



Designation: E 989 – 89 (Reapproved 1999)

Standard Classification for Determination of Impact Insulation Class (IIC)¹

This standard is issued under the fixed designation E 989; 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.

1. Scope

1.1 This classification covers the determination of a single-figure rating that can be used for comparing floor-ceiling assemblies for general building design purposes. The rating is called impact insulation class (IIC). This classification is applicable only to one-third octave band impact noise data obtained using the standard tapping machine described in Test Method E 492. This rating may be used with data obtained in the laboratory or field.

1.2 *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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

E 492 Test Method for Laboratory Measurement of Impact Sound Transmission Through Floor-Ceiling Assemblies Using the Tapping Machine²

3. Significance and Use

3.1 The IIC system rates floor-ceiling structures in ascending degrees of impact sound insulation. Thus, IIC values increasing in magnitude indicate a correspondingly increasing degree of impact sound insulation under tapping machine test. The IIC rating can be used by architects, builders, and specification and code authorities for acoustical design purposes in building constructions.

4. Basis of Classification

4.1 To determine the impact insulation class (IIC) of a floor-ceiling assembly, its normalized impact sound pressure levels in the 16 test frequency bands are compared with those of the IIC reference contour. The contour is illustrated in Fig. 1 and tabulated in Table 1. The test frequency bands are a series of one third octaves centered on 100 to 3150 Hz.

NOTE 1—Use of this classification for the purpose of comparing or

¹ This classification is under the jurisdiction of ASTM Committee E-33 on Environmental Acoustics and is the direct responsibility of Subcommittee E33.03 on Sound Transmission.

Current edition approved July 28, 1989. Published September 1989. Originally published as E 989 – 84. Last previous edition E 989 – 84.

² Annual Book of ASTM Standards, Vol 04.06.

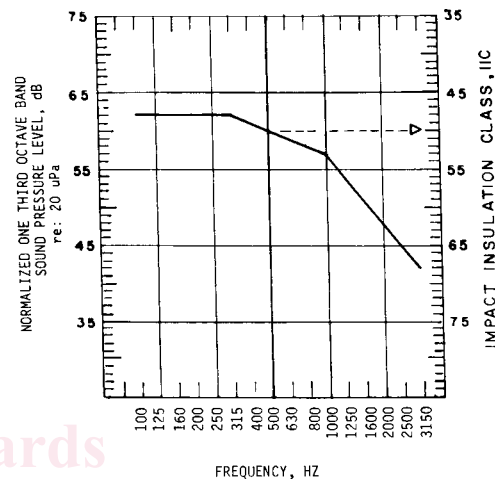


FIG. 1 Typical IIC Contour (IIC-50)

rating test data based on octave band measurements may cause confusion and result in erroneous or misleading evaluations. Therefore this classification cannot be used with octave band data.

4.2 *Graphical Determination of IIC*—If the normalized sound pressure levels for the test specimen are plotted in a graph (see Note 2), the impact insulation class may be determined by using a transparent overlay on which the IIC contour is drawn. The IIC contour is shifted vertically relative to the test data until the following conditions are fulfilled: (1) the sum of the deviations above the contour do not exceed 32 dB, and (2) the maximum deviation at a single test frequency shall not exceed 8 dB. The normalized sound pressure level at the intersection of the contour and the 500 Hz ordinate is subtracted from 110 to obtain the impact insulation class or may be read directly from the right-hand ordinate scale (see Fig. 1).

4.3 *Numerical Determination of IIC*—Table 1 lists the normalized one-third octave band sound pressure levels (L_n) corresponding to a range of IIC contours. This range may be extended upwards or downwards by adding or subtracting increments of 1 dB. The test data are compared with the rows of L_n values given in the table to determine the maximum row for which the conditions given in 4.2 are met.

5. Presentation of Results

5.1 It is recommended that the test data be plotted in a graph together with the corresponding IIC contour obtained as