Section 5.8. Sound Transmission

(See Note A-5.8.)

5.8.1. Protection from Airborne Noise

5.8.1.1. Required Protection

1) Except as provided in Sentence (2), a *dwelling unit* shall be separated from every other space in a *building* in which noise may be generated by

a) a separating assembly and adjoining constructions, which, together, provide an *apparent sound transmission class (ASTC)* rating not less than 47, or

b) a separating assembly that provides a *sound transmission class (STC)* rating of not less than 50 and adjoining constructions that conform to Article 9.11.1.4.

2) Assemblies and adjoining constructions separating a *dwelling unit* from an elevator shaft or a refuse chute shall have an *STC* rating not less than 55.

5.8.1.2. Determination of Sound Transmission Ratings

(See Note A-5.8.1.2.)

1) The *STC* ratings of separating assemblies shall be determined in accordance with ASTM E 413, "Classification for Rating Sound Insulation," using the results from measurements carried out in accordance with ASTM E 90, "Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements."

2) The *ASTC* ratings of separating assemblies and adjoining constructions shall be

a) determined in accordance with ASTM E 413, "Classification for Rating Sound Insulation," using the results from measurements carried out in accordance with ASTM E 336, "Measurement of Airborne Sound Attenuation between Rooms in Buildings," or

b) calculated in accordance with

i) the detailed method described in Article 5.8.1.4., or

ii) the simplified method described in Article 5.8.1.5.

5.8.1.3. Compliance with Required Ratings

1) Compliance with the required *STC* ratings shall be demonstrated through

a) measurements carried out in accordance with Sentence 5.8.1.2.(1), or

b) the construction of separating assemblies conforming to those presented in Table 9.10.3.1.-A or 9.10.3.1.-B, as applicable.

2) Compliance with the required *ASTC* ratings shall be demonstrated through

a) measurements or calculations carried out in accordance with Sentence 5.8.1.2.(2), or

b) the construction of separating assemblies conforming to those presented in Table 9.10.3.1.-A or 9.10.3.1.-B, as applicable, that have an *STC* rating of not less than 50 in conjunction with flanking assemblies constructed in accordance with Article 9.11.1.4.

5.8.1.4. Detailed Method for Calculating ASTC

(See Note A-5.8.1.4.)

1) The sound transmission loss measured in accordance with ASTM E 90, "Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements," shall be used in lieu of the sound reduction index required in ISO 15712-1, "Building Acoustics – Estimation of Acoustic Performance of Buildings From the Performance of Elements – Part 1: Airborne Sound Insulation Between Rooms."

2) The vibration reduction index for the junctions between separating assemblies shall be

a) determined using the equations presented in Annex E of ISO 15712-1, "Building Acoustics – Estimation of Acoustic Performance of Buildings From the Performance of Elements – Part 1: Airborne Sound Insulation Between Rooms," or

b) measured in accordance with Parts 1 to 4 of ISO 10848, "Acoustics – Laboratory Measurement of the Flanking Transmission of Airborne and Impact Sound Between Adjoining Rooms."

3) The normalized flanking level difference shall be measured in accordance with Parts 1 to 4 of ISO 10848, "Acoustics – Laboratory Measurement of the Flanking Transmission of Airborne and Impact Sound Between Adjoining Rooms."

4) The direct sound reduction index for the separating assembly in situ shall be determined using Clause (a) or (b), depending on the type of construction:

a) for a lightweight separating wall or floor assembly with wood or steel framing, the index shall be taken as equal to the sound transmission loss, without correction;

b) for a heavyweight separating wall or floor assembly of concrete or masonry, the index shall be determined in accordance with the detailed method for structure-borne transmission presented in ISO 15712-1, "Building Acoustics – Estimation of Acoustic Performance of Buildings From the Performance of Elements – Part 1: Airborne Sound Insulation Between Rooms."

5) The flanking sound reduction index for each flanking path at each edge of the separating assembly shall be determined using Clause (a), (b) or (c), depending on the type of construction:

a) for a lightweight separating wall or floor assembly with wood or steel framing and connected lightweight flanking assemblies with wood or steel framing, the index shall be taken as equal to the normalized flanking level difference re-normalized for the *ASTC* field situation in accordance with Annex F of ISO 15712-1, "Building Acoustics – Estimation of Acoustic Performance of Buildings From the Performance of Elements – Part 1: Airborne Sound Insulation Between Rooms";

b) for a heavyweight separating wall or floor assembly of concrete or masonry and connected flanking assemblies of concrete or masonry, the index shall be determined in accordance with the detailed method for structure-borne transmission presented in ISO 15712-1, "Building Acoustics – Estimation of Acoustic Performance of Buildings From the Performance of Elements – Part 1: Airborne Sound Insulation Between Rooms";

c) for a mixture of lightweight framed assemblies and heavyweight concrete or masonry assemblies, the index shall be determined in accordance with Clause (a) or (b).

6) Once the pertinent indices and measurements referred to in Sentences (1) to (5) have been determined based on the type of construction, the apparent sound reduction index shall then be determined in accordance with ISO 15712-1, "Building Acoustics – Estimation of Acoustic Performance of Buildings From the Performance of Elements – Part 1: Airborne Sound Insulation Between Rooms."

7) The *ASTC* shall be calculated in accordance with ASTM E 413, "Classification for Rating Sound Insulation," using the apparent sound reduction index determined in Sentence (6), which shall be treated as equivalent to the values of apparent sound transmission loss measured in accordance with ASTM E 336, "Measurement of Airborne Sound Attenuation between Rooms in Buildings."

5.8.1.5. Simplified Method for Calculating ASTC

(See Note A-5.8.1.4.)

1) The *STC* rating shall be used in lieu of the weighted sound reduction index required in ISO 15712-1, "Building Acoustics – Estimation of Acoustic Performance of Buildings From the Performance of Elements – Part 1: Airborne Sound Insulation Between Rooms."

2) The vibration reduction index for the junctions between separating assemblies shall be

a) determined using the equations presented in Annex E of ISO 15712-1, "Building Acoustics – Estimation of Acoustic Performance of Buildings From the Performance of Elements – Part 1: Airborne Sound Insulation Between Rooms," or

b) measured in accordance with Parts 1 to 4 of ISO 10848, "Acoustics – Laboratory Measurement of the Flanking Transmission of b) Airborne and Impact Sound Between Adjoining Rooms."

3) The weighted normalized flanking level difference shall be determined in accordance with ASTM E 413, "Classification for Rating Sound Insulation," using the results from measurements carried out in accordance with Parts 1 to 4 of ISO 10848, "Acoustics – Laboratory Measurement of the Flanking Transmission of Airborne and Impact Sound Between Adjoining Rooms."

4) The direct weighted sound reduction index for the separating assembly shall be taken as equal to the *STC*, without correction.

5) The weighted flanking sound reduction index for each flanking path at each edge of the separating assembly shall be determined using Clause (a) or (b), depending on the type of construction:

a) for a lightweight separating wall or floor assembly with wood or steel framing and connected lightweight flanking assemblies with wood or steel framing, the index shall be taken as equal to the weighted normalized flanking level difference re-normalized for the ASTC field situation in accordance with Annex F of ISO 15712-1, "Building Acoustics – Estimation of Acoustic Performance of Buildings From the Performance of Elements – Part 1: Airborne Sound Insulation Between Rooms";

b) for a heavyweight separating wall or floor assembly of concrete or masonry and connected flanking assemblies of concrete or masonry, the index shall be determined in accordance with the simplified method for structure-borne transmission presented in ISO 15712-1, "Building Acoustics – Estimation of Acoustic Performance of Buildings From the Performance of Elements – Part 1: Airborne Sound Insulation Between Rooms."

6) Once the pertinent indices and measurements referred to in Sentences (1) to (5) have been determined based on the type of construction, the *ASTC* shall then be calculated in accordance with ISO 15712-1, "Building Acoustics – Estimation of Acoustic Performance of Buildings From the Performance of Elements – Part 1: Airborne Sound Insulation Between Rooms."