



Designation: E557 – 12 (Reapproved 2020)

Standard Guide for Architectural Design and Installation Practices for Sound Isolation between Spaces Separated by Operable Partitions¹

This standard is issued under the fixed designation E557; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope

1.1 This guide provides design details that should be considered in the design of buildings that include operable partitions. Operable partitions are those that can be quickly put in place or removed and stored to provide flexibility in the size of spaces typically used for meetings or social functions.

1.1.1 The guide primarily discusses details in the building design required to limit leakage of sound around an operable partition.

1.1.2 The guide also discusses some factors that affect the performance of the partitions themselves.

1.1.3 This guide is neither a specification for operable partitions nor a document intended to be imposed as a requirement on manufacturers of operable partitions.

1.2 Excluded from this guide are those partitions that are classified by the building products industry as *demountable*. Demountable partitions are those that are designed and installed with the intent of later being taken down and re-erected by a crew over a period of time, with the components being reusable.

1.3 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recom-*

mendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

2. Referenced Documents

2.1 *ASTM Standards:*²

E90 Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements

E336 Test Method for Measurement of Airborne Sound Attenuation between Rooms in Buildings

E413 Classification for Rating Sound Insulation

E1155 Test Method for Determining F_F Floor Flatness and F_L Floor Levelness Numbers

E1155M Test Method for Determining F_F Floor Flatness and F_L Floor Levelness Numbers (Metric)

3. Significance and Use

3.1 Rooms formed by operable partitions often need to be isolated acoustically. Sound-isolating properties of operable partitions are specified by architects in terms of sound transmission class (STC) and so advertised by the manufacturer on the basis of laboratory tests in accordance with Test Method **E90** and Classification **E413**.

3.2 Because normal building design and construction practices are not the same as those used in acoustical laboratories, actual field performance of partitions, including operable partitions, will probably be less than that of test specimens. Sound transmission between areas to be isolated will occur through all of the connecting building components in addition to the operable partition, that is, floor and ceiling slabs, ceiling plenums, common walls, etc. All possible paths between the areas being isolated should have a sound insulation performance at least equal to the operable partition. Unless good acoustical practice is followed in both building design and installation, there may be a significant discrepancy between the sound isolation expected and that achieved.

¹ This guide is under the jurisdiction of ASTM Committee **E33** on Building and Environmental Acoustics and is the direct responsibility of Subcommittee **E33.04** on Application of Acoustical Materials and Systems.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

3.3 Because of the complex nature of the sound flanking paths adjacent to operable partitions, it is highly recommended that all related construction details be reviewed by a person qualified in acoustical design and construction.

3.4 This guide does not specify requirements. However, persons desiring to write installation and construction specifications may find the contents useful in developing requirements for the building design site preparation, and installation practices necessary to minimize leakage and flanking sound around the operable partition.

4. Properties of Operable Partitions

4.1 There are several types of operable partitions: hinged panel groups, individual panel and continuously hinged partition systems. Some are supported by overhead track with or without a floor guide or track. Some are floor supported with an overhead track to guide them. They may be manual or power-operated. One type consists of movable panels secured in place by vertical expansion to seal against the floor and ceiling.

4.2 Several factors should be considered in specifications:

4.2.1 Seals or gaskets are of many kinds; some consist of resilient material that maintains continuous flexible contact with floor or ceiling, and some include a mechanical, hydraulic or pneumatic mechanism that maintains clearance when in motion and a positive seal when finally closed. The seals at the top of the partitions should make continuous contact with smooth surfaces on both sides of the operable partitions. The sound path through an insufficient seal, up and over the track, and out on the other side through the insufficient seal constitutes a serious sound leak.

4.2.2 When a partition consists of several panels, leaks may occur at the vertical joints when the seals at the joint are not tight.

4.2.3 Pass-through doors in partitions will generally reduce the overall sound isolation of the wall. For this reason, pass-through doors should be equipped with full perimeter gasketing, including seals at head.

4.2.4 Track assemblies installed outside the partition storage pocket area to form cross-through paths (90° to each other) primarily for the transport of partitions from one location to the other should be avoided unless a satisfactory method is provided to reduce the flanking path created through the track section from one side of the partition to the other.

5. Properties of the Building

5.1 *Sound Flanking Paths and Interface Surfaces*—Although the operable partition may be an adequate barrier itself, sound may pass from one side to the other by going over, around, or under the partition. The passage of sound by paths other than directly through the partition itself is called flanking transmission. The building should provide proper flat surfaces to interface with the seals. These flanking paths and surfaces for seals in various areas should be addressed in the design of the building as discussed in the following.

5.2 Area Above Track:

5.2.1 If there is a plenum above the partition, sound may pass up through the ceiling on one side and down through the

ceiling on the other. A barrier should be erected directly above the operable partitions. This barrier, in conjunction with the ceiling, should have a sound transmission loss equal to or greater than that of the partition. The barrier is best designed as part of the building and not added as an afterthought (see Fig. 1). Often a seemingly solid ceiling has hollows behind it, such as spaces between the joists, or spaces in corrugated decks, that provide a flanking path around an operable partition below. The hollow spaces should be blocked directly above the operable partition. The sound transmission loss provided by the blocking barrier should be equal to or greater than that provided by the operable partition.

5.2.2 When a plenum is part of the air conditioning system, direct connections between the plenums on each side of the operable partition should be avoided wherever possible. When this is not possible a sound-attenuating duct or silencer should be installed through the barrier wall straddling the operable partition below. The duct or silencer, and the ceiling, should be designed so the noise reduction through that path is approximately 10 dB greater than the expected noise reduction

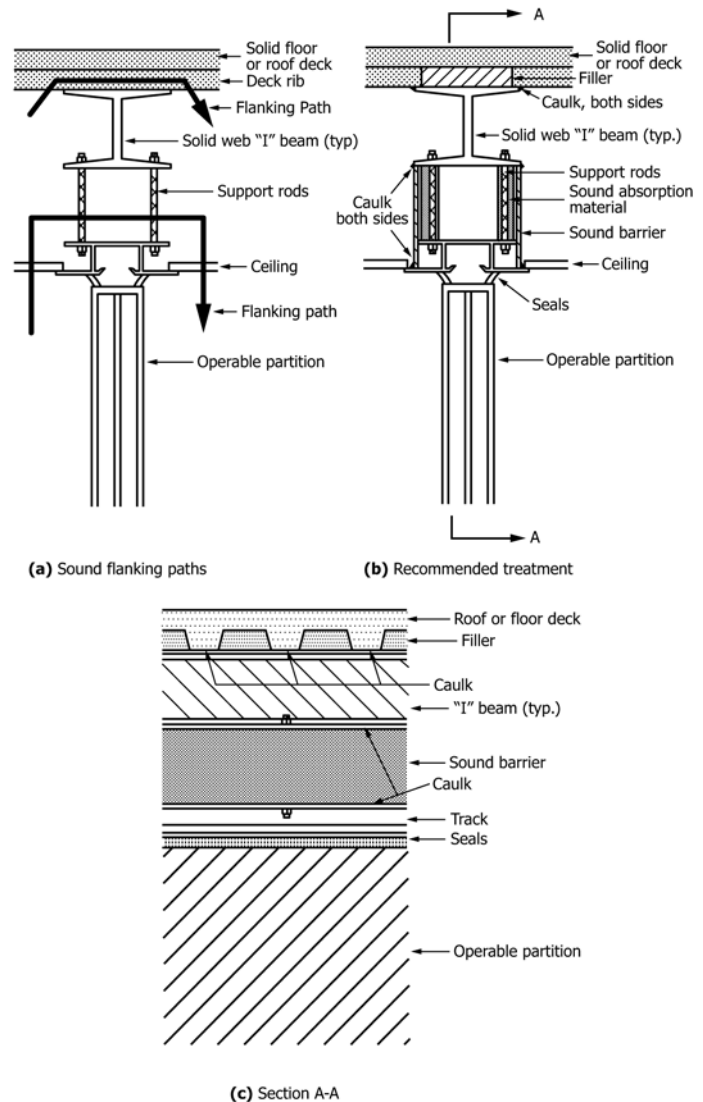


FIG. 1 Recommended Ceiling Barrier Installation