
ASA TECHNICAL REPORT

Rationale for Withdrawing ANSI/ASA S12.9-2008/Part 6

(A Technical Report prepared by ANSI-Accredited Standards Committee S12 and registered with ANSI)

ASA TR S12.9-2018/Part 6

Accredited Standards Committee S12, Noise

Standards Secretariat
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Secretariat:

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Abstract

This ASA Technical Report provides the rationale for the recommendation by Working Group S12/WG 15 to withdraw the 2008 ANSI/ASA Standard “Quantities and Procedures for Description and Measurement of Environmental Sound — Part 6: Methods for Estimation of Awakenings Associated with Outdoor Noise Events Heard in Homes.” The decision to withdraw the standard is based in part on the relatively small and non-representative corpus of field observations of noise-induced behavioral awakening available for analysis; on the poor generalizability of predicted awakening rates from airport to airport; on practical experience with the limited utility of predictions of “at least one behavioral awakening per night” for purposes of assessing environmental noise impacts, as required by the National Environmental Policy Act; on the statistical assumptions of convenience and *post hoc* analysis methods used to generate predictions of awakenings; on information published subsequent to development of the original standard; and on the findings of peer-reviewed re-analyses of the findings on which the original standard was based.

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Foreword

[This Foreword is for information only, and is not a part of the Technical Report ASA TR S12.9-2018/Part 6 Rationale for Withdrawing ANSI/ASA S12.9-2008/Part 6. As such, this Foreword may contain material that has not been subjected to public review or a consensus process. In addition, it does not contain requirements necessary for conformance to the standard.]

This Technical Report comprises a part of a group of definitions, standards, and specifications for use in noise. It was developed and approved by Accredited Standards Committee S12 Noise, under its approved operating procedures. Those procedures have been accredited by the American National Standards Institute (ANSI). The Scope of Accredited Standards Committee S12 is as follows:

Standards, specifications, and terminology in the field of acoustical noise pertaining to methods of measurement, evaluation, and control, including biological safety, tolerance, and comfort, and physical acoustics as related to environmental and occupational noise.

This Technical Report contains the rationale for a decision to withdraw ANSI/ASA S12.9-2008/Part 6. The decision was based on the findings of peer-reviewed information published subsequent to development of the original Standard; practical experience in the application of the Standard to aircraft noise environmental impact assessments; and re-analyses of the findings on which the original Standard was based.

Publication of this Technical Report that has been registered with ANSI has been approved by Accredited Standards Committee S12, Noise. This document is registered as a Technical Report according to the *Procedures for the Registration of Technical Reports with ANSI*. This document is not an American National Standard and the material contained herein is not normative in nature. Comments on the content of this document should be sent to the Acoustical Society of America Standards Secretariat, 1305 Walt Whitman Road, Suite 300, Melville, NY 11747, or emailed to asastds@acousticalsociety.org.

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Suggestions for improvements of this Technical Report are welcomed. They should be sent to Accredited Standards Committee S12, Noise, in care of the Standards Secretariat of the Acoustical Society of America, 1305 Walt Whitman Road, Suite 300, Melville, New York 11747. Telephone: 631-390-0215; Fax: (631) 923-2875; E-mail: asastds@acousticalsociety.org.

Introduction

Noise-induced sleep disturbance is a familiar experience for many, but a difficult quantity to define and predict with rigor. Sleep disturbance predictions are nonetheless required by the U.S. National Environmental Policy Act (NEPA) for purposes such as assessing the nighttime environmental impacts of major federally funded projects, including construction of airport and highway infrastructure. The 2008 ANSI/ASA Standard that is the subject of this Technical Report developed a method for predicting transportation-noise-induced sleep disturbance for events heard in homes through secondary analyses of a small corpus of peer-reviewed field observations of behaviorally confirmed awakenings.

Additional information published since the development of ANSI/ASA S12.9-2008/Part 6 ("the Standard") calls into question the generalizability of its predictions, as well as its suitability for NEPA-related purposes. Experience in application of the Standard has also revealed limitations to its ability to distinguish among the environmental impacts of preferred and alternative proposed actions. By itself, however, the newly available information offers no unambiguous basis for revising the 2008 Standard.

This Technical Report provides the background and rationale for the decision by Working Group S12/WG 15 to withdraw ANSI/ASA S12.9-2008/Part 6.

TECHNICAL REPORT

Rationale for Withdrawing ANSI/ASA S12.9-2008/Part 6

1 Scope

ANSI/ASA S12.9-2008/Part 6 described a method of predicting the probability of awakening at least once per night due to transportation noise intrusions into residential sleeping quarters. This report summarizes the technical and pragmatic bases for the 2016 decision by ASA Working Group S12/WG 15 to withdraw ANSI/ASA S12.9-2008/Part 6.

ANSI/ASA S12.9-2008/Part 6 was developed primarily to assess sleep disturbance created by transportation noise, as required by NEPA and by similar state legislation, for assessing nighttime noise impacts of major, government-funded projects. Limitations of the Standard (described in clause 2 below) that have become evident in the years since its publication outweigh its usefulness for its intended purpose.

The decision of Working Group S12/WG 15 to withdraw ANSI/ASA S12.9-2008/Part 6 implies that the method for calculating “at least one behavioral awakening per night” contained in the former Standard should no longer be relied upon for environmental impact assessment purposes. The Working Group believes that continued reliance on the 2008 Standard would lead to unreliable and difficult-to-interpret predictions of transportation-noise-induced sleep disturbance.

The Working Group further believes that project alternatives that have been endorsed in already-completed environmental assessments on the basis of calculations of “at least one behavioral awakening per night” may be in error and have overestimated numbers of expected awakenings. The Working Group understands that its decision to withdraw the 2008 Standard may be disruptive to acoustical consultants who rely on the Standard for environmental impact assessment purposes. Therefore, two Informative Annexes of the 2008 standard are included in this document for the guidance they can provide until more plausible and technically defensible means are developed for predicting sleep disturbance due to transportation noise.¹

2 Terms and definitions

ASEL: A-weighted sound exposure level

dB: decibel, A-weighted unless otherwise indicated, re 20 μ Pa.

CEQA: California Environmental Quality Act

DNL: Day-Night Average Sound Level, a 24-hour time weighted average of A-weighted sound levels

FICAN: U.S. Federal Interagency Committee on Aircraft Noise

NEPA: National Environmental Policy Act

SEL: Sound exposure level

¹ Practitioners and the public may benefit from information that describes the difference between awakening in habituated and unhabituated populations. Higher noise levels have been reported to be required to disturb sleep in an habituated population than for a non-habituated population [Ollerhead, 1992]. This finding may be relevant in assessments conducted for NEPA-related purposes of project-related noise effects on sleep disturbance.