

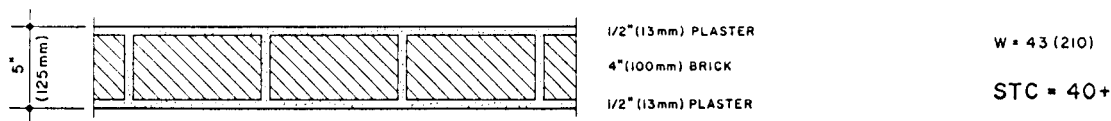
Figures B.1 to B.9 include a number of typical wall constructions with pertinent architectural-acoustical data. The STC ratings indicated at each wall construction represent average values, somewhat on the conservative side, derived from test results issued by leading authorities in the field of acoustical testing and research. These values can be regarded as guidelines in architectural design practice. Most of the information shown in Figs. B.1 to B.9 was published in *A Guide to Air-borne, Impact, and Structure-borne Noise Control in Multi-family Dwellings*, National Bureau of Standards, Washington, D.C., 1967, and by the National Research Council of Canada, Ottawa, in the Building Research Note entitled *Transmission Loss of Plasterboard Walls*, 1968. It must be stressed that in practice the STC ratings may fall somewhat short of the values shown in the figures, due to poor workmanship or unpredictable and invisible paths of flanking transmission.

These illustrations also exemplify the manner in which the overall acoustical performance of walls is affected by various components and their physical characteristics, such as number and thickness of layers, width of air space between the layers, the use of isolation blanket or resilient attachment, spacing and rigidity of studs, etc.

The wall constructions shown in Figs. B.1 to B.9 can be grouped in the following way:

1. Masonry walls (Fig. B.1)
2. Lightweight walls
 - 2.1 Single-leaf assemblies (Fig. B.2)
 - 2.2 Multiple-leaf assemblies:
 - Wood-stud partitions with 16-in. (41-cm) spacing (Fig. B.3)
 - Wood-stud partitions with 24-in. (61-cm) spacing (Fig. B.4)
 - Staggered wood-stud partitions (Fig. B.5)
 - Metal-stud partitions with 16-in. (41-cm) spacing (Fig. B.6)
 - Metal-stud partitions with 24-in. (61-cm) spacing (Fig. B.7)
 - Staggered metal-stud partitions (Fig. B.8)
 - Studless partitions (Fig. B.9)

1. 4" (100mm) BRICK



2. 4 1/2" (114mm) BRICK

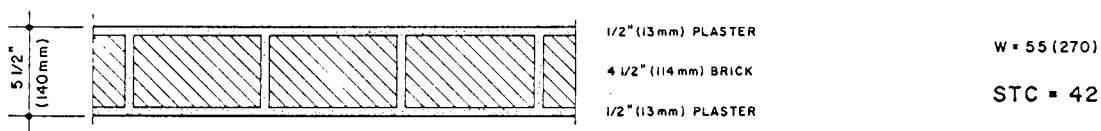
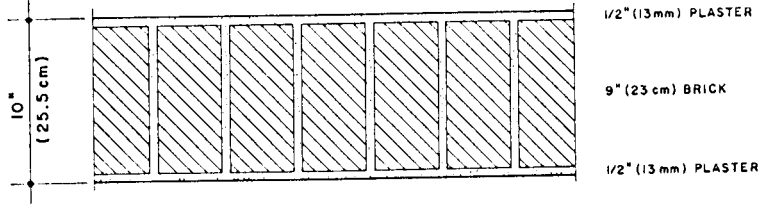


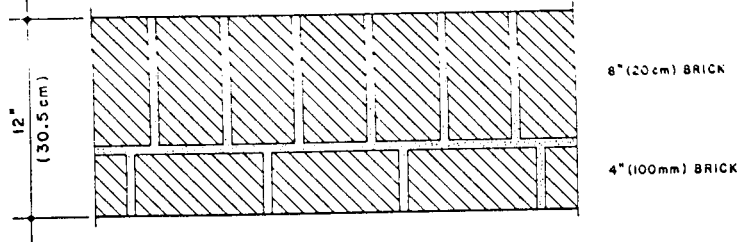
Fig. B.1 Sound-insulation values of masonry walls: W, weight in pounds per square foot (kilograms per square meter); STC, sound transmission class rating in decibels.

3. 9" (23 cm) BRICK



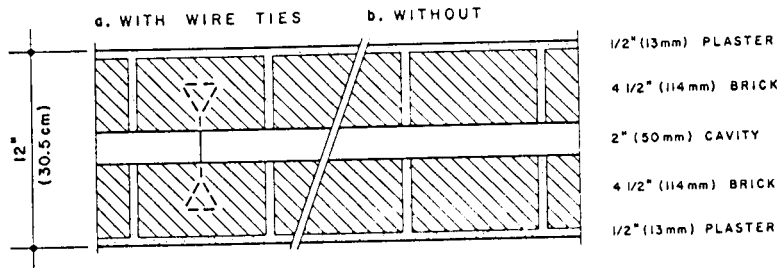
W = 100 (490)
STC = 52

4. 12" (30.5 cm) BRICK



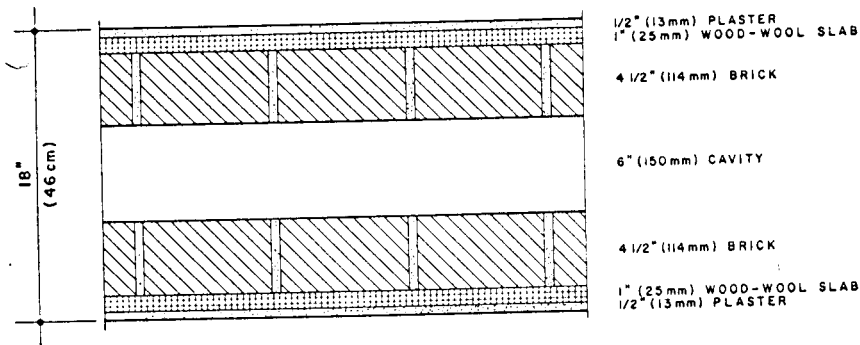
W = 121 (590)
STC = 54+

5. CAVITY BRICK



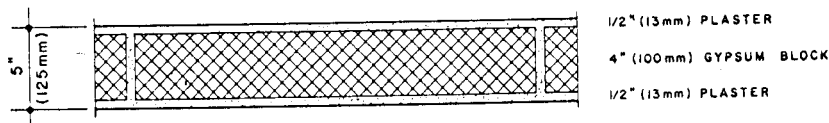
W_a = 100 (490)
STC_a = 49
W_b = 100 (490)
STC_b = 54

6.



W = 120 (585)
STC = 62

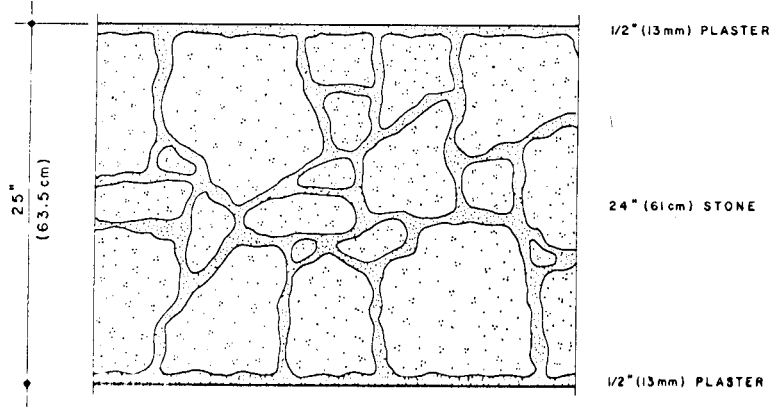
7. 4" (100mm) HOLLOW GYPSUM BLOCK



W = 23.5 (115)
STC = 40+

Fig. B.1 (continued) Sound-insulation values of masonry walls: W, weight in pounds per square foot (kilograms per square meter); STC, sound transmission class rating in decibels.

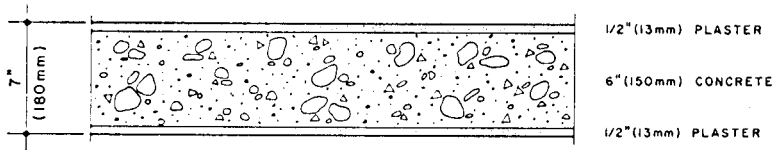
8. 24" (61cm) STONE



W = 280 (1,370)

STC = 56

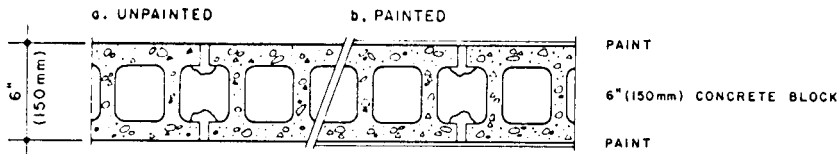
9. 6" (150mm) CONCRETE



W = 80 (390)

STC = 52+

10. 6" (150mm) HOLLOW DENSE CONCRETE BLOCK



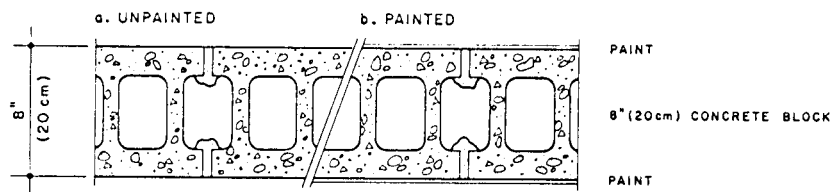
W_a = 30 to 40
(145 to 195)

STC_a = 43+

W_b = 30 to 40
(145 to 195)

STC_b = 45+

11. 8" (20cm) HOLLOW DENSE CONCRETE BLOCK



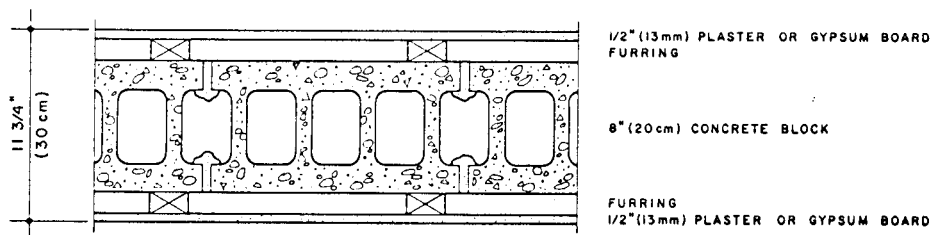
W_a = 40 to 50
(195 to 245)

STC_a = 45+

W_b = 40 to 50
(195 to 245)

STC_b = 48+

12.

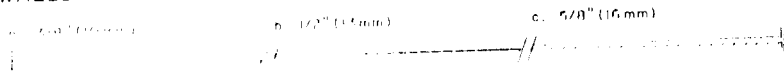


W = 45 to 55
(220 to 270)

STC = 50+

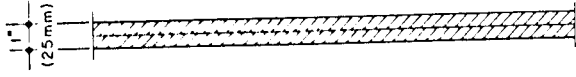
Fig. B.1 (continued) Sound-insulation values of masonry walls: W, weight in pounds per square foot (kilograms per square meter); STC, sound transmission class rating in decibels.

13. GYPSUM WALLBOARD



$W_a = 1.6 (8)$ $STC_a = 26$
 $W_b = 2.1 (10)$ $STC_b = 28$
 $W_c = 2.7 (13)$ $STC_c = 29$

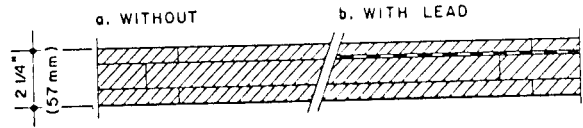
14. TWO LAYERS OF GYPSUM WALLBOARD



$1/2" (13\text{mm})$ GYPSUM BOARD
 $1/2" (13\text{mm})$ GYPSUM BOARD

$W = 4.6 (22)$
 $STC = 31$

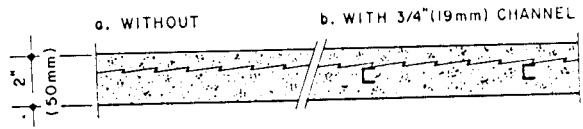
15. GYPSUM SANDWICH PANEL



$1/2" (13\text{mm})$ GYPSUM BOARD
 $1/8" (3\text{mm})$ LEAD
 $1" (25\text{mm})$ GYPSUM COREBOARD
 $5/8" (16\text{mm})$ GYPSUM BOARD

$W_a = 10 (49)$ $STC_a = 34+$
 $W_b = 17 (83)$ $STC_b = 40+$

16. SOLID PLASTER

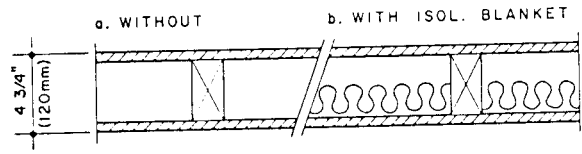


SANDED GYPSUM PLASTER
 METAL LATH
 $3/4" (19\text{mm})$ CHANNEL

$W_a = 18.5 (90)$ $STC_a = 36$
 $W_b = 18.5 (90)$ $STC_b = 36+$

Fig. B.2 Sound-insulation values of lightweight walls with single-leaf assemblies: W, weight in pounds per square foot (kilograms per square meter); STC, sound transmission class rating in decibels.

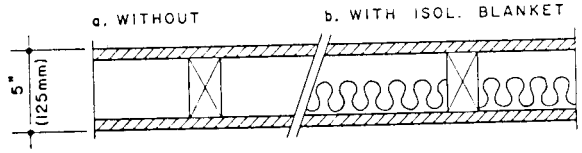
17.



$1/2" (13\text{mm})$ GYPSUM BOARD
 $2" \times 4" (50 \times 100\text{mm})$ WOOD STUD
 $2" (50\text{mm})$ ISOLATION BLANKET
 $1/2" (13\text{mm})$ GYPSUM BOARD

$W_a = 4.2 (21)$ $STC_a = 33$
 $W_b = 4.7 (23)$ $STC_b = 36$

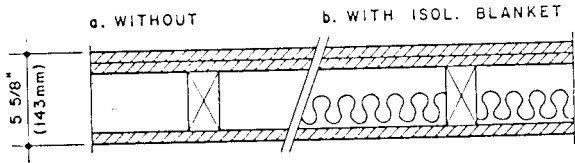
18.



$5/8" (16\text{mm})$ GYPSUM BOARD
 $2" \times 4" (50 \times 100\text{mm})$ WOOD STUD
 $2" (50\text{mm})$ ISOLATION BLANKET
 $5/8" (16\text{mm})$ GYPSUM BOARD

$W_a = 5.4 (26)$ $STC_a = 34$
 $W_b = 5.9 (29)$ $STC_b = 38$

19.

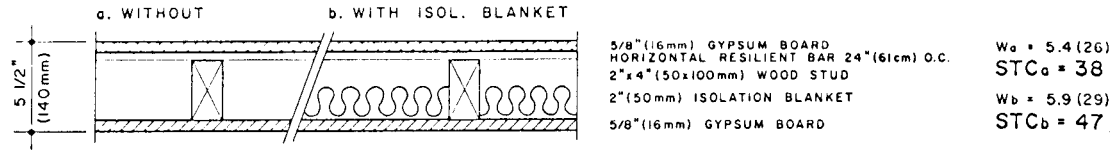


$5/8" (16\text{mm})$ GYPSUM BOARD
 $5/8" (16\text{mm})$ GYPSUM BOARD
 $2" \times 4" (50 \times 100\text{mm})$ WOOD STUD
 $2" (50\text{mm})$ ISOLATION BLANKET
 $5/8" (16\text{mm})$ GYPSUM BOARD

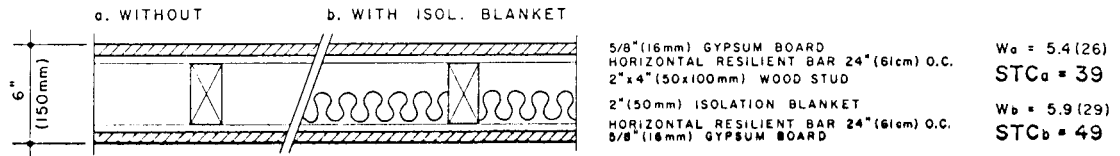
$W_a = 8.5 (42)$ $STC_a = 36$
 $W_b = 9 (44)$ $STC_b = 39$

Fig. B.3 Sound-insulation values of wood-stud partition walls with 16-in. (41-cm) spacings: W, weight in pounds per square foot (kilograms per square meter); STC, sound transmission class rating in decibels.

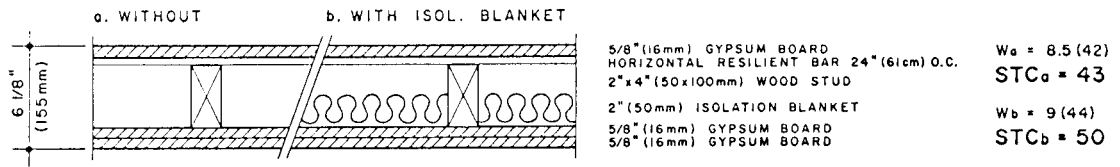
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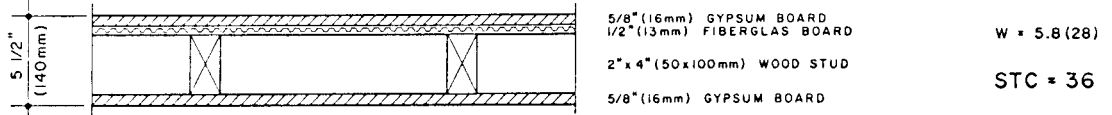
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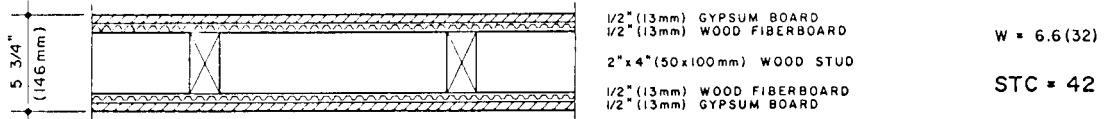
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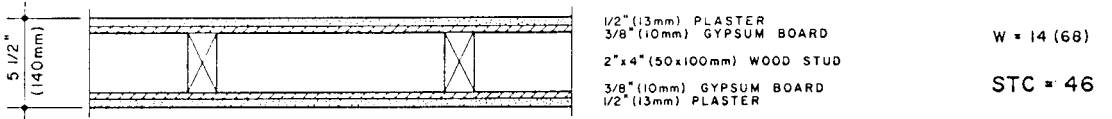
23.



24.



25.



26.

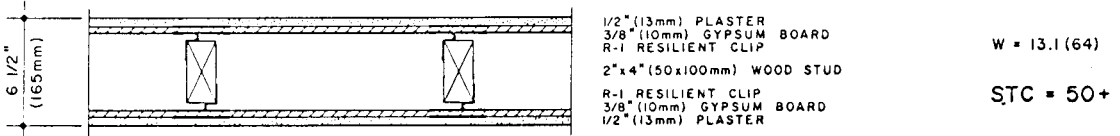
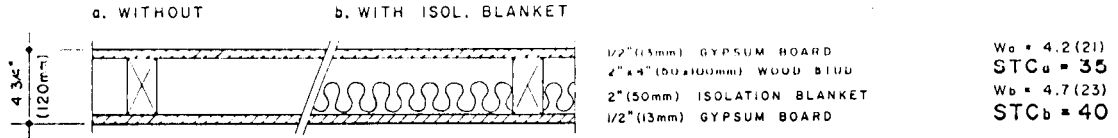
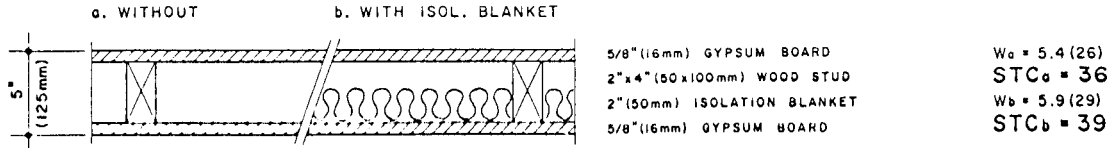


Fig. B.3 (continued) Sound-insulation values of wood-stud partition walls with 16-in. (41-cm) spacings; W, weight in pounds per square foot (kilograms per square meter); STC, sound transmission class rating in decibels.

27.



28.



29.

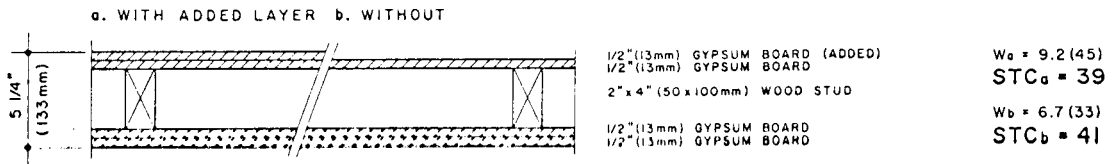
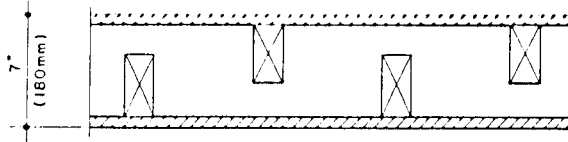


Fig. B.4 Sound-insulation values of wood-stud partition walls with 24-in. (61-cm) spacings: W, weight in pounds per square foot (kilograms per square meter); STC, sound transmission class rating in decibels.

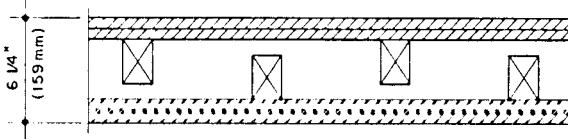
30.



5/8" (16mm) GYPSUM BOARD
 2"x4" (50x100mm) WOOD STUD
 5/8" (16mm) GYPSUM BOARD

W = 5.4 (26)
 STC = 39

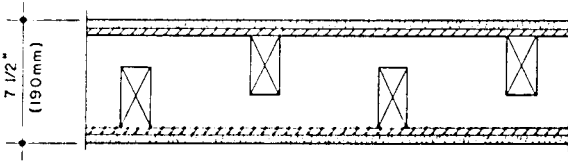
31.



5/8" (16mm) GYPSUM BOARD
 5/8" (16mm) GYPSUM BOARD
 2"x3" (50x75mm) WOOD STUD
 5/8" (16mm) GYPSUM BOARD
 5/8" (16mm) GYPSUM BOARD

W = 13.4 (65)
 STC = 44

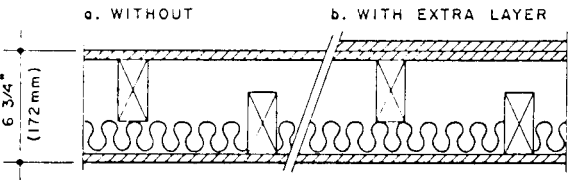
32.



1/2" (13mm) PLASTER
 3/8" (10mm) GYPSUM BOARD
 2"x4" (50x100mm) WOOD STUD
 3/8" (10mm) GYPSUM BOARD
 1/2" (13mm) PLASTER

W = 13.5 (66)
 STC = 45+

33.

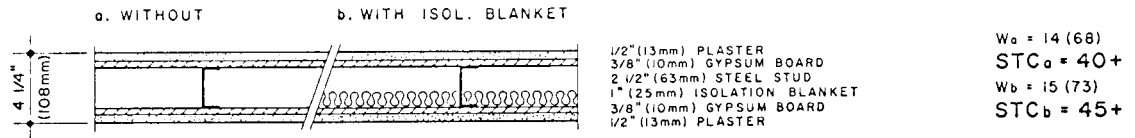


5/8" (16mm) GYPSUM BOARD (EXTRA)
 1/2" (13mm) GYPSUM BOARD
 2"x4" (50x100mm) WOOD STUD
 2" (50mm) ISOLATION BLANKET
 1/2" (13mm) GYPSUM BOARD

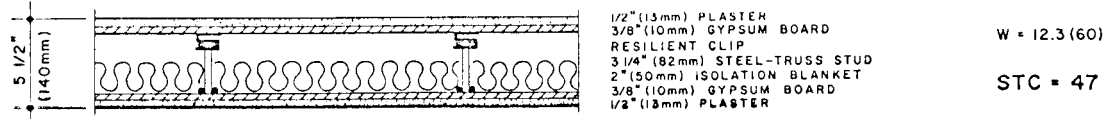
W_a = 4.7 (23)
 STC_a = 46
 W_b = 7.5 (37)
 STC_b = 50+

Fig. B.5 Sound-insulation values of staggered wood-stud partition walls with 8-in. (20-cm) spacings: W, weight in pounds per square foot (kilograms per square meter); STC, sound transmission class rating in decibels.

34.



35.



36.

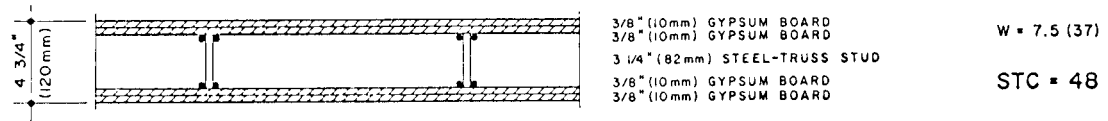


Fig. B.6 Sound-insulation values of metal-stud partition walls with 16-in. (41-cm) spacings: W, weight in pounds per square foot (kilograms per square meter); STC, sound transmission class rating in decibels.

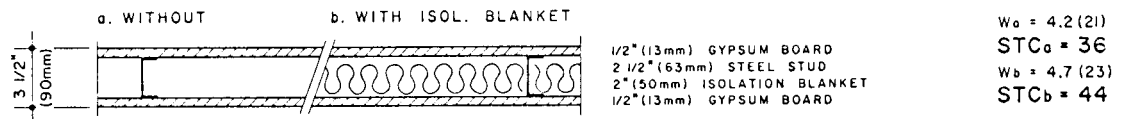
37.



38.



39.



40.

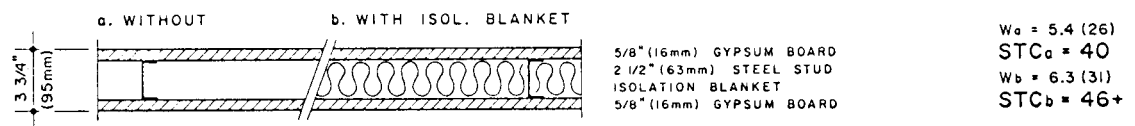
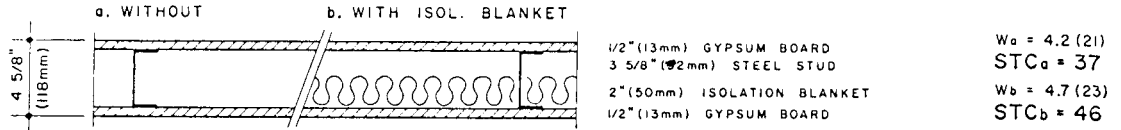
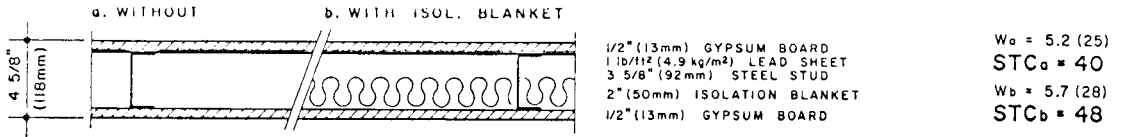


Fig. B.7 Sound-insulation values of metal-stud partition walls with 24-in. (61-cm) spacings: W, weight in pounds per square foot (kilograms per square meter); STC, sound transmission class rating in decibels.

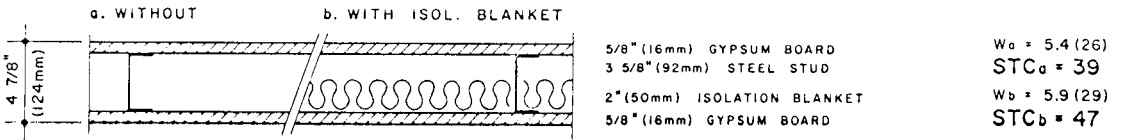
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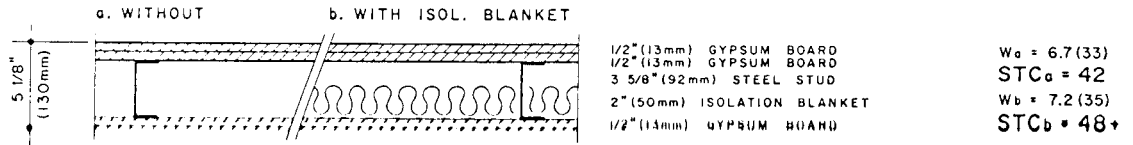
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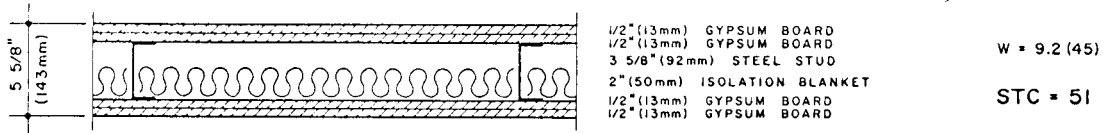
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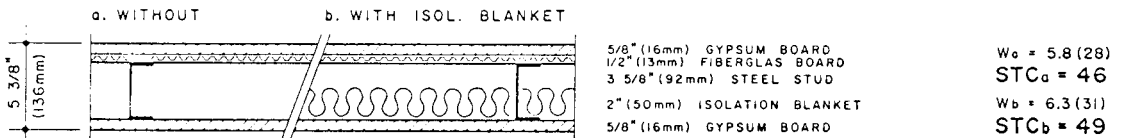
44.



45.



46.



47.

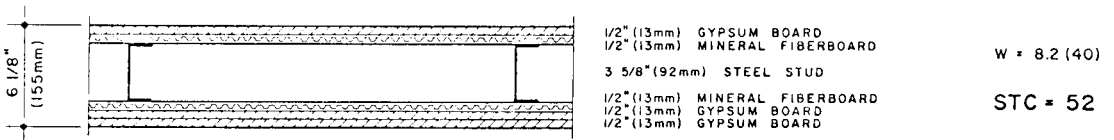
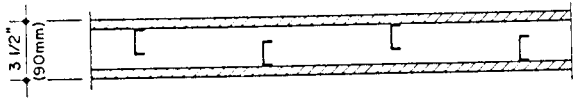


Fig. B.7 (continued) Sound-insulation values of metal-stud partition walls with 24-in. (61-cm) spacings; W, weight in pounds per square foot (kilograms per square meter); STC, sound transmission class rating in decibels.

48.

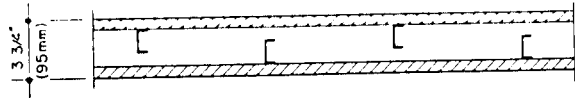


1/2" (13mm) GYPSUM BOARD
 2 1/2" (63mm) AIR SPACE
 1 5/8" (41mm) STEEL STUD
 1/2" (13mm) GYPSUM BOARD

W = 4.2 (21)

STC = 34

49.

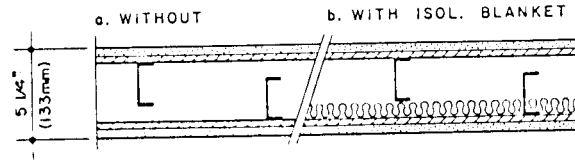


5/8" (16mm) GYPSUM BOARD
 2 1/2" (63mm) AIR SPACE
 1 5/8" (41mm) STEEL STUD
 5/8" (16mm) GYPSUM BOARD

W = 5.4 (26)

STC = 38

50.



1/2" (13mm) PLASTER
 3/8" (10mm) GYPSUM BOARD
 3 1/2" (90mm) AIR SPACE
 2 1/2" (63mm) STEEL STUD
 1" (25mm) ISOLATION BLANKET
 3/8" (10mm) GYPSUM BOARD
 1/2" (13mm) PLASTER

W_a = 17 (83)

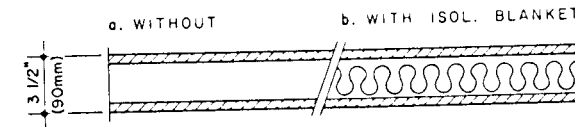
STC_a = 42+

W_b = 17 (83)

STC_b = 47+

Fig. B.8 Sound-insulation values of staggered metal-stud partition walls with 8-in. (20-cm) spacings; W, weight in pounds per square foot (kilograms per square meter); STC, sound transmission class rating in decibels.

51.



1/2" (13mm) GYPSUM BOARD
 2 1/2" (63mm) AIR SPACE
 2" (50mm) ISOLATION BLANKET
 1/2" (13mm) GYPSUM BOARD

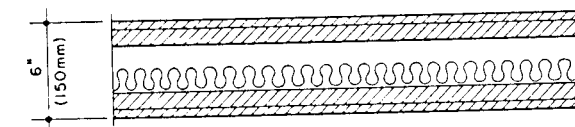
W_a = 4.2 (21)

STC_a = 29

W_b = 4.7 (23)

STC_b = 44

52.

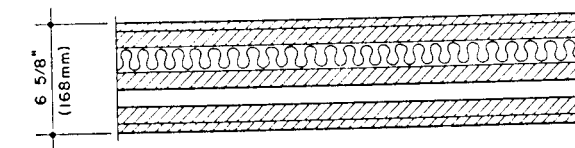


1/2" (13mm) GYPSUM BOARD
 1" (25mm) GYPSUM COREBOARD
 3" (75mm) AIR SPACE
 1 1/2" (38mm) ISOLATION BLANKET
 1" (25mm) GYPSUM COREBOARD
 1/2" (13mm) GYPSUM BOARD

W = 13 (63)

STC = 54+

53.



1/2" (13mm) GYPSUM BOARD
 1" (25mm) GYPSUM COREBOARD
 1 1/2" (38mm) ISOLATION BLANKET
 1" (25mm) GYPSUM COREBOARD
 1 1/8" (28mm) AIR SPACE
 1" (25mm) GYPSUM COREBOARD
 1/2" (13mm) GYPSUM BOARD

W = 17 (83)

STC = 56+

Fig. B.9 Sound-insulation values of studless partition walls; W, weight in pounds per square foot (kilograms per square meter); STC, sound transmission class rating in decibels.

Figures C.1 to C.4 include a number of typical floor constructions with pertinent architectural-acoustical data. The STC and IIC ratings indicated at each floor construction have been derived from test results issued by leading authorities in the field of acoustical testing and research. Most of the information shown in Figs. C.1 to C.4 was published in *A Guide to Air-borne, Impact, and Structure-borne Noise Control in Multi-family Dwellings*, National Bureau of Standards, Washington, D.C., 1967. It should be noted that in practice both STC and IIC ratings may fall somewhat short of the values shown in the figures, due to poor workmanship or unpredictable and invisible paths of flanking transmission. In addition, resiliently suspended ceilings in field installations seldom perform as effectively as they do in testing laboratories unless flanking paths are eliminated or at least minimized.

These illustrations also exemplify how the overall acoustical performance of floors is affected by various components and their physical characteristics, such as resilient floor finish, resilient or rigid floor supports, number and thickness of various layers, the use of isolation blankets in cavities, resilient ceiling attachments, spacing of joists, etc.

The floor constructions shown in Figs. C.1 to C.4 can be grouped in the following way:

1. Cast-in-place concrete floors (Fig. C.1)
2. Precast concrete floors (Fig. C.2)
3. Wood-joist floors (Fig. C.3)
4. Steel-joist floors (Fig. C.4)

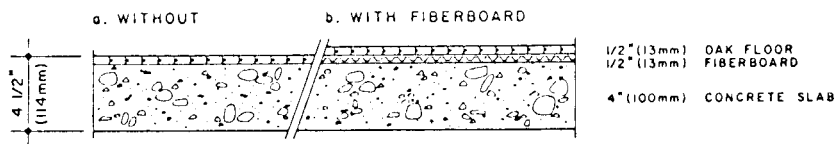
$IIC^c = 110 - \text{Val}_{500\text{Hz}}$ II
 $INR = 61 - II$

1. 4" (100mm) CONCRETE SLAB



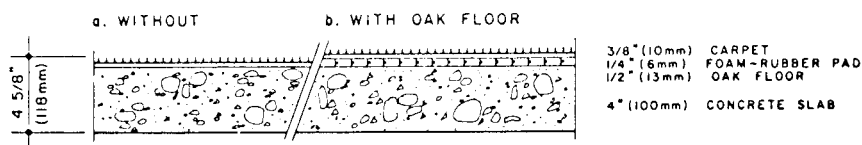
$W_a = 53 (260)$
 $STC_a = 44$
 $IIC_a = 25$
 $W_b = 54 (265)$
 $STC_b = 44$
 $IIC_b = 28$

2.



$W_a = 55 (270)$
 $STC_a = 44$
 $IIC_a = 45$
 $W_b = 56 (275)$
 $STC_b = 44$
 $IIC_b = 45$

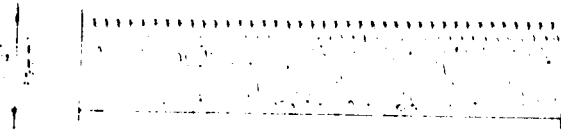
3.



$W_a = 54 (265)$
 $STC_a = 44$
 $IIC_a = 80$
 $W_b = 56 (275)$
 $STC_b = 44$
 $IIC_b = 84$

Fig. C.1 Sound-insulation values of cast-in-place concrete floors: W, weight in pounds per square foot (kilograms per square meter); STC, sound transmission class rating in decibels; IIC, impact insulation class rating.

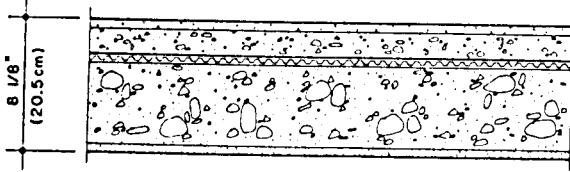
4. 5" (125mm) CONCRETE SLAB



1/4" (6mm) OAK FLOOR
 1/4" (6mm) PLYWOOD SUBFLOOR
 1/4" (6mm) GYPK
 5" (125mm) CONCRETE SLAB

W = 70(340)
 STC = 48+
 IIC = 47

5.

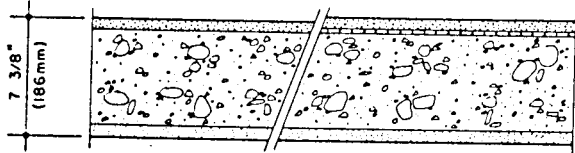


LINOLEUM ON 1/2" (13mm) PITCH-MASTIC
 1/2" (38mm) CONCRETE TOPPING
 BUILDING PAPER
 1/2" (13mm) BITUMEN-BONDED GLASS WOOL
 5" (125mm) CONCRETE SLAB
 1/2" (13mm) PLASTER

W = 90(440)
 STC = 51
 IIC = 53

6. 6" (150mm) CONCRETE SLAB

a. WITHOUT b. WITH CORK

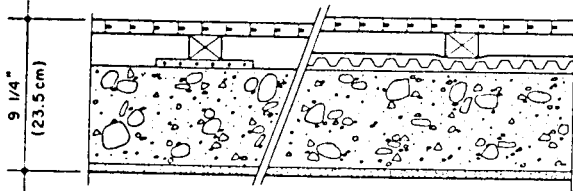


5/8" (16mm) MASTIC ASPHALT
 1/4" (6mm) CORK
 6" (150mm) CONCRETE SLAB
 3/4" (19mm) PLASTER

W_a = 85(415)
 STC_a = 47
 IIC_a = 31
 W_b = 85(415)
 STC_b = 47
 IIC_b = 46

7.

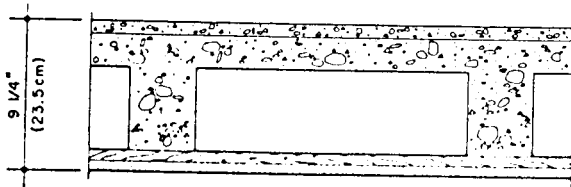
a. WITH CORK PAD b. WITH GLASS WOOL



3/4" (19mm) T & G WOOD FLOOR
 1 1/2" x 2" (38x50mm) SLEEPER
 1/2" (13mm) CORK // 1" (25mm) GLASS-WOOL QUILT
 6" (150mm) CONCRETE SLAB
 1/2" (13mm) PLASTER

W_a = 75(365)
 STC_a = 53+
 IIC_a = 53
 W_b = 83(405)
 STC_b = 55
 IIC_b = 57

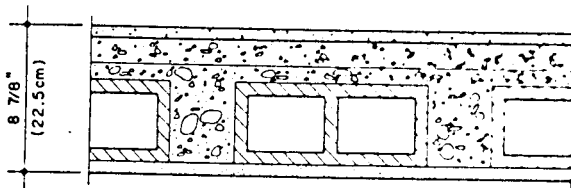
8. BEAM AND SLAB CONSTRUCTION



3/4" (19mm) CONCRETE TOPPING
 2" (50mm) REINFORCED CONCRETE SLAB
 5 1/4" (133mm) AIR SPACE
 5/8" (16mm) WOOD LATH
 5/8" (16mm) REEDS & PLASTER

W = 45(220)
 STC = 46
 IIC = 42

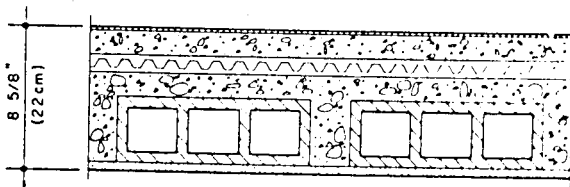
9. CONCRETE FLOOR WITH HOLLOW BLOCKS



5/8" (16mm) PITCH-MASTIC ON FELT
 1/2" (38mm) CONCRETE TOPPING
 REINFORCED CONCRETE FLOOR
 5" x 12" (12.5 x 30.5 cm) HOLLOW BLOCK
 3/4" (19mm) PLASTER

W = 70(340)
 STC = 49
 IIC = 30

10.

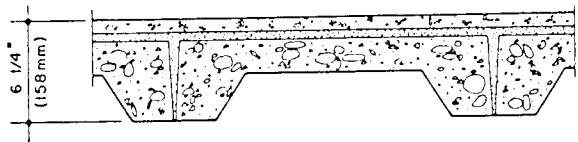


THERMOPLASTIC TILE
 1/2" (13mm) CONCRETE TOPPING
 1" (25mm) BITUMEN-BONDED GLASS WOOL
 REINFORCED CONCRETE FLOOR
 4" x 12" (10 x 30.5 cm) HOLLOW BLOCK
 1/2" (13mm) PLASTER

W = 65(315)
 STC = 52
 IIC = 47

Fig. C.1 (continued) Sound-insulation values of cast-in-place concrete floors: W, weight in pounds per square foot (kilograms per square meter); STC, sound transmission class rating in decibels; IIC, impact insulation class rating.

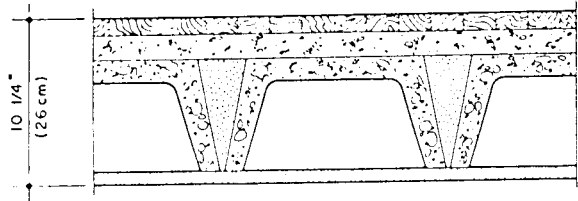
11.



3/4" (19mm) CONCRETE TOPPING
MORTAR
5" (125mm) PRECAST CONCRETE ELEMENT

W = 28 (136)
STC = 42
IIC = 32

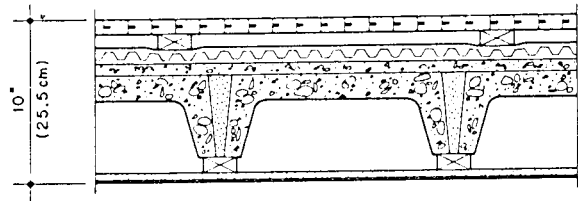
12.



1" (25mm) WOOD FLOOR
1 1/2" (38mm) CONCRETE TOPPING
7" (180mm) PRECAST CONCRETE ELEMENT
3/4" (19mm) PLASTER

W = 65 (315)
STC = 47
IIC = 42

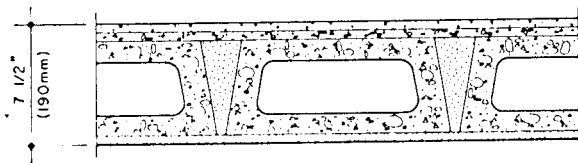
13.



7/8" (22mm) T & G WOOD FLOOR
1" x 2" (25 x 50mm) SLEEPER
1" (25mm) GLASS-WOOL QUILT
3/4" (19mm) CONCRETE TOPPING
5" (125mm) PRECAST CONCRETE ELEMENT
1" x 2" (25 x 50mm) WOOD BATTEN
3/8" (10mm) GYPSUM BOARD
1/8" (3mm) PLASTER

W = 45 (220)
STC = 50
IIC = 53

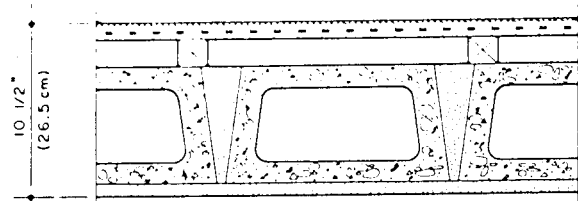
14.



1/2" (13mm) PITCH-MASTIC FLOOR
CONCRETE TOPPING
6" (150mm) PRECAST CONCRETE ELEMENT
1/2" (13mm) PLASTER

W = 55 (270)
STC = 45
IIC = 31

15.

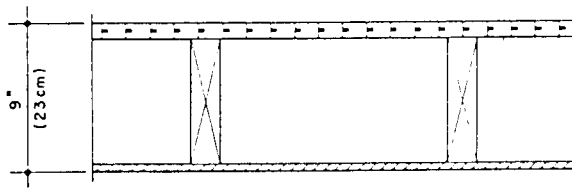


LINOLEUM
7/8" (22mm) T & G WOOD FLOOR
2" x 2" (50 x 50mm) WOOD BATTEN
7" (180mm) PRECAST CONCRETE ELEMENT
3/4" (19mm) PLASTER

W = 45 (220)
STC = 44
IIC = 48

Fig. C.2 Sound-insulation values of precast concrete floors: W, weight in pounds per square foot (kilograms per square meter); STC, sound transmission class rating in decibels; IIC, impact insulation class rating.

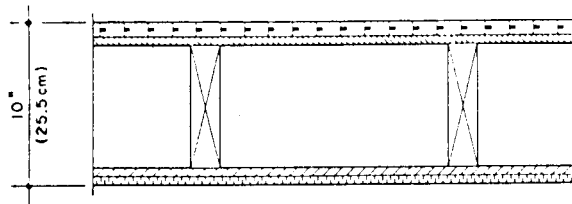
16.



7/8" (22mm) T & G WOOD FLOOR
 2"x8" (5x20cm) WOOD JOIST
 3/8" (10mm) GYPSUM BOARD

W = 7 (34)
 STC = 34
 IIC = 32

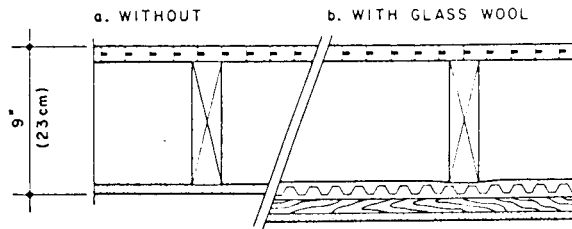
17.



25/32" (20mm) HARDWOOD FLOOR
 1/2" (13mm) PLYWOOD
 2"x8" (5x20cm) WOOD JOIST
 1/2" (13mm) GYPSUM BOARD
 CEILING TILE

W = 9.9 (48)
 STC = 39
 IIC = 37

18.

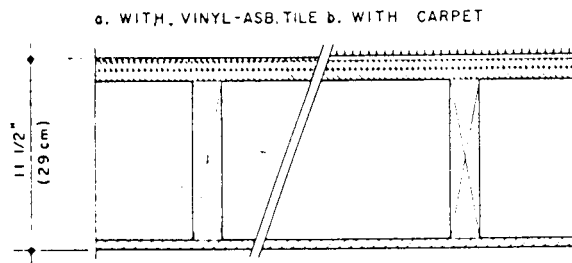


a. WITHOUT b. WITH GLASS WOOL

7/8" (22mm) T & G WOOD FLOOR
 2"x8" (5x20cm) WOOD JOIST
 1" (25mm) GLASS-WOOL QUILT
 1"x2" (25x50mm) WOOD BATTEN
 1/2" (13mm) PLASTER ON METAL LATH // 1/2" (13mm) PLASTER ON WOOD LATH

W_a = 13 (63)
 STC_a = 41
 IIC_a = 36
 W_b = 12 (59)
 STC_b = 43
 IIC_b = 43

19.

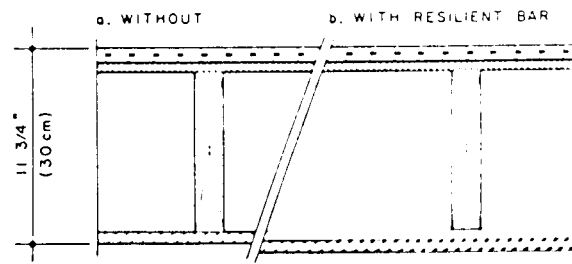


a. WITH VINYL-ASB TILE b. WITH CARPET

1/8" (3mm) VINYL-ASB TILE // 1/2" (13mm) PLYWOOD
 3/8" (10mm) NYLON CARPET
 1/4" (6mm) FOAM-RUBBER PAD
 5/8" (16mm) PLYWOOD
 2"x10" (5x25.5cm) WOOD JOIST
 1/2" (13mm) GYPSUM BOARD

W_a = 9 (44)
 STC_a = 37
 IIC_a = 33
 W_b = 9 (44)
 STC_b = 37
 IIC_b = 53

20.

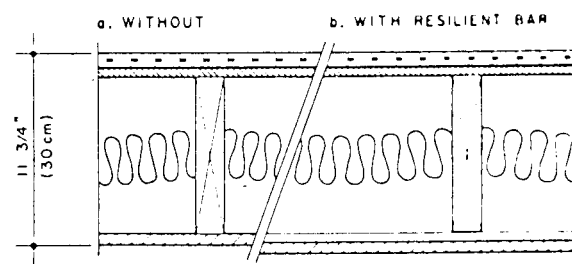


a. WITHOUT b. WITH RESILIENT BAR

25/32" (20mm) OAK FLOOR
 BUILDING PAPER
 1/2" (13mm) PLYWOOD
 2"x10" (5x25.5cm) WOOD JOIST
 RESILIENT BAR 24"x16cm O.C.
 5/8" (16mm) GYPSUM BOARD

W_a = 9.5 (46)
 STC_a = 37
 IIC_a = 32
 W_b = 9.6 (47)
 STC_b = 47
 IIC_b = 39

21.



a. WITHOUT b. WITH RESILIENT BAR

25/32" (20mm) OAK FLOOR
 BUILDING PAPER
 1/2" (13mm) PLYWOOD
 2"x10" (5x25.5cm) WOOD JOIST
 3" (75mm) ISOLATION BLANKET
 RESILIENT BAR 24"x16cm O.C.
 5/8" (16mm) GYPSUM BOARD

W_a = 10 (49)
 STC_a = 40
 IIC_a = 32
 W_b = 10.1 (49)
 STC_b = 49
 IIC_b = 46

Fig. C.3 Sound-insulation values of wood-joist floors with 16-in. (41-cm) spacings: W, weight in pounds per square foot (kilograms per square meter); STC, sound transmission class rating in decibels; IIC, impact insulation class rating.