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August 24, 2017

AMERICAN NATIONAL STANDARD

METHOD FOR PREPARATION OF A STANDARD MATERIAL FOR DYNAMIC MECHANICAL MEASUREMENTS

ANSI S2.21-1998

Accredited Standards Committee S2, Mechanical Vibration and Shock

Standards Secretariat
Acoustical Society of America
120 Wall Street, 32nd Floor
New York, New York 10005-3993

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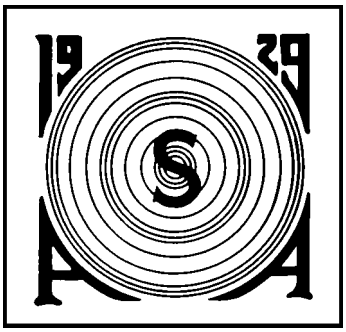

American National Standard

Method for Preparation of a Standard Material for Dynamic Mechanical Measurements

Secretariat
Acoustical Society of America

Approved 22 June 1998
American National Standards Institute, Inc.

Abstract

This Standard defines a method for preparing a standard viscoelastic material for comparison of different instruments and calibration of the same instrument.

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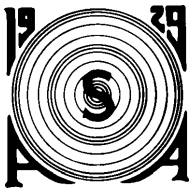

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Foreword

[This Foreword is for information only, and is not a part of ANSI S2.21-1998 *American National Standard Method for Preparation of a Standard Material for Dynamic Mechanical Measurements*.]

This Standard was developed under the jurisdiction of Accredited Standards Committee S2, Mechanical Vibration and Shock, which 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.*

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

D. J. Evans, *Chair*
R. F. Taddeo, *Vice Chair*
A. Brenig, *Secretary*

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	L. D. Cole (*Alt.*)
Vibration Institute	J. McHugh

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

P. K. Baade	L. A. Herstein	D. F. Muster
G. Booth	D. L. Johnson	D. E. Vendittis
K. M. Eldred	A. F. Kilcullen	H. E. von Gierke
S. I. Hayek		

Working Group S2/WG79, Characterization of the Dynamic Properties of Viscoelastic Polymers, which assisted Accredited Standards Committee S2, Mechanical Vibration and Shock, in the development of this Standard, had the following membership:

W. M. Madigosky, *Chair*
B. Hartmann, *Vice-Chair*

B. R. Allen
R. Blaine
D. A. Brown
R. N. Capps
R. J. Deigan
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Suggestions for improvements of this Standard will be welcomed. Send suggestions for improvement to Accredited Standards Committee S2, Mechanical Vibration and Shock, in care of the ASA Standards Secretariat, 120 Wall Street, 32nd Floor, New York, New York 10005-3993, USA. E-mail: asastds@aip.org; Telephone: +1 212 248 0373; Fax +1 212 248 0146.

American National Standard

Method for Preparation of a Standard Material for Dynamic Mechanical Measurements

0 Introduction

0.1 This Standard concerns the preparation of a standard material for use in the calibration of instruments for measuring the dynamic mechanical properties of viscoelastic materials.

0.2 The standard material is chemically classified as a polyurethane.

0.3 The component materials required for the preparation of the standard material are specified in clause 4.

0.4 The laboratory equipment required for the preparation of the standard material is specified in clause 5.

0.5 In the context of this Standard, the phrase ''dynamic mechanical properties'' means the logarithmic frequency dependence of modulus and loss factor at a given reference temperature.

1 Scope, purpose, and applications

1.1 Scope

This Standard applies to the preparation of a standard material for calibration of instruments for measuring the dynamic mechanical properties of viscoelastic materials.

1.2 Purpose

The purpose of this Standard is to assist users of dynamic mechanical test equipment in preparing the standard material from its basic components.

1.3 Applications

The standard material is used for the calibration of new instruments in comparison with other instruments and in checking the operation of the same instrument at different times.

2 Informative references

[1] *ASTM Method D2572-91. Standard Test Method for Isocyanate Groups in Urethane Materials or Prepolymers.*

[2] W. M. Madigosky and G. F. Lee, ''Improved resonance technique for material characterization,'' *J. Acoust. Soc. Am.* ***73***, 1374-1377 (1983).

[3] J. D. Ferry, *Viscoelastic Properties of Polymers,* 3rd ed., Wiley, New York, 1980, pp 264-320.

3 Definitions

For the purposes of this Standard, the following definitions apply:

3.1 polyurethane. A polymer containing the group -NHCOO-.

3.2 glycol. A compound terminated with -OH groups.

3.3 diisocyanate. A compound terminated with -NCO groups.

3.4 pre-polymer. Low molecular weight material formed by the reaction of a glycol with a large excess of diisocyanate.

3.5 chain extender. Compound terminated with -OH groups added to a pre-polymer to complete the reaction of the isocyanate groups and form the final polymer.

4 Components

The material shall be a three component system: a glycol, a diisocyanate, and a chain extender blend of two chemicals.

4.1 Glycol

The glycol shall be polytetramethylene ether glycol of nominal molcular weight 2000. Abbreviation: PTMG2000. The chemical formula for this component is

$$HO\text{-}[(CH_2)_4O]_n\text{-}H$$

where the value of n determines the molecular weight. CAS Registry numbers 25190-0601 and 24979-97-3.