National Standards Authority of Ireland

IRISH STANDARD

I.S. EN 12354-4:2000

ICS 91.120.20

BUILDING ACOUSTICS - ESTIMATION OF ACOUSTIC PERFORMANCE OF BUILDINGS FROM THE PERFORMANCE OF ELEMENTS PART 4: TRANSMISSION OF INDOOR SOUND TO THE OUTSIDE

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*This Irish **Standard** was published under the authority of the National **Standards** Authority of Ireland and comes into effect on: December 1, 2000*

Price Code I

Údarás um Chaighdeáin Náisiúnta na hÉireann

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 12354-4

September 2000

ICS 91.120.20

English version

Building Acoustics - Estimation of acoustic performance of buildings from the performance of elements - Part 4: Transmission of indoor sound to the outside

Acoustique du bâtiment - Calcul de la performance acoustique des bâtiments à partir de la performance des éléments - Partie 4: Transmission du bruit intérieur à l'extérieur

Bauakustik - Berechnung der akustischen Eigenschaften von Gebäuden aus den Bauteileigenschaften - Teil 4: Schallübertragung von Räumen ins Freie

This European Standard was approved by CEN on 9 September 2000.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

Ref. No. EN 12354-4:2000 E

Contents

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 126 "Acoustic properties of building products and of buildings", the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by March 2001, and conflicting national standards shall be withdrawn at the latest by March 2001.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

This document is the first version of a standard which forms a part of a series of standards specifying calculation models in building acoustics :

Part 1 : *Building Acoustics – Estimation of acoustic performance of buildings from the performance of elements – Part 1 : Airborne sound insulation between rooms.*

Part 2 : *Building Acoustics – Estimation of acoustic performance of buildings from the performance of elements – Part 2 : Impact sound insulation between rooms.*

Part 3 : *Building Acoustics – Estimation of acoustic performance of buildings from the performance of elements – Part 3 : Airborne sound insulation against outdoor sound.*

Part 4 : *Building Acoustics – Estimation of acoustic performance of buildings from the performance of elements – Part 4 : Transmission of indoor sound to the outside.*

Part 5 : *Building Acoustics – Estimation of acoustic performance of buildings from the performance of elements – Part 5 : Noise from technical installations and equipment.*

Part 6 : *Building Acoustics – Estimation of acoustic performance of buildings from the performance of elements – Part 6 : Sound absorption in enclosed spaces.*

The accuracy of this standard alone is difficult to specify since it forms just one link in the chain of inside sound level, sound radiation and sound propagation outdoors, the first and last items of which are not covered by this standard. The accuracy can only be specified after widespread comparisons with field data in combination with other prediction standards, i.e. those for outdoor sound propagation. It is the responsibility of the user (i.e. a person, an organization, the authorities) to address the consequences of the accuracy, inherent for all measurement and prediction methods, by specifying requirements for the input data and/or applying a safety margin to the results or applying some other correction.

Annex A forms an integral part of this part of EN 12354, Annexes B, C, D, E, F, G and H are for information only.

1 Scope

This European Standard describes a calculation model for the sound power level radiated by the envelope of a building due to airborne sound inside that building, primarily by means of measured sound pressure levels inside the building and measured data which characterize the sound transmission by the relevant elements and openings in the building envelope. These sound power levels, together with those of other sound sources in or in front of the building envelope, form the basis for the calculation of the sound pressure level at a chosen distance from a building as a measure for the acoustic performance of buildings.

The prediction of the inside sound pressure level from knowledge of the indoor sound sources is outside the scope of this European Standard.

The prediction of the outdoor sound propagation is outside the scope of this European Standard.

NOTE For simple propagation conditions an approach is given for the estimation of the sound pressure level in informative annex E.

This European Standard describes the principles of the calculation model, lists the relevant quantities and defines its applications and restrictions. It is intended for acoustical experts and provides the framework for the development of application documents and tools for other users in the field of building construction, taking into account local circumstances.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN ISO 140-3, *Acoustics – Measurement of sound insulation in buildings and of building elements – Part 3 : Laboratory measurements of airborne sound insulation of building elements (ISO 140-3:1995).*

EN ISO 140-5, *Acoustics – Measurement of sound insulation in buildings and of building elements – Part 5 : Field measurements of airborne sound insulation of façade elements and façades (ISO 140-5:1998).*

EN 20140-10, *Acoustics – Measurement of sound insulation in buildings and of building elements – Part 10 : Laboratory measurement of airborne sound insulation of small building elements (ISO 140-10:1991).*

EN ISO 7235, *Acoustics – Measurement procedures for ducted silencers - Insertion loss, flow noise and total pressure loss (ISO 7235:1991).*

3 Relevant quantities

The symbols used for the purposes of this European Standard are given in annex A.

3.1 Quantities to express building performance

3.1.1 Sound power level L_w

The sound power level of a substitute point sound source.

3.1.2 Directivity correction D_c

The deviation in decibels of the sound pressure level of a point sound source in a specified direction from the level of an omni-directional point source producing the same sound power level.