10.1	10.1	
Flanking Transmission Loss									
Flanking TL for path Ff_2	R_ Ff	ISO 15712-1, Eq. 25b	**40**	**60**	**57**	**71**	**86**	**90**	**64**
Flanking TL for path Fd_2	R_ Fd	ISO 15712-1, Eq. 25b	**51**	**71**	**68**	**82**	**90**	**90**	**75**
Flanking TL for path Df_2	R_ Df	ISO 15712-1, Eq. 25b	**51**	**71**	**68**	**82**	**90**	**90**	**75**
Junction 2: Flanking TL for all paths			39	59	56	70	83	85	63
Junction 3: Top Junction									
All values the same as for Junction 1 except linings									
ΔTL change by lining on F	ΔR_F3	G13_SilentFX(15.9)	1	1	0	4	3	7	
ΔTL change by lining on f	ΔR_f3	G13_SilentFX(15.9)	1	1	0	4	3	7	
Junction Coupling									
Vibration Reduction Index for Ff	K_Ff,3	RR-335, CLT-WF-Xa-01	0.6	0.6	0.6	0.6	0.6	0.6	
Vibration Reduction Index for Fd	K_Fd,3	RR-335, CLT-WF-Xa-01	10.2	10.2	10.2	10.2	10.2	10.2	
Vibration Reduction Index for Df	K_Df,3	RR-335, CLT-WF-Xa-01	10.2	10.2	10.2	10.2	10.2	10.2	
Flanking Transmission Loss									
Flanking TL for path Ff_3	R_ Ff	ISO 15712-1, Eq. 25b	**39**	**37**	**44**	**56**	**63**	**68**	**47**
Flanking TL for path Fd_3	R_ Fd	ISO 15712-1, Eq. 25b	**48**	**57**	**59**	**72**	**83**	**90**	**66**
Flanking TL for path Df_3	R_ Df	ISO 15712-1, Eq. 25b	**48**	**57**	**59**	**72**	**83**	**90**	**66**
Junction 3: Flanking TL for all paths			38	37	44	56	63	68	47
Junction 4: Side Junction									
All values the same as for Junction 2									
Flanking TL for path Ff_4	R_ Ff	ISO 15712-1, Eq. 25b	**40**	**60**	**57**	**71**	**86**	**90**	**64**
Flanking TL for path Fd_4	R_ Fd	ISO 15712-1, Eq. 25b	**51**	**71**	**68**	**82**	**90**	**90**	**75**
Flanking TL for path Df_4	R_ Df	ISO 15712-1, Eq. 25b	**51**	**71**	**68**	**82**	**90**	**90**	**75**
Junction 4: Flanking TL for all paths			39	59	56	70	83	85	63
Total Flanking (for all 4 junctions)			34	37	43	55	63	68	47
ASTC due to Direct plus Flanking Paths		RR-335, Eq. 1.1	**31**	**37**	**43**	**55**	**63**	**68**	**47**

Example 58: CLT Construction - Rooms one-above-the-other

- **CLT Floors and CLT Walls[3]**
- **Walls have a lining of one layer of 15.9 mm SilentFX® QuickCut gypsum board on 38 mm x 38 mm furring strips spaced 610 mm on center with 38 mm CertainTeed Fiberglass Insulation in the cavity.**
- **Ceiling of a base layer of 15.9 mm SilentFX® QuickCut gypsum board and a face layer of CertainTeed 12.7 mm Type C board.**
- **Topping of 38 mm thick gypsum concrete over 8 mm closed cell foam in both rooms.**

Separating floor assembly with:

- CLT175(5) floor assembly with mass per unit area 91.4 kg/m^2, continuous through cross-junction with CLT wall assemblies at Junctions 1 and 3 and oriented so that face ply strands are perpendicular to loadbearing Junctions 1 and 3.
- The CLT panels are connected with 90 mm equal leg angle brackets spaced 300 mm on center and nailed/screwed to both sides of separating element.
- Floor lining of 38 mm concrete over 8 mm closed cell foam
- Ceiling of a base layer of 15.9 mm SilentFX® QuickCut gypsum board and a face layer of CertainTeed 12.7 mm Type C board directly fixed to the CLT.

Junction 1, 3 or 4: (separating floor / flanking walls) with:

- CLT175(5) wall assembly with mass per unit area 91.4 kg/m^2, above and below cross-junctions with separating assembly that is continuous or lapped and glued across these junctions
- CLT wall assembly oriented so face ply strands are vertical
- The CLT panels are connected with 90 mm equal leg angle brackets spaced 300 mm on center and nailed/screwed to both sides of separating element.
- Lining of 15.9 mm SilentFX® QuickCut gypsum board on 38 mm x 38 mm furring Strips Spaced 610 mm on Center with 38 mm CertainTeed Fiberglass Insulation in the cavity.

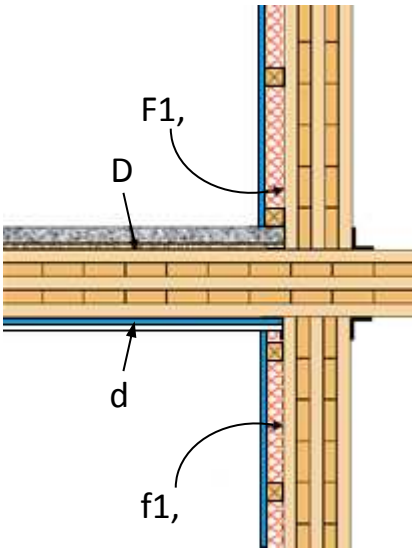
Junction 2: Each Side (separating floor / flanking walls) with:

- CLT175(5) wall assembly with mass per unit area 91.4 kg/m^2, above and below T-junction with separating assembly that terminates at this junction
- CLT wall assembly oriented so face ply strands are vertical
- Connected with 90 mm equal leg angle brackets nailed/screwed at 300 mm o.c. to one side of the wall assembly and to the abutting floor assemblies
- Lining of 15.9 mm SilentFX® QuickCut gypsum board on 38 mm x 38 mm furring Strips Spaced 610 mm on Center with 38 mm CertainTeed Fiberglass Insulation in the cavity.

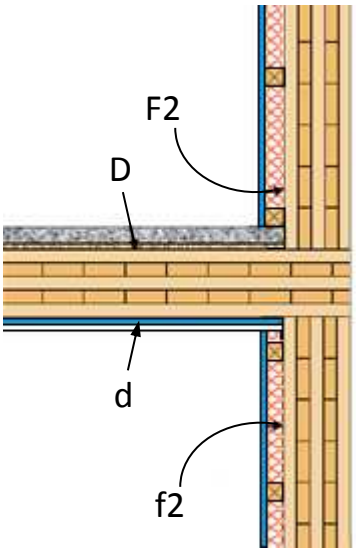
Room Parameters

- See Figure 2 of this report or Figure 1.3 of the National Research Council Report RR-331.
- The separating floor is 4 m by 5 m.
- The flanking walls 1 and 3 are 2.5 m high by 4 m wide.
- The flanking walls 2 and 4 are 2.5 m high by 5 m wide.

Illustration for this case



Cross-junctions of a separating floor of CLT175(5) with CLT175(5) wall assemblies above and below. (Side view of Junctions 1, 3 and 4, except the orientation of the floor assemblies differs for Junction 4)



T-junction of a CLT175(5) floor with CLT175(5) wall assemblies above and below. (Side view of Junction 2)

Example 58	ISO Symbol	Reference	125	250	500	1000	2000	4000	STC or ASTC
Separating Partition									
Laboratory Transmission Loss	R_D,lab	RR-335, Base CLT175(5)	32	30	39	43	52	49	42
Correction Resonant Transmission		N/A	0	0	0	0	0	0	
ΔTL change by lining on D	ΔR_D	CON38_FOAM08	6	10	12	22	27	32	
ΔTL change by lining on d	ΔR_d	TypeC(12.7)_SilentFX(15.9)	1	1	0	4	3	7	
Correction		N/A	0	0	0	0	0	0	
Direct TL in-situ	R_D,situ	ISO 15712-1, Eq. 24	**39**	**41**	**51**	**69**	**82**	**88**	**54**
Junction 1: Side Junction									
Transmission Loss of Flanking Elements									
TL of element F1, laboratory	R_F1,lab	RR-335, Base CLT175(5)	32	30	39	43	52	49	42
TL of element f1, laboratory	R_f1,lab	RR-335, Base CLT175(5)	32	30	39	43	52	49	42
Correction Resonant Transmission F1		N/A	0	0	0	0	0	0	
Correction Resonant Transmission f1		N/A	0	0	0	0	0	0	
TL of element F1, in-situ	R_F1,situ	ISO 15712-1, Eq. 19, T_s,situ = T_s,lab	32	30	39	43	52	49	42
TL of element f1, in-situ	R_f1,situ	ISO 15712-1, Eq. 19, T_s,situ = T_s,lab	32	30	39	43	52	49	42
ΔTL change by lining on F	ΔR_F1	SilentFX(15.9)_WFUR38(600)_GFB38	3	8	5	11	10	11	
ΔTL change by lining on f	ΔR_f1	SilentFX(15.9)_WFUR38(600)_GFB38	3	8	5	11	10	11	
Junction Coupling									
Vibration Reduction Index for Ff	K_Ff,1	RR-335, CLT-FW-Xa-05	17.6	17.6	17.6	17.6	17.6	17.6	
Vibration Reduction Index for Fd	K_Fd,1	RR-335, CLT-FW-Xa-05	10.2	10.2	10.2	10.2	10.2	10.2	
Vibration Reduction Index for Df	K_Df,1	RR-335, CLT-FW-Xa-05	10.2	10.2	10.2	10.2	10.2	10.2	
Flanking Transmission Loss									
Flanking TL for path Ff_1	R_ Ff	ISO 15712-1, Eq. 25b	**62**	**70**	**73**	**89**	**90**	**90**	**81**
Flanking TL for path Fd_1	R_ Fd	ISO 15712-1, Eq. 25b	**52**	**55**	**60**	**74**	**81**	**83**	**66**
Flanking TL for path Df_1	R_ Df	ISO 15712-1, Eq. 25b	**57**	**64**	**72**	**90**	**90**	**90**	**77**
Junction 1: Flanking TL for all paths			50	54	60	74	80	82	66
Junction 2: Side Junction									
Transmission Loss of Flanking Elements									
TL of element F2, laboratory	R_F2,lab	RR-335, Base CLT175(5)	32	30	39	43	52	49	42
TL of element f2, laboratory	R_f2,lab	RR-335, Base CLT175(5)	32	30	39	43	52	49	42
Correction Resonant Transmission F2		N/A	0	0	0	0	0	0	
Correction Resonant Transmission f2		N/A	0	0	0	0	0	0	
TL of element F2, in-situ	R_F2,situ	ISO 15712-1, Eq. 19, T_s,situ = T_s,lab	32	30	39	43	52	49	42
TL of element f2, in-situ	R_f2,situ	ISO 15712-1, Eq. 19, T_s,situ = T_s,lab	32	30	39	43	52	49	42
ΔTL change by lining on F	ΔR_F2	SilentFX(15.9)_WFUR38(600)_GFB38	1	12	6	11	14	25	
ΔTL change by lining on f	ΔR_f2	SilentFX(15.9)_WFUR38(600)_GFB38	1	12	6	11	14	25	
Junction Coupling									
Vibration Reduction Index for Ff	K_Ff,2	RR-335, CLT-FW-Ta-05	12.9	12.9	12.9	12.9	12.9	12.9	
Vibration Reduction Index for Fd	K_Fd,2	RR-335, CLT-FW-Ta-05	6.8	6.8	6.8	6.8	6.8	6.8	
Vibration Reduction Index for Df	K_Df,2	RR-335, CLT-FW-Ta-05	6.8	6.8	6.8	6.8	6.8	6.8	
Flanking Transmission Loss									
Flanking TL for path Ff_2	R_ Ff	ISO 15712-1, Eq. 25b	**54**	**74**	**71**	**85**	**90**	**90**	**78**
Flanking TL for path Fd_2	R_ Fd	ISO 15712-1, Eq. 25b	**48**	**57**	**59**	**72**	**83**	**90**	**66**
Flanking TL for path Df_2	R_ Df	ISO 15712-1, Eq. 25b	**53**	**66**	**71**	**90**	**90**	**90**	**76**
Junction 2: Flanking TL for all paths			46	56	58	72	82	85	65
Junction 3: Side Junction									
All values the same as for Junction 1									
Flanking Transmission Loss									
Flanking TL for path Ff_3	R_ Ff	ISO 15712-1, Eq. 25b	**58**	**78**	**74**	**89**	**90**	**90**	**82**
Flanking TL for path Fd_3	R_ Fd	ISO 15712-1, Eq. 25b	**50**	**59**	**61**	**74**	**86**	**90**	**68**
Flanking TL for path Df_3	R_ Df	ISO 15712-1, Eq. 25b	**55**	**68**	**73**	**90**	**90**	**90**	**78**
Junction 3: Flanking TL for all paths			48	58	61	74	83	85	67
Junction 4: Side Junction									
Transmission loss values of flanking elements are the same as for Junction 2, but Kij values are the same as for Junction 1 or 3.									
Flanking Transmission Loss									
Flanking TL for path Ff_4	R_ Ff	ISO 15712-1, Eq. 25b	**59**	**79**	**75**	**90**	**90**	**90**	**83**
Flanking TL for path Fd_4	R_ Fd	ISO 15712-1, Eq. 25b	**51**	**60**	**62**	**75**	**87**	**90**	**69**
Flanking TL for path Df_4	R_ Df	ISO 15712-1, Eq. 25b	**56**	**69**	**74**	**90**	**90**	**90**	**79**
Junction 4: Flanking TL for all paths			49	59	62	75	84	85	68
Total Flanking (for all 4 junctions)			42	51	54	67	76	78	61
ASTC due to Direct plus Flanking Paths		RR-335, Eq. 1.1	**37**	**41**	**49**	**65**	**75**	**78**	**54**

Footnotes

1. UL Product Spec™ BXUV7 - Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada http://productspec.ul.com/document.php?id=BXUV.M535
2. The use of floor finishes on the bare subfloor (for example a concrete topping, tiles or laminate flooring) will in most cases result in ASTC ratings which are equal to or exceed the ratings shown in the examples presented in this report.
3. Cross-Laminated Timber (CLT) assemblies are structural panels fabricated by bonding wood elements together in layers with alternating perpendicular orientation of the timber elements. The CLT panels evaluated in this study had adhesive bonding between the faces of timber elements in adjacent layers, but no adhesive bonding the adjacent timber elements within a given layer. There were noticeable cracks between the timber elements comprising each layer of the CLT assembly. These CLT panels could be called “Face-laminated CLT Panels” but are simply referred to as CLT panels in the body of this Report. For the 3-ply panels considered in this Report, each layer or ply has a thickness of 26 mm and is comprised of parallel wood strips whose cross section is 26x89 mm. For the 5-ply and 7-ply panels, the ply thickness increases from 26 mm to 35 mm. The testing of the unlined assemblies is presented in Section 2.1. The physical properties of the bare laminated panels are:
    - 3-ply panels: 78 mm thick, 42.4 kg/m^2
    - 5-ply panels: 175mm thick, 91.4 kg/m^2
    - 7-ply panels: 245 mm thick, 130 Kg/m^2

References

[1] ISO 15712-1:2005 -- Building acoustics -- Estimation of acoustic performance of buildings from the performance of elements -- Part 1: Airborne sound insulation between rooms. Geneva, Switzerland: International Standards Organization; 2005.

[2] ISO 10848-1:2006 -- Acoustics -- Laboratory measurement of the flanking transmission of airborne and impact sound between adjoining rooms -- Part 1: Frame document. Geneva, Switzerland: International Standards Organization; 2006.

[3] Hoeller, C., Quirt D., Mahn J., RR-331: Guide to Calculating Airborne Sound Transmission in Buildings: 3rd Edition. Ottawa, Canada: National Research Council Canada; 2017. http://doi.org/10.4224/23002279

[4] Zeitler B., Quirt D., Schoenwald S., Mahn J., RR-334: Apparent Sound Insulation in Concrete Block Buildings. Ottawa, Canada: National Research Council Canada; 2015. http://doi.org/10.4224/21275887