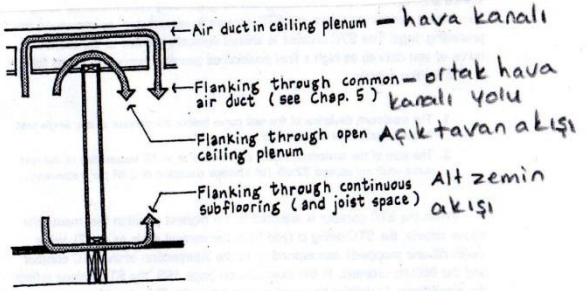
Ses İzolasyonu 2. Bölüm

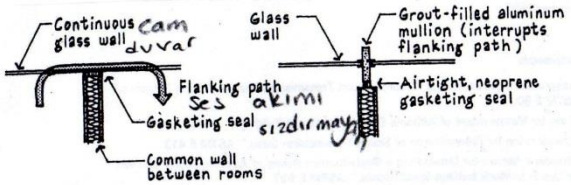
FLANKING

Sesler dolaylı yollardan dolaşıp iletim kaybına uğrayabilir. Aşağıdaki şekilde tarama alanlarındaki ahşap çerçeve (kuru duvar) gözükmektedir. Tüm sesi izole etmeyi sağlamak için tüm bağlantıların çok iyi ayarlanmış olması gerekmektedir.



Example Flanking in Drywall Construction

Cam yüzeyler sayesinde odalar arasında sesin iletilmesinde kesinti sözkonusudur. Mesela cam elyaf alüminyum kullanarak (harç dolu Mullions yerine) pencereli bir duvarda 5 azaltıyor. Oyuk pencere tirizi ses kaybını azaltır.

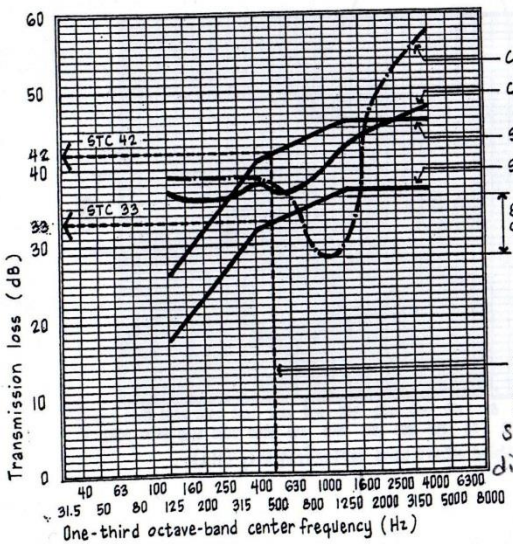


Continuous Glazing — Glazing with Mullions

STC ses iletim sistemi Değerleri

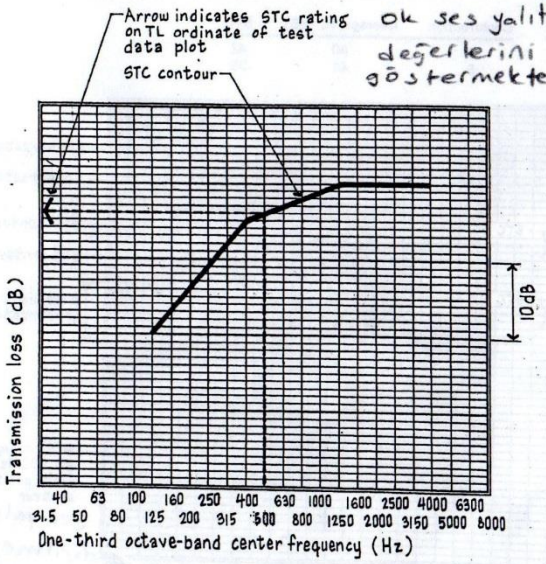
1960'lara kadar ortalama 9 frekansı kullanılmış yapılardaki iletim kaybını engellemek için. Fakat bu tercih edilmedi çünkü 1 frekans bile zayıf izolasyonu olan başka şeyi örteler.

Construction	Average TL (dB)	STC
A	40	42
B	41	33



Ses iletim Eğrisi

Batı avrupa'da yıllardır kullanılan 9 tuşla sistemi başarılı bulunmamaktadır. Bu tür binaların yapımında gerekli önlemlerin alınması önemlidir. Herşey iyi izole edilmeli çünkü Ses iletim metodu 125 Hz (frekans)ın altındaki Sesleri ölçünleyememektedir.



ok ses yalıtım değerlerini göstermektedir.

200 SOUND ISOLATION

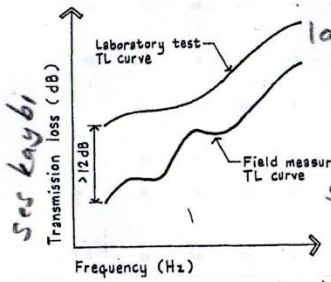
SES YALITIM ÖLÇÜM KRİTERLERİ

STC ses iletim kaybını gösteren değerdir. Nekadar yüksek değer olursa okadar etkili ses-yalıtımı sağlanmıştır. Bu ölçümleme standartlara göre yapılmıştır. 125 - 4000 frekansları arasında ölçümlemeler yapılmıştır. yansayfada görebileceğiniz gibi STC eğrisi iletim-kaybına göre değişmektedir. STC eğrisi en yüksek değerlendirmelere göre gösterilmiştir.

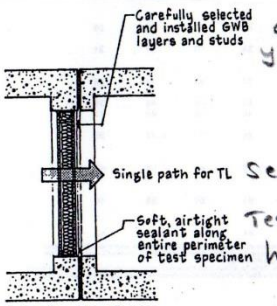
Sapmalar en fazla 8 dB ye kadardır. 32 dB yi geçmemelidir.

Laboratuar ve Alan Şartları

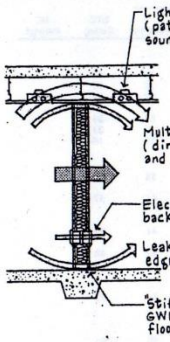
Laboratuar testlerine göre TL verileri genelde ideal durumlarda sesi yansıtmayabilir. Çünkü üretilmiş bileşenlerin dikkatli bir şekilde yerleştirilmiş olması gerekmektedir. Test numuneleri uzman teknisyenler tarafından yapılmış olması gerekiyor. Bu tür binalardaki iletim kaybı verileri beklenenden çok daha fazla çıkabilir.



İşi bilmeyen tarafından yapılan binalarda da ses sızıntısına sebebiyet verebilir. Yapılan binada emin olmak gerekiyor. Tüm izolasyonun yapılmış olmasından gerekli denetimlerin yapılması ses kaybını önlemede büyük rol oynar.



Laboratory Test Setup



Binalardaki Element verileri

Building Construction	Transmission Loss (dB) 125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	STC Rating	IIC Rating†
Walls[2-4,1]								
Monolithic								
1 3/8-in plywood (1 lb/ft²)	14	18	22	20	21	26	22	
2 26-gauge sheet metal (1.5 lb/ft²)	12	14	15	21	21	25	20	
3. 1/2-in gypsum board (2 lb/ft²)	15	20	25	31	33	27	28	
4. 2 layers 1/2-in gypsum board, laminated with joint compound (4 lb/ft²)	19	26	30	32	29	37	31	
5. 1/32-in sheet lead (2 lb/ft²)	15	21	27	33	39	45	31	
6. Glass-fiber roof fabric (37.5 oz/yd²)	6	9	11	16	20	25	16	
Interior								
7 2 by 4 wood studs 16 in oc with 1/2-in gypsum board both sides (5 lb/ft²)	17	31	33	40	38	36	33	
8. Construction no. 7 with 2-in glass-fiber insulation in cavity	15	30	34	44	46	41	37	
9 2 by 4 staggered wood studs 16 in oc each side with 1/2-in gypsum board both sides (8 lb/ft²)	23	28	39	46	54	44	39	
10. Construction no. 9 with 2 1/4-in glass-fiber insulation in cavity	29	38	45	52	58	50	48	
11. 2 by 4 wood studs 16 in oc with 5/8-in gypsum board both sides, one side screwed to resilient channels, 3-in glass-fiber insulation in cavity (7 lb/ft²)	32	42	52	58	53	54	52	
12. Double row of 2 by 4 wood studs 16 in oc with 3/8-in gypsum board on both sides of construction, 9-in glass-fiber insulation in cavity (4 lb/ft²)	31	44	55	62	67	65	54	
13 6-in dense concrete block, 3 cells, painted (34 lb/ft²)	37	36	42	49	55	58	45	
14. 8-in lightweight concrete block, 3 cells, painted (38 lb/ft²)	34	40	44	49	59	64	49	
15. Construction no. 14 with expanded mineral loose fill in cells	34	40	46	52	60	66	51	
16. 6-in lightweight concrete block with 1/2-in gypsum board supported by resilient metal channels on one side, other side painted (26 lb/ft²)	35	42	50	64	67	65	53	
17. 2 1/2-in steel channel studs 24 in oc with 5/8-in gypsum board both sides (6 lb/ft²)	22	27	43	47	37	46	39	
18. Construction no. 17 with 2-in glass-fiber insulation in cavity	28	41	52	54	45	51	45	
19. 3 5/8-in steel channel studs 16 in oc with 1/2-in gypsum board both sides (5 lb/ft²)	26	36	43	51	48	43	43	
20. Construction no. 19 with 3-in mineral-fiber insulation in cavity	28	45	54	55	47	54	48	
21. 2 1/2-in steel channel studs 24 in oc with two layers 5/8-in gypsum board one side, one layer other side (8 lb/ft²)	28	31	46	51	53	47	44	
22. Construction no. 21 with 2-in glass-fiber insulation in cavity	31	43	55	58	61	51	51	
23. 3 5/8-in steel channel studs 24 in oc with two layers 5/8-in gypsum board both sides (11 lb/ft²)	34	41	51	54	46	52	48	
24. Construction no. 23 with 3-in mineral-fiber insulation in cavity	38	52	59	60	56	62	57	
Exterior								
25. 4 1/2-in face brick (50 lb/ft²)	32	34	40	47	55	61	45	
26. Two wythes of 4 1/2-in face brick, 2-in airspace with metal ties (100 lb/ft²)	37	37	47	55	62	67	50	
27 Two wythes of plastered 4 1/2-in brick, 2-in airspace with glass-fiber insulation in cavity	43	50	52	61	73	78	59	
28. 2 by 4 wood studs 16 in oc with 1-in stucco on metal lath on outside and 1/2-in gypsum board on inside (8 lb/ft²)	21	33	41	46	47	51	42	
29. 6-in solid concrete with 1/2-in plaster both sides (80 lb/ft²)	39	42	50	58	64	67	53	
Floor-Ceilings[2,3]								
30. 2 by 10 wood joists 16 in oc with 1/2-in plywood subfloor under 25/32-in oak on floor side, and 5/8-in gypsum board nailed to joists on ceiling side (10 lb/ft²)	23	32	36	45	49	56	37	32

Building Construction	Transmission Loss (dB) 125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	STC Rating	IIC Rating†
31. Construction no. 30 with 5/8-in gypsum board screwed to resilient channels spaced 24 in oc perpendicular to joists	30	35	44	50	54	60	47	39
32. Construction no. 31 with 3-in glass-fiber insulation in cavity	36	40	45	52	58	64	49	46
33. 4-in reinforced concrete slab (54 lb/ft²)	48	42	45	56	57	66	44	25
34. 14-in precast concrete tees with 2-in concrete topping on 2-in slab (75 lb/ft²)	39	45	50	52	60	68	54	24
35. 6-in reinforced concrete slab (75 lb/ft²)	38	43	52	59	67	72	55	34
36. 6-in reinforced concrete slab with 3/4-in T&G wood flooring on 1 1/2 by 2 wooden battens floated on 1-in glass fiber (83 lb/ft²)	38	44	52	55	60	65	55	57
37. 18-in steel joists 16 in oc with 1 5/8-in concrete on 5/8-in plywood under heavy carpet laid on pad, and 5/8-in gypsum board attached to joists on ceiling side (20 lb/ft²)	27	37	45	54	60	65	47	62
Roofs[3]								
38. 3 by 8 wood beams 32 in oc with 2 by 6 T&G planks, asphalt felt built-up roofing, and gravel topping	29	33	37	44	55	63	43	
39. Construction no. 38 with 2 by 4s 16 in oc between beams, 1/2-in gypsum board supported by metal channels on ceiling side with 4-in glass-fiber insulation in cavity	35	42	49	62	67	79	53	
40. Corrugated steel, 24 gauge with 1 3/8-in sprayed cellulose insulation on ceiling side (1.8 lb/ft²)	17	22	26	30	35	41	30	
41. 2 1/2-in sand and gravel concrete (148 lb/ft²) on 28 gauge corrugated steel supported by 14-in-deep steel bar joists with 1/2-in gypsum plaster on metal lath attached to metal furring channels 13 1/2 in oc on ceiling side (41 lb/ft²)	32	46	45	50	57	61	49	
Doors[3]								
42. Louvered door, 25 to 30% open	10	12	12	12	12	11	12	
43 1 3/4-in hollow-core wood door, no gaskets, 1/4-in air gap at sill (1.5 lb/ft²)	14	19	23	18	17	21	19	
44. Construction no. 43 with gaskets and drop seal	19	22	25	19	20	29	21	
45. 1 3/4-in solid-core wood door with gaskets and drop seal (4.5 lb/ft²)	29	31	31	31	39	43	34	
46. 1 3/4-in hollow-core 16 gauge steel door, glass-fiber filled, with gaskets and drop seal (7 lb/ft²)	23	28	36	41	39	44	38	
Glass[1,2]								
47. 1/8-in monolithic float glass (1.4 lb/ft²)	18	21	26	31	33	22	26	
48. 1/4-in monolithic float glass (2.9 lb/ft²)	25	28	31	34	30	37	31	
49. 1/2-in insulated glass: 1/8- + 1/8-in double glass with 1/4-in airspace (3.3 lb/ft²)	21	26	24	33	44	34	28	
50. 1/4- + 1/8-in double glass with 2-in airspace	18	31	35	42	44	44	39	
51. Construction no. 50 with 4-in airspace	21	32	42	48	48	44	43	
52 1/4-in laminated glass, 30-mil plastic interlayer (3.6 lb/ft²)	25	28	32	35	36	43	35	
53. Double glass: 1/4-in laminated + 3/16-in monolithic glass with 2-in airspace (5.9 lb/ft²)	25	34	44	47	48	55	45	
54. Double glass: 1/4-in laminated + 3/16-in monolithic glass with 4-in airspace (5.9 lb/ft²)	36	37	48	51	50	58	48	
55. Double glass: 1/4-in laminated + 1/4-in laminated with 1/2-in airspace (7.2 lb/ft²)	21	30	40	44	46	57	42	

† IIC (*impact isolation class*) is a single-number rating of the impact sound transmission performance of a floor-ceiling construction tested over a standard frequency range. The higher the IIC, the more efficient the construction will be for reducing impact sound transmission. INR (*impact noise rating*) previously was used as the single-number rating of impact noise isolation. To convert the older INR data to IIC, add 51 to the INR number.

‡ A wide range of TL and STC performance can be achieved by gypsum wallboard constructions. Refer to ASTM E 90 laboratory report and literature from manufacturers for specific details such as type of gypsum board; gauge, width, and spacing of steel studs; glass-fiber or mineral-fiber insulation thickness and density, and complete installation recommendations.

*TL data for proprietary building construction materials should be from up-to-date full-scale tests by independent acoustical laboratories (e.g., Cedar Knolls, ETL, Riverbank) or from field tests on installed identical assemblies conducted according to current ASTM procedures. In the United States, the National Bureau of Standards (NBS) accredits testing laboratories to perform tests in the area of their established competence. A directory of National Voluntary Laboratory Accreditation Program (NVLAP) accredited laboratories is available from NBS (order from Superintendent of Documents, U.S. Government Printing Office, Washington, D C 20402).

Test Reference

"Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions," ASTM E 90. Available from American Society for Testing and Materials (ASTM). 1916 Race Street, Philadelphia, PA 19103.

Sources kaynak

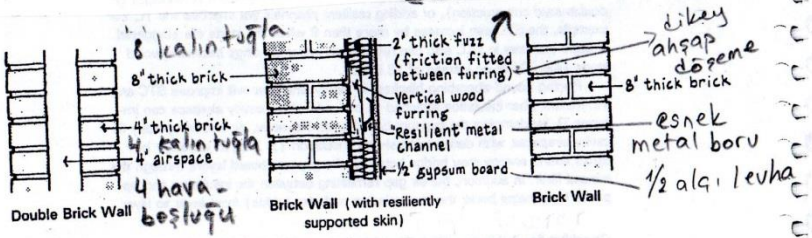
1. "Acoustical Glazing Design Guide," Saflex Interlayer, Monsanto Co., St. Louis, Mo., 1986. (Section 1 also contains STC data for numerous exterior wall constructions.)
2. R. D. Berendt et al., "A Guide to Airborne, Impact, and Structure Borne Noise-Control in Multifamily Dwellings," U.S. Department of Housing and Urban Development, Washington, D.C., September 1967.
3. R. B. DuPree, "Catalog of STC and IIC Ratings for Wall and Floor/Ceiling Assemblies," Office of Noise Control, California Department of Health Services, Berkeley, Calif., September 1981.
4. "Noise Control Manual," Owens-Corning Fiberglas Corp., Toledo, Ohio, November 1984.
5. A. Ordubadi and R. H. Lyon, "Effect of Orthotropy on the Sound Transmission Through Plywood Panels," *Journal of the Acoustical Society of America*, January 1979.
6. H. S. Roller, "Design Data for Acousticians," United States Gypsum Co., Chicago, 1985.
7. A. C. C. Warnock, "Field Sound Transmission Loss Measurements," Building Research Note 232, National Research Council of Canada, June 1985.

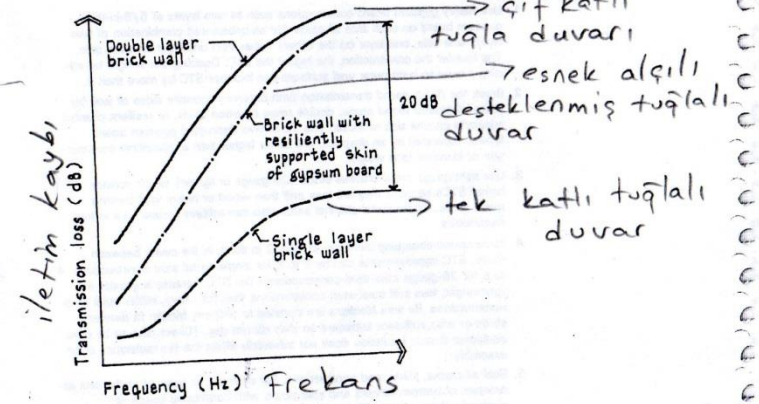
Note: For fire-resistance ratings of building constructions, refer to current editions of "Fire Resistance Index," available from Underwriters' Laboratories (UL), 333 Pfingsten Road, Northbrook, IL 60062 and "Fire Resistance Design Manual," available from Gypsum Association, 1603 Orrington Ave., Evanston, IL 60201.

Karmaşık Duvarların izolasyon ilkeleri

Tuğladan yapılmış olan bir duvarı ses iletimini transfer edebilmesi için 4'er tuğlaya ayırıp araya alçı tabakası döşenir. Hava boşluğu bırakılır. Dikey ahşap borularda duvara monte edilir.

2 kalın döşemeli duvar





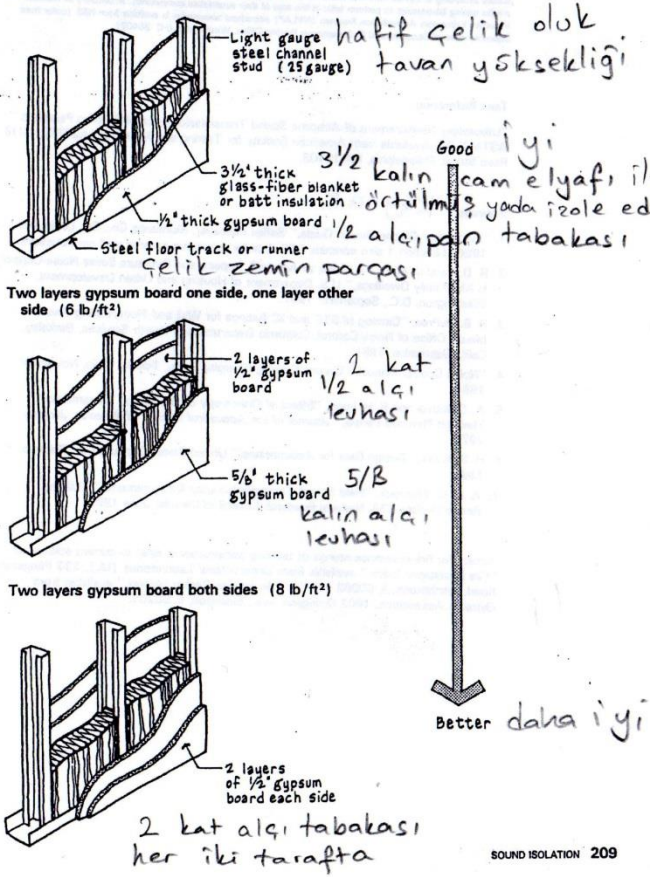
Alçılı Duvar Yapısı

Duvara çeşitli şekillerde alçıpan yerleştirerek ses izolasyonu sağlanabilir. Hacmi, sertliği ve kurulum şekli sonucu etkileyecektir. Ne kadar yoğun alçı olursa o kadar iyi ses iletimi sağlanır. Esnek borular sayesinde ses izolasyonu sağlanabilir.

Checklist for Achieving High TL with Gypsum Wallboard Constructions

1. Use *heavy* gypsum board constructions such as two layers of 5/8-in-thick gypsum board on each side of studs (or an unbalanced combination of two layers one side, one layer on the other) rather than one layer on each side. The heavier the construction, the higher the STC. Doubling the weight by adding a layer to both outer wall surfaces can increase STC by more than 5.
2. Break the direct sound transmission path between opposite sides of wall by using staggered wood studs, double rows of wood studs, or resilient channel supports on one side of studs. The TL of two decoupled gypsum board layers, separated by an airspace, will be far higher than a monolithic construction of identical total weight.
3. Use light-gauge metal channel studs (25 gauge or lighter) which provide higher STCs because they are less *stiff* than wood or heavy load-bearing metal studs. Wider metal channel studs also can achieve greater TLs at low frequencies.
4. Place sound-absorbing blankets, at least 2 in thick, in the cavity between studs. STC improvements can be 2 to 8 for single wood stud constructions; 4 to 8 for 25-gauge steel stud constructions. The STC increase is greater for lightweight, less stiff steel stud constructions than for heavy, stiffer steel stud constructions. Be sure blankets are installed to properly friction fit between studs or with sufficient fasteners so they do not sag. (Check also to be sure additional fibrous insulation does not adversely affect the fire resistance of an assembly.)
5. Seal *all* cracks, joints, and penetrations. For example, at base of walls, seal perimeters of bottom runners and sole plates with continuous beads of nonhardening caulking (35 durometer) at edges on each side.

Metal-Channel-Stud Partition	Sound-Isolating Effectiveness
One layer gypsum board each side (4 lb/ft²)	
Two layers gypsum board one side, one layer other side (6 lb/ft²)	
Two layers gypsum board both sides (8 lb/ft²)	



References Kaynak

D. W. Green and C. W. Sherry, "Sound Transmission Loss of Gypsum Wallboard Partitions," *Journal of the Acoustical Society of America*, January 1982 and April 1982.

R. E. Jones, "How to Design Walls for Desired STC Ratings," *Sound and Vibration*, August 1978.

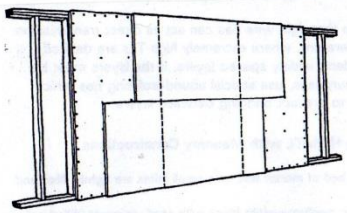
J. W. Kopec, "Variations in Sound Transmission on Steel Studded, Gypsum Walls," *Sound and Vibration*, June 1982.

H. S. Roller, "Research Evaluates Role of Density in Acoustical Insulation Performance," *Form & Function*, Issue 2, 1985.

INST

DUVAR KURULUMU

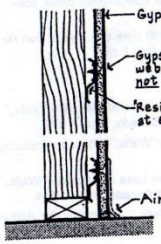
Alçılı levha duvara monte edilir. Daha yüksek ses-yalıtımı sağlanır. Katmanları bir araya getirerek duvara monte etmelisiniz.



Multilayer GWB (with staggered panel joints)

Yapının tek tarafına esnek borular yerleştirilerek ses iletimi yükseltilebilir. Aşağıdaki resimde nasıl yapıldığı gösterilmiştir. Vidalar sayesinde sabitlenmiş alçıpanların betona değmemesi önemlidir. Bu yüzden kısa civiler kullanılmalıdır.

Resilient Channel Supports Sesyalıtımlı destek boruları



Farklı Duvar Yapıları

Sert tel bağlantıları sesin katmanlar arasındaki iletimini direkt etkiler. Bu yüzden çok yüksek ses iletimi tercih edilmeli. En az iki bağımsız katman kullanılmalı. Eğer iki katman birbirine değmek zorunda ise ozaman özel ses-izolasyon bağlantısı kullanılmalı. Bu sayede iki katman arasındaki bağlantı kesilebilir.

Ch

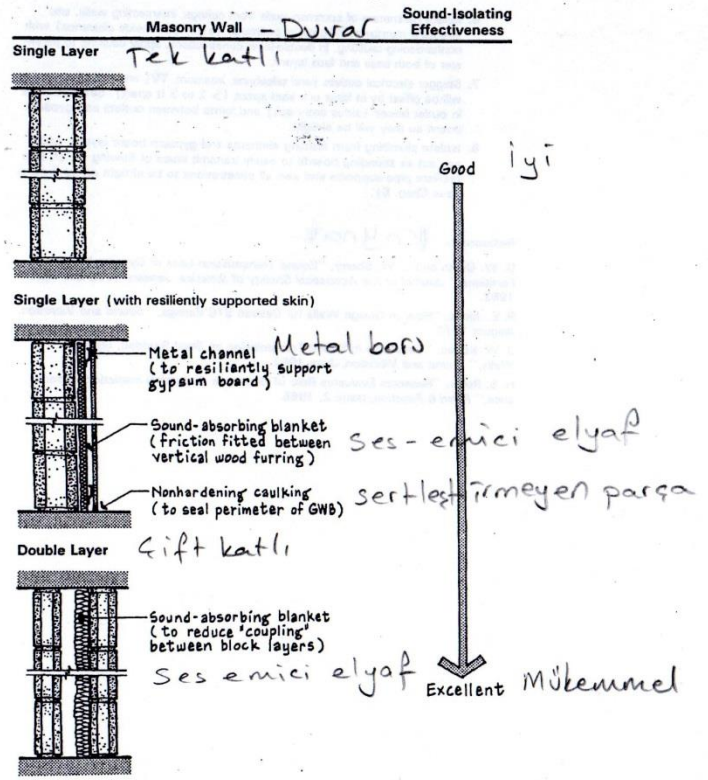
References Kaynak

T. D. Northwood and D. W. Monk, "Sound Transmission Loss of Masonry Walls," Building Research Note 90, National Research Council of Canada, April 1974.

D. P. Walsh, "Sound Isolating Characteristics of Masonry Walls," *Masonry Industry*, April 1970.

A. C. C. Warnock and D. W. Monk, "Sound Transmission Loss of Masonry Walls," Building Research Note 217, National Research Council of Canada, June 1984.

B. G. Watters, "Transmission Loss of Some Masonry Walls," *Journal of the Acoustical Society of America*, July 1959.



çift katlı duvarların ses-yalıtım yapıları

iletim kaybının iyileştirilmesi

hava boşluğu

Airspace (in)	Improvement in TL (dB) 125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz
2	5	7	19	25	30	30
4	10	12	24	30	35	35

Note: To achieve maximum TL improvement from double-wall constructions, be sure airspace is sound-absorptive (fibrous blankets, porous masonry surfaces) and bridging is avoided (no rigid ties). For additional data on TL improvement, refer to R. B. Newman, "Acoustics" in J. H. Callender (ed.), *Time-Saver Standards for Architectural Design Data*, McGraw-Hill, New York, 1974, p. 709.

Birbirinden ayrı dururlarsa etkili ses yalıtımı sağlarlar. Bırakılan hava boşluğu sayesinde daha yüksek değerlere ulaşılabilir. Aşağıdaki tablo ses yalıtımını yükseltmede kullanılmak üzere hazırlanmıştır. Hava boşluklarına lif süngeri yerleştirilmelidir.

EXAMPLE PROBLEM (DOUBLE-WALL TL)

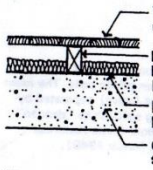
Estimate the improvement in TL if a single 8-in-thick concrete block wall can be installed as two 4-in-thick concrete block layers of identical total weight, separated by a 4-in airspace, filled with glass-fiber insulation.

Construction	Transmission Loss (dB) 125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz
8-in painted concrete block wall with sand-filled cells	36	41	49	56	60	63
Improvement in TL	10	12	24	30	35	35
4-in concrete block + 4-in airspace + 4-in concrete block with 2-in glass fiber in airspace	46	53	73	86	95	98

Note: In 1836 Professor Michael Faraday advised H.M. Commission of Prisons (England) on how to achieve high TL performance between prison cells. The most successful construction was two layers of 9-in brick (to be heavy) separated by about 6 inches (to reduce stiffness) with sound-absorbing sailcloth to "deaden" the airspace (cf., W. Allen and R. Pocock, "Sound Insulation: Some Historical Notes," *Journal of the Royal Institute of British Architects*, March 1946).

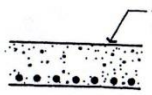
Zemin döşeme yapısı

Aşağıdaki grafikte ahşap zemin kirişlerin zemindeki ses yalıtımındaki etkisini görebilirsiniz. Sızıntının önlenmesi için çakılan çivilerin uygun ölçüde ve düzenli aralıkta olmaları önemlidir. Katmanlar arasında yalıtım kullanılmalı ve sadece işlenmiş ahşap kullanılmalı.



ahşap döşeme
ahşap tirizler
cam elyafı
beton döşeme.

Floated Floor

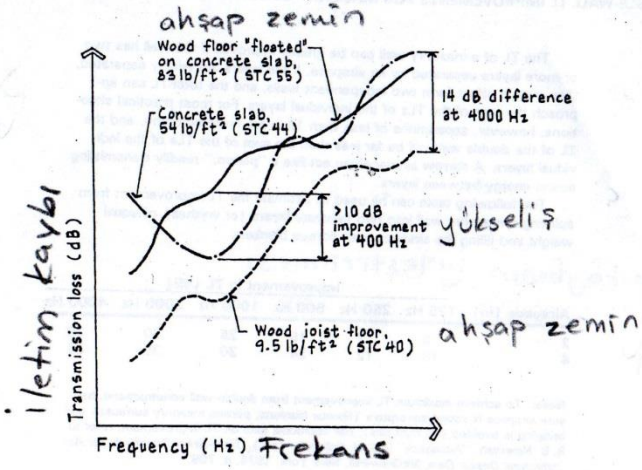


takviyeli döşeme

Concrete Slab

meşe ağacı zemin
kontraplak zemin
cam - elyafı
alçıpan levhası
vidalar

Wood Joist Floor



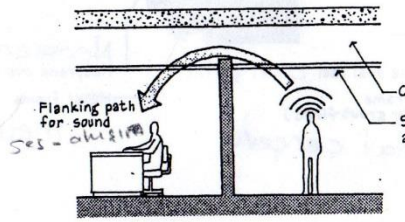
References

R. D. Berendt et al., "A Guide to Airborne, Impact, and Structure Borne Noise-Control in Multifamily Dwellings," U.S. Department of Housing and Urban Development, Washington, D.C., September 1967.

R. D. Berendt et al., "Quieting: A Practical Guide to Noise Control," U.S. National Bureau of Standards, NBS Handbook 119, July 1976.

P Jensen, "How You Can Soundproof Your Home," Lexington Publishing Company, Lexington, Mass., 1974, pp. 73-75.

Çatı ve odalar arasında bariyer oluşturmalı. Hafif ses ileten çıtalar iyi izole edemezler. Dayanıklı ses-emici materialler (geçirgen olmayan) hem etkili ses emici hemde izolasyonu odalar arasında sağlayabilir. Tüm bağlantılar sıkıca kilitlenmiş olmalı. Laboratuarda test edilebilir. Aşağıdaki çizimde odalar arasında sesin iletimi gösterilmektedir.

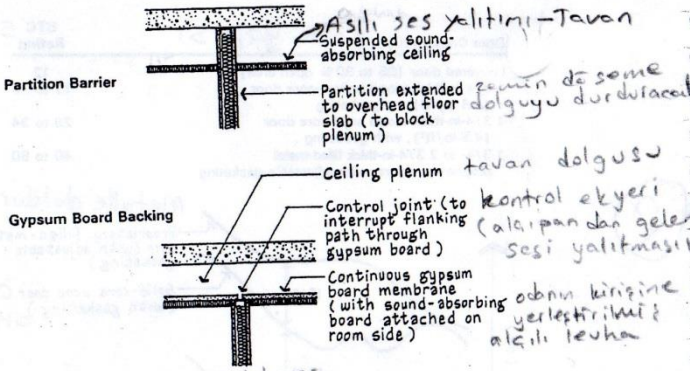


Ceiling Flanking Path

Prevent ceiling flanking by using sound-absorbing board with high ceiling-attenuation ratings, extending the partition to block the plenum, or installing a gypsum board ceiling. Be sure the ceiling membrane is interrupted at the top runner of the partition so that sound energy does not directly flank through the continuous surface.

Dolgulu Bariyerler

Alçıpan, levha ve mineral lif dikey bariyer olarak kullanılırsa ses iletimi önlenebilir. Aşağıda görüldüğü gibi bu bariyerler sayesinde "plenum" lar kapatılabilir. Gösterildiği gibi mineral elyaflar yatay olarakta yerleştirilebilir. Bu şekilde ses yalıtımı sağlanır. Tabi yalıtımın yoğunluğu elyafın kalınlığına bağlıdır.



Sheet Lead (or Vinyl) Barrier

Kurşun levha bariyeri

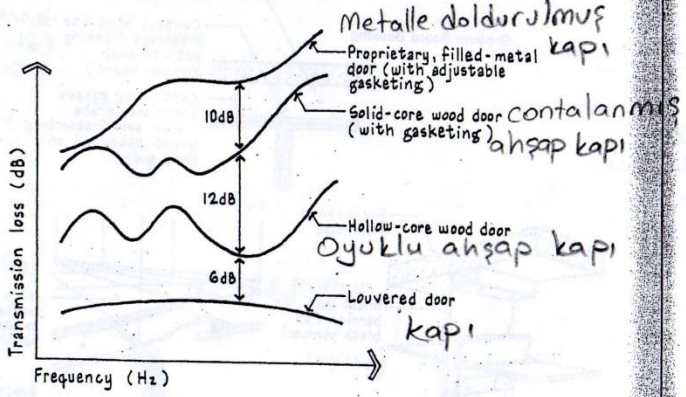
Mineral-Fiber Overlayment

Mineral lif üst döşeme.

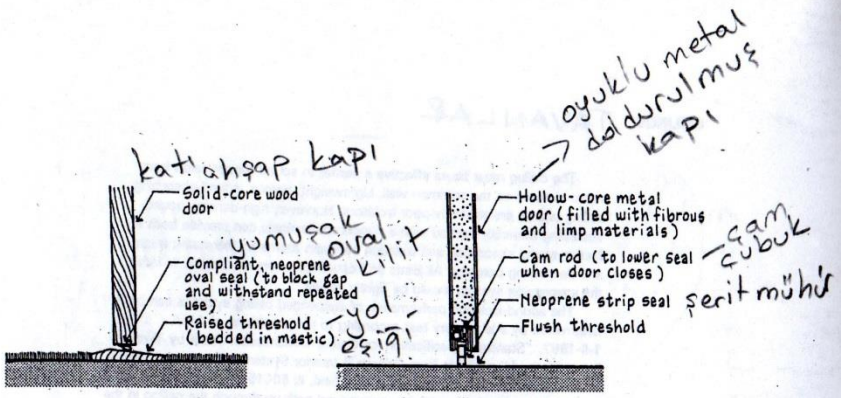
Kapılar

Aşağıdaki tablo ses iletim verilerini göstermektedir. Ahşap kapı ve çerçeve yüksek izolasyon sağlamak için kullanılmıştır. Bir kapının iyi ses yalıtımı sağlaması için kalın ve kapalıyken hava sızdırmaz olmalı. Hava geçidi olan kapılar iyi bir ses yalıtımına sahip değillerdir. Kapı kenarları sıranmalıdır.

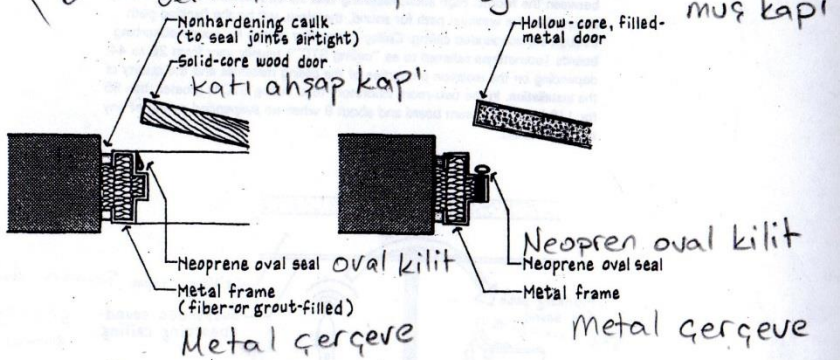
Door Construction (Kapı Yapısı)	STC Rating (Ses iletim değeri)
Louvered door (25 to 30% open area)	12
1 3/4-in-thick wood hollow-core door (1.5 lb/ft²), no gasketing	17 to 19
1 3/4-in-thick wood solid-core door (4.5 lb/ft²), with gasketing	29 to 34
1 3/4- to 2 3/4-in-thick filled-metal proprietary doors, with adjustable gasketing	40 to 50



Note: Be sure STC rated doors are tested according to the provisions of the latest edition of ASTM E 90.



Sections Bölümler

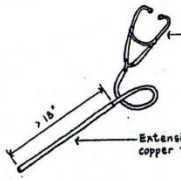


Plans

Checklist on How to Improve TL of Doors

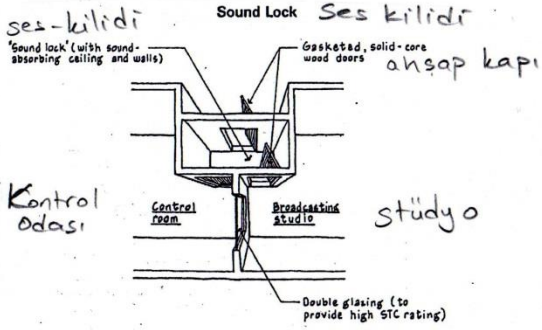
1. Do *not* use louvered or undercut doors where sound isolation is needed.
2. Use solid-core wood doors or fiber-filled, hollow-core metal doors, gasketed to be airtight when closed. Frames should be filled with grout (or packed with fibrous material) and caulked airtight at wall. For high STC requirements, use proprietary hollow-metal doors that come with special frames and adjustable gasketing such as "refrigerator-type" magnetic seals.

Sesin sızıp sızmadığı steteskopla kontrol edilebilir. Montaj sırasında belirli aralıklarla sızdırmalar varmı yokmu diye kontrol edilmelidir.



Stethoscope

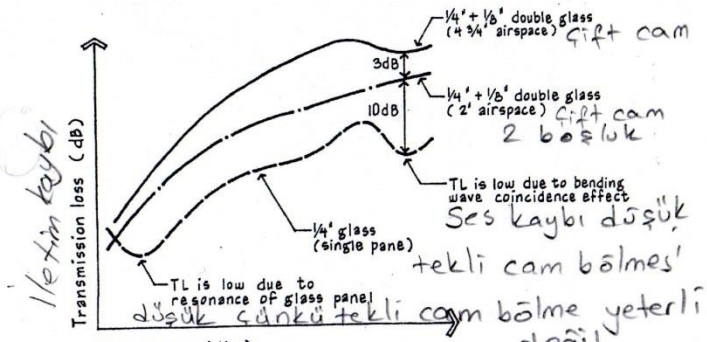
Kullanıma bağlı olarak periyodik bakımların yapılması gerekmektedir. Koridorları ses önleyici yerler olarak kullanınız.



Pencere ve camlar

Aşağıdaki tablo pencere yapıların ses iletim verilerini göstermektedir. En yüksek ses iletimi çift cam sayesinde sağlanır. Farklı kalınlıklarda bölmelerle desteklendiğinde daha iyi bir yalıtım sağlanır.

Window Construction (Pencere Yapısı)	STC Rating
1/8- + 1/8-in-thick double glass with 1/4-in airspace	26
1/4-in-thick glass set in caulking	30
1/4-in-thick laminated glass	34
1/4- + 1/8-in-thick double glass with 2-in airspace	39
1/4- + 1/8-in-thick double glass with 4 3/4-in airspace	43



TL data for identical window constructions can vary widely from one laboratory to another. Discrepencies can be due to variations in size and shape of the panel being tested (glass dimensions affect resonant frequencies), edge support conditions (rigid support stiffens panel thereby lowering TL), and other factors. The TL of a single layer of plastic is similar to a single layer of glass of identical mass.