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AMERICAN NATIONAL STANDARD

Vibration Testing Requirements and Acceptance Criteria for Shipboard Equipment

Secretariat:

Acoustical Society of America

Approved on 20 November 2001:

American National Standards Institute, Inc.

Abstract

This standard describes procedures for vibration testing of shipboard equipment, specifying amplitude, frequency, and endurance requirements.

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AMERICAN NATIONAL STANDARD
**VIBRATION TESTING REQUIREMENTS
AND ACCEPTANCE
CRITERIA FOR SHIPBOARD
EQUIPMENT**

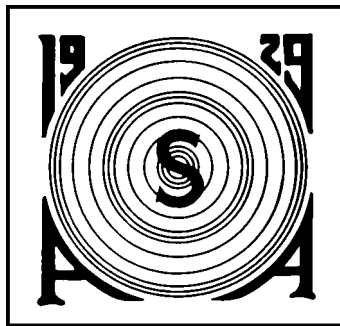
ANSI S2.26-2001

Accredited Standards Committee S2, Mechanical Vibration and Shock

Standards Secretariat
Acoustical Society of America
35 Pinelawn Road, Suite 114E
Melville, NY 11747-3177

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This standard describes procedures for vibration testing of shipboard equipment, specifying amplitude, frequency, and endurance requirements.

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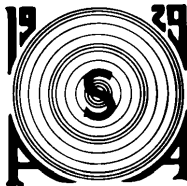
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Standards Secretariat
Acoustical Society of America
35 Pinelawn Road, Suite 114 E
Melville, New York 11747-3177
Telephone: 1 (631) 390-0215
Telefax: 1 (631) 390-0217

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Contents

| | Page |
|--|----------|
| Foreword | iii |
| 0 Introduction | 1 |
| 1 Scope | 1 |
| 2 Informative References | 1 |
| 3 Definitions | 2 |
| 3.1 Amplitude, peak | 2 |
| 3.2 Environmental vibration | 2 |
| 3.3 Equipment | 2 |
| 3.4 Hull mounted equipment | 2 |
| 3.5 Mast-mounted equipment | 2 |
| 3.6 Mounts and equipment mounting | 2 |
| 3.7 Operation critical | 2 |
| 3.8 Reciprocating machinery-mounted equipment | 2 |
| 3.9 Response prominence (RP) | 2 |
| 3.10 Transmissibility | 2 |
| 4 Basis of acceptability | 2 |
| 5 Test requirements and procedure | 3 |
| 5.1 Testing machines | 3 |
| 5.2 Method of attachment | 3 |
| 5.3 Test procedure | 4 |
| 5.4 Operation of equipment during vibration tests | 5 |
| 5.5 Exceptions | 5 |
| 5.6 Pre- and post-vibration testing | 5 |
| 6 Test report | 6 |
| 7 Certification of testing | 6 |
| 8 General notes | 6 |
| 9 Extension of qualification | 6 |
| Tables | |
| 1 Vibration test requirements for shipboard equipment and machinery components | 3 |
| Annexes | |
| A Guidance for testing | 6 |
| B Limits for hull and mast vibration | 7 |
| C Extension of qualification | 7 |

Foreword

[This Foreword is for information only, and is not a part of the American National Standard ANSI S2.26 - 2001 Vibration Testing Requirements and Acceptance Criteria for Shipboard Equipment].

This standard comprises a part of a group of definitions, standards, and specifications for use in mechanical vibration and shock. It has been developed using the American National Standards Institute (ANSI) Accredited Standards Committee Procedure. The Acoustical Society of America provides the Secretariat for Accredited Standards Committee S2, Mechanical Vibration and Shock.

American National Standards Committee S2, Mechanical Vibration and Shock, under whose jurisdiction this standard was developed, has the following scope:

Standards, specifications, methods of measurement and test terminology in the fields of mechanical vibration and shock and condition monitoring and diagnostics of machines, but excluding those aspects which pertain to biological safety, tolerance, and comfort.

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

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

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| | |
|---|--|
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| U.S. Naval Surface Warfare Center | P.C. Shang L.D. Cole (<i>Alt.</i>) |
| Vibration Institute | R.L. Eshleman |

Individual Experts of Accredited Standards Committee S2, Mechanical Vibration and Shock:

P.K. Baade

L.A. Herstein

D.L. Johnson

Working Group S2/WG11 (formerly WG77), Measurement and Evaluation of Ship Vibration, which assisted Accredited Standards Committee S2, Mechanical Vibration and Shock, in the development of this standard, had the following membership:

A.F. Kilcullen, Chair

G.P. Antonides
W. Blake
R.K. Brown
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A. Cautilli
K. Danahy

G.D. Hill
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J. Slager
R. Sonnenschein
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M. Wilson
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Suggestions for improvements of this 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, 35 Pinelawn Road, Suite 114E, Melville, NY 11747- 3177, USA. Telephone 1 (631) 390-0215; FAX 1 (631) 390-0217.

American National Standard

Vibration Testing Requirements and Acceptance Criteria for Shipboard Equipment

0 Introduction

All machinery installed aboard ship will be subjected to a vibratory environment consisting of various frequencies and amplitudes of vibration. During the operational life of the ship, the machinery and equipment must continue to function normally. Shipboard structural arrangements may result in machinery placed in areas which result in magnification of vibratory displacements, and therefore machinery and equipment may be subjected to more severe vibrations than those imposed by the hull.

For equipment and machinery in general, the frequency range of interest is governed by the prime mover (such as a diesel engine) and by propeller and blade excitation. This range does not usually extend beyond 100 Hz.

Vibration measurements for steady-state conditions are usually made in relatively quiet seas and during constant-speed operations. However, actual ship operations occur in all sea states and headings. Any change in a ship's speed, heading, or sea states may have a significant effect on the vibration values.

Based on these considerations, the proposed test severities for vibration testing of shipboard equipment and machinery components cannot be interpreted as simulating normal environmental conditions, but as representing vibration values sufficiently large to obtain a reasonably high degree of confidence that the equipment will not fail or malfunction during service life.

This standard was developed with the specific intent to provide requirements for vibration testing of shipboard equipment. Requirements for vibration qualification methods other than testing (such as prior use or analysis) are covered by design or purchase specifications.

Shipboard equipment for which compliance with this national standard is not specified, or is waived, may experience failures induced by vibration in service.

1 Scope

This national standard defines vibration test requirements for shipboard equipment and machinery components. The tests are intended to locate resonances of the equipment and impose endurance tests at these frequencies, if any. The frequency range of the tests is 4 Hz to 50 Hz (100 Hz for reciprocating machinery-mounted equipment).

This standard is applicable to the following shipboard equipment:

- control and instrumentation,
- navigation and communication,
- mast-mounted equipment,
- machinery components.

For special machinery, equipment and installations such as antennae, large machinery items and certain unusual designs, it may be necessary to deviate from this standard, subject to approval by the parties concerned.

The maximum size and mass of equipment and machinery that can be tested in accordance with this standard cannot be defined because the capacities of available vibration-testing machines vary. Furthermore, a given piece of equipment or machinery, although too large to be accommodated on a vibration-testing machine, may be separated into components that are small enough for testing. Control and instrumentation equipment, although often attached to larger pieces of machinery, are tested in this manner. Separating equipment into component parts for vibration testing must be approved by buyer or acceptance authority.

2 Informative references

- [1] ANSI S2.1-2000 ISO 2041:1990, Nationally Adopted International Standard (NAIS Standard) *Vibration and shock — Vocabulary*.
- [2] ANSI S2.5-1962 (R2001), *American National Standard Recommendations for Specifying the Performance of Vibration Machines*.
- [3] ISO 10055:1996, *Mechanical vibration — Vibration testing requirements for shipboard equipment and machinery components*.