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AMERICAN NATIONAL STANDARD

Procedure for Testing Railroad Horns *ex situ*

ANSI/ASA S12.69-2010

Accredited Standards Committee S12, Noise

Standards Secretariat
Acoustical Society of America
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Procedure for Testing Railroad Horns *ex situ*

Secretariat:

Acoustical Society of America

Approved October 6, 2010 by:

American National Standards Institute, Inc.

Abstract

Federal regulations require the testing of sound emissions from horns located on railroad locomotives. This Standard specifies an alternate method for compliance with the Federal requirements in metropolitan areas where tests cannot be conducted in an outdoor space free of obstructions. The data that result from this procedure are equivalent to those that derive from the procedure promulgated by the Federal Railroad Administration as described in 49 CFR Part 229.129.

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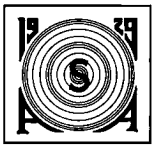

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Foreword

[*This Foreword is for information only and is not a part of the American National Standard ANSI/ASA S12.69-2010 American National Standard Procedure for Testing Railroad Horns ex situ.*]

This standard 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 standard is not comparable to any existing ISO Standard.

At the time this Standard was submitted to Accredited Standards Committee S12, Noise for approval, the membership was as follows:

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Suggestions for improvements to this standard will be welcomed. They should be sent to Accredited Standards Committee S12, Noise, in care of the Standards Secretariat of the Acoustical Society of America, 35 Pinelawn Road, Suite 114E, Melville, New York 11747-3177. Telephone: 631-390-0215; FAX: 631-390-0217; E-mail: asastds@aip.org.

Introduction

The Federal Railroad Administration requires periodic testing of horns used on trains to assure that they meet minimum and maximum output sound levels. The FRA test protocol specifies environmental conditions that are required in the test environment including meteorological conditions and freedom from interfering sound reflecting surfaces. In many parts of the country it is impractical to comply with these restrictions as a consequence of normal climatic conditions, adjacencies to metropolitan structures, or community annoyance. This Standard documents a procedure that can be used to test train horns inside maintenance facilities as an alternative to 49 CFR Part 229.129. This procedure consists of two distinct parts. First is the determination of the difference between measurements of train horn sound levels as required by FRA and the levels measured within a specific maintenance facility. This difference is then applied to future train horn sound level measurements that are made within the maintenance facility to produce measurement data equivalent to that required by FRA.

American National Standard

Procedure for Testing Railroad Horns *ex situ*

1 Scope

This Standard specifies an alternative test procedure to produce horn sound level data equivalent to that produced by the *in situ* procedure in 49 CFR Part 229.129.

This method may be used when:

1. No test location exists that meets the requirements of the regulation.

2. A conforming location exists but testing at that location creates an unacceptable environmental impact on the surrounding residents.

3. The standard is applicable for a specific locomotive model, horn model, and mounting location and for horns having a fundamental frequency between 200 Hz and 4,000 Hz.

Three separate measurements are specified to produce results that are acoustically valid and to determine the transfer function: measurement of the maximum and minimum compressed air pressures for the fleet, measurement of the A-weighted sound level of the horns under test *in situ*, and measurement of the horn in a hemi-anechoic room. Once the transfer function is determined, only measurements in a hemi-anechoic room are needed to produce horn sound levels to evaluate compliance with the Federal requirement.

In addition, this method relies on an *a priori* knowledge of the effect of the horn mounting position on the train. A procedure is specified to determine this transfer function on a typical sample of trains.

The test procedure relies on mounting the horn under test in a hemi-anechoic room provided with a compressed air supply. Previously determined maximum and minimum air pressures measured during horn soundings are used to test the horn acoustical output.

A-weighted data are used in the evaluation of horn output and mounting transfer function to permit adjustment of the acoustic output measured *ex situ* in a hemi-anechoic room to correspond with the level that would be measured *in situ* by the FRA test method. The A-weighted adjusted levels are then reported per the FRA requirements.

2 Normative references

The following referenced documents are indispensable for the application of this standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ANSI S1.1 *American National Standard Acoustical Terminology*

ANSI S1.4-1983 (R2006) *American National Standard Specification for Sound Level Meters*