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Acoustics — Measurement of sound insulation in buildings and of building elements — Part I : Requirements for laboratories

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FOREWORD

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Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 140/I was developed by Technical Committee ISO/TC 43, *Acoustics*, and was circulated to the member bodies in May 1976.

It has been approved by the member bodies of the following countries :

Australia	India	Romania
Austria	Israel	South Africa, Rep. of
Belgium	Italy	Sweden
Canada	Japan	Switzerland
Czechoslovakia	Korea, Rep. of	Turkey
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The member body of the following country expressed disapproval of the document on technical grounds :

Spain

This International Standard, together with International Standards ISO 140/III, IV, VI and VII, cancel and replace ISO Recommendation R 140-1960, of which they constitute a technical revision.

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Acoustics — Measurement of sound insulation in buildings and of building elements — Part I : Requirements for laboratories

0 INTRODUCTION

The purpose of this International Standard is to provide a co-ordinated statement of requirements for laboratories used for measurements of sound insulation of building elements.

Laboratories for the determination of airborne and impact sound reduction of structural elements should be constructed in such a way that the measurement results can be directly or indirectly applied to the conditions in actual buildings.

In the case of laboratories with suppressed radiation from flanking elements, the behaviour of the element in the actual building can be concluded only indirectly and only in some cases from the measurement results in the laboratory. The test rooms described in this International Standard belong to this group of laboratories. This group includes laboratories where the specimen is structurally isolated from both test rooms, and laboratories where the test specimen is connected to one or both of the test rooms, the radiation from flanking elements being reduced either by use of heavy elements or by use of appropriate linings.

A direct application of the results of laboratory measurements is possible if the flanking transmission is included. For this purpose, the test rooms and coupling of test specimen to the flanking construction must resemble the situation in usual buildings ("laboratories with flanking transmission", "mockups"). The requirements for such laboratories are under consideration.

1 SCOPE AND FIELD OF APPLICATION

This International Standard lays down specifications concerning laboratories for sound insulation measurements of building elements. It applies to laboratories with suppressed radiation from flanking elements.

2 REFERENCES

ISO 140/III, *Acoustics — Measurement of sound insulation in buildings and of building elements — Part III : Laboratory measurements of airborne sound insulation of building elements.*

ISO 140/VI, *Acoustics — Measurement of sound insulation in buildings and of building elements — Part VI : Laboratory measurements of impact sound insulation of floors.*

ISO 140/VIII, *Acoustics — Measurement of sound insulation in buildings and of building elements — Part VIII : Laboratory measurements of the reduction of transmitted impact noise by floor coverings on a standard floor.*

3 LABORATORIES FOR AIRBORNE SOUND INSULATION MEASUREMENTS UNDER DIFFUSE CONDITIONS

The laboratory test facility consists of two adjacent reverberant rooms with a test opening between them in which the test specimen is inserted.

3.1 Rooms

Volumes and shapes of the two test rooms should not be exactly the same. A difference in room volumes of at least 10 % is recommended. The volumes of the test rooms should be at least 50 m^3.

The ratios of the room dimensions should be so chosen that the natural frequencies in the low-frequency region are spaced as uniformly as possible.

If necessary, diffusing elements should be installed in the rooms to obtain a diffuse sound field.

NOTES

1 The volume of the rooms and the size of the test opening as well as the position of the test specimen within this opening are under consideration. Theoretical calculation as well as some experiments have indicated that it may be advisable that the specimen should cover a total side wall or ceiling of the test room, i.e. the test opening should extend from wall to wall and/or from ceiling to floor. In such a case, a volume of 50 m^3 is appropriate in view of the recommended size of the test opening.

2 The reverberation time in the rooms should not be excessively long. Where the reverberation time at low frequencies exceeds 2 s, a check should be made to determine whether the measured sound reduction index depends on the reverberation time. When such a dependance is found — even with diffusors in the rooms — the room should be modified to reduce the reverberation time to not more than 2 s at low test frequencies.

The background level in the receiving room must be sufficiently low to permit a measurement of the sound transmitted from the source room, considering the power output in the source room and the sound insulation of the specimens for which the laboratory is intended.

In laboratory test facilities for measuring the sound reduction index, the sound transmitted by any indirect path should be negligible compared with the sound trans-