

ANSI/ASA S2.73-2014 / ISO 10819:2013
(Revision of ANSI S2.73-2002 / ISO 10819:1996)

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AMERICAN NATIONAL STANDARD

Mechanical Vibration and Shock – Hand-arm Vibration – Measurement and Evaluation of the Vibration Transmissibility of Gloves at the Palm of the Hand (a nationally adopted international standard)

ANSI/ASA S2.73-2014 /
ISO 10819:2013

Accredited Standards Committee S2, Mechanical Vibration and Shock

Standards Secretariat
Acoustical Society of America
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Secretariat:

Acoustical Society of America

Approved on April 16, 2014 by:

American National Standards Institute, Inc.

Abstract

This American National Standard specifies a method for the laboratory measurement, data analysis, and reporting of the vibration transmissibility of a glove with a vibration-reducing material that covers the palm, fingers, and thumb of the hand. ANSI/ASA S2.73-2014 / ISO 10819:2013 specifies vibration transmissibility in terms of vibration transmitted from a handle through a glove to the palm of the hand in one-third-octave frequency bands with center frequencies of 25 Hz to 1,250 Hz.

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Foreword

[This Foreword is for information only, and is not a part of the American National Standard ANSI/ASA S2.73-2014 / ISO 10819:2013 American National Standard Acoustics — Mechanical vibration and shock – Hand-arm vibration – Measurement and evaluation of the vibration transmissibility of gloves at the palm of the hand.]

This nationally adopted international standard specifies a method for the laboratory measurement, data analysis, and reporting of the vibration transmissibility of a glove with a vibration-reducing material that covers the palm, fingers, and thumb of the hand. It was approved by Accredited Standards Committee S2 Mechanical Vibration and Shock, under its approved operating procedures. Those procedures have been accredited by the American National Standards Institute (ANSI). The Scope of Accredited Standards Committee S2 is as follows:

Standards, specification, methods of measurement and test, and terminology in the field of mechanical vibration and shock, and condition monitoring and diagnostics of machines, including the effects of exposure to mechanical vibration and shock on humans, including those aspects which pertain to biological safety, tolerance and comfort.

This standard is an identical national adoption of ISO 10819:2013 which was prepared by Technical Committee ISO/TC 108/SC 4, *Human exposure to mechanical vibration and shock*. This standard is a revision of ANSI S2.73-2002 (R 2007) / ISO 10819:1996. This revision incorporates stronger criteria for antivibration gloves and the addition of a method for measuring the material thickness. In conformance with ANSI and ISO rules, the words "American National Standard" replace the words "International Standard" where they appear in the ISO document, decimal points were substituted in place of the decimal commas used in ISO documents, and American English spelling is used in place of British English spelling.

The ANSI/ASA equivalent for ISO 2041 referenced in this standard is:

- ANSI/ASA S2.1-2009 / ISO 2041:2009 American National Standard Mechanical vibration, shock and condition monitoring –Vocabulary.

At the time this American National Standard was submitted to Accredited Standards Committee S2, Mechanical Vibration and Shock for approval, the membership was as follows:

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Working Group S2/WG 39, *Human Exposure to Mechanical Vibration and Shock*, which assisted Accredited Standards Committee S2, Mechanical Vibration and Shock, in the development of this standard, had the following membership:

D.D. Reynolds, Chair
R. Dong, Vice-Chair

K. Barazanji	L. DeVries	B.L. Price
C.R. Bass	T. Jetzer	D.G. Roley
M. Callison	E. Johanning	D.C. Sinclair
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Suggestions for improvements of this American National Standard will be welcomed. They should be sent to Accredited Standards Committee S2, Mechanical Vibration and Shock, 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@aip.org.

Introduction

Because of the growing demand to reduce health risks associated with exposure to hand-transmitted vibration, gloves with vibration-reducing materials are often used to attenuate vibration transmitted to the hands. These gloves normally provide little reduction in hand-transmitted vibration at frequencies below 150 Hz. Some gloves can increase the vibration transmitted to the hands at these low frequencies. Gloves with vibration-reducing materials that meet the requirements of this American National Standard to be classified as an antivibration glove can be expected to reduce hand-transmitted vibration at frequencies above 150 Hz. These gloves can reduce but not eliminate health risks associated with hand-transmitted vibration exposure.

Field observations indicate that gloves with vibration-reducing materials can result in positive and negative health effects. Positive health effects can occur with gloves that reduce finger tingling and numbness and that keep the hands warm and dry. Negative health effects can occur with gloves that increase the vibration transmitted to the hands at low frequencies and that increase hand and arm fatigue because they increase the hand grip effort required to control a vibrating machine.

Gloves tested in accordance with the requirements of this American National Standard are evaluated in a controlled laboratory environment. The actual vibration attenuation of a glove in a work environment can differ from that measured in a controlled laboratory environment.

Vibration transmissibility measurements made in accordance with the requirements of this American National Standard are performed only at the palm of the hand. The transmission of vibration to the fingers is not measured. When evaluating the effectiveness of a glove with a vibration-reducing material used to reduce vibration transmitted to the hand, vibration transmission to the fingers should also be assessed. However, research subsequent to the publication of this American National Standard is needed to develop a measurement procedure that can be used to measure the vibration transmissibility of gloves at the fingers.

The measurement procedure specified in this American National Standard only addresses glove properties that can reduce health risks associated with hand-transmitted vibration in work environments. It does not address glove properties necessary to reduce other hand-related health and safety risks in work environments.

The measurement procedure specified in this American National Standard can also be used to measure the vibration transmissibility of a material that is being evaluated for use to cover a handle of a machine or for potential use in a glove.

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WARNING — This American National Standard defines a screening test procedure for measuring the vibration transmission through gloves with an embedded vibration-reducing material. Many factors not addressed in this American National Standard can influence the transmission of vibration through these gloves. Therefore, use the vibration transmissibility values obtained in accordance with this American National Standard with caution in the assessment of the vibration-reducing effects of gloves.

1 Scope

This American National Standard specifies a method for the laboratory measurement, data analysis, and reporting of the vibration transmissibility of a glove with a vibration-reducing material that covers the palm, fingers, and thumb of the hand. This American National Standard specifies vibration transmissibility in terms of vibration transmitted from a handle through a glove to the palm of the hand in one-third-octave frequency bands with center frequencies of 25 Hz to 1,250 Hz.

The measurement procedure specified in this American National Standard can also be used to measure the vibration transmissibility of a material that is being evaluated for use to cover a handle of a machine or for potential use in a glove. However, results from this test cannot be used to certify that a material used to cover a handle meets the requirements of this American National Standard to be classified as an antivibration covering. A material tested in this manner could later be placed in a glove. When this is the case, the glove needs to be tested in accordance with the measurement procedure of this American National Standard and needs to meet the vibration attenuation performance requirements of this American National Standard in order to be classified as an antivibration glove.

NOTE ISO 13753^[1] defines a method for screening materials used for vibration attenuation on the handles of machines and for gloves.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

- a) ISO 2041, *Mechanical vibration, shock and condition monitoring — Vocabulary*
- b) ISO 5349-1, *Mechanical vibration — Measurement and evaluation of human exposure to hand-transmitted vibration — Part 1: General requirements*
- c) ISO 5805, *Mechanical vibration and shock — Human exposure — Vocabulary*