

ANSI Z80.9-2004

AMERICAN NATIONAL STANDARD



*for Ophthalmics –  
Devices for Low Vision*

Currently in preview, click buy full version

Currently in preview, click buy full version

**ANSI®**  
**Z80.9-2004**  
Revision of  
ANSI Z80.9-1998

American National Standard  
for Ophthalmics –  
Devices for Low Vision

Secretariat  
**Optical Laboratories Association**

Approved January 10, 2005  
**American National Standards Institute, Inc.**

# American National Standard

Approval of an American National Standard requires review by ANSI that the requirements for due process, consensus, and other criteria for approval have been met by the standards developer.

Consensus is established when, in the judgement of the ANSI Board of Standards Review, substantial agreement has been reached by directly and materially affected interests. Substantial agreement means much more than a simple majority, but not necessarily unanimity. Consensus requires that all views and objections be considered, and that a concerted effort be made towards their resolution.

The use of American National Standards is completely voluntary; their existence does not in any respect preclude anyone, whether he has approved the standards or not, from manufacturing, marketing, purchasing, or using products, processes, or procedures not conforming to the standards.

The American National Standards Institute does not develop standards and will in no circumstances give an interpretation of any American National Standard. Moreover, no person shall have the right or authority to issue an interpretation of an American National Standard in the name of the American National Standards Institute. Requests for interpretations should be addressed to the secretariat or sponsor whose name appears on the title page of this standard.

**CAUTION NOTICE:** This American National Standard may be revised or withdrawn at any time. The procedures of the American National Standards Institute require that action be taken periodically to reaffirm, revise, or withdraw this standard. Purchasers of American National Standards may receive current information on all standards by calling or writing the American National Standards Institute.

## *Developed by*

The Accredited Committee Z80 for Ophthalmic Standards -  
Optical Laboratories Association  
Z80 Secretariat  
P. O. Box 2000  
Merrifield, VA 22116-2000

## *Published by*

Optical Laboratories Association  
P. O. Box 2000  
Merrifield, VA 22116-2000

Copyright © 2005 by Optical Laboratories Association  
All rights reserved.

No part of this publication may be reproduced in any form, in an electronic retrieval system or otherwise, without prior written permission of the publisher.

Printed in the United States of America

## Contents

	Page
Foreword .....	iii
<b>1</b> Scope.....	1
<b>2</b> Normative references.....	1
<b>3</b> Terms and definitions.....	2
<b>4</b> Classification.....	5
<b>5</b> Requirements.....	7
5.1 Optical devices.....	7
5.1.1 Spatial resolution .....	5
5.1.2 Equivalent power - magnifiers.....	5
5.1.3 Angular Magnification - telescopes.....	5
5.1.4 Field of view.....	6
5.1.5 Lateral variation of magnification .....	6
5.1.6 Transmittance .....	6
5.1.7 Materials and construction.....	6
5.2 Electro-optical devices.....	7
5.2.1 Image characteristics.....	7
5.2.2 Materials and construction.....	8
5.2.3 Electrical .....	8
<b>6</b> Environmental conditions of use.....	9
<b>7</b> Test methods.....	9
7.1 Equivalent power - Magnifiers.....	9
7.2 Angular magnification - Telescopes.....	9
7.3 Display magnification test - electro-optical devices .....	9
7.4 Spatial resolution test.....	10
7.4.1 Optical devices.....	10
7.4.2 Electro-optical devices.....	13
7.5 Test for the determination of lateral variation of magnification .....	13
7.6 Field of view.....	13
<b>8</b> Marking, packaging and instructions for use.....	14
<b>Tables</b>	
<b>1</b> Magnifiers/Near telescopes .....	6
<b>2</b> Distance telescopes.....	6
<b>3</b> Environmental conditions of use.....	9

	Page
<b>Figures</b>	
1 Example for an optotype with Ronchi rulings.....	10
2 Example for a test set-up for near-vision devices .....	11
3 Example for a test set-up for telescopic systems .....	12
<b>Annex</b>	
A Mechanical design .....	15

**Foreword** (This foreword is not part of American National Standard ANSI Z80.9-2004.)

The Z80 Standards Committee for Ophthalmic Lenses was organized in 1956. The Committee's initial standard was issued in 1964. At the beginning of 1970, the Z80 Standards Committee was reorganized, with the Optical Society of America serving as secretariat. In 1972, the Committee was authorized to broaden its scope from "prescription glass ophthalmic lenses" to "prescription ophthalmic lenses." In 1975, the scope of the committee was further broadened to "ophthalmic standards." On May 21, 1985, the Z80 Committee became the Accredited Standards Committee on Ophthalmic Standards with the Optical Laboratories Association serving as secretariat. Current ophthalmic standards are drafted by subcommittees of the Z80 Committee. These subcommittees, in turn, establish working groups and consultant appointments,

In 1998, the Z80 Committee approved adoption of ISO 15253, Optical Devices for Low Vision, as ANSI Z80.9-1998. In 2004, upon review of ANSI Z80.9-1998, the Z80 Committee further approved inclusion of ISO 15254, Electro-Optical Devices for Low Vision, into the revision of ANSI Z80.9, thus creating a single standard that includes all classes of devices for Low Vision.

Suggestions for improvement of this standard will be welcome. They should be sent to the Optical Laboratories Association, P.O. Box 2000, Manassas, VA 22116-2000.

This standard was processed and approved for submission to ANSI by the Accredited Standards Committee on Ophthalmics, Z80. Committee approval of this standard does not necessarily imply that all committee members voted for its approval. At the time it approved this standard, the Z80 Committee had the following members:

Thomas C. White, M.D., Chair  
Quido Cappelli, Vice-Chair  
Robert Rosenberg, O.D., Secretary  
Dan Torgersen, Secretariat

<i>Organization Represented</i>	<i>Name of Representative</i>
AR Council.....	Nick Mileti Lee K. Anderson (Alt.) John W. Quinn (Alt.)
Advance Medical Technologies Association .....	Douglas J. Fortunato Carolyn Jones (Alt.) Glenn Davies (Alt.) Stanley J. Rogaski (Alt.)
American Academy of Optometry.....	David S. Loshin
American Academy of Ophthalmology .....	Thomas C. White Gerhard Cibis (Alt.) Keith Baratz (Alt.) Paul F. Vinger (Alt.)
American Optometric Association .....	Donald Pitts William J. Benjamin (Alt.) Robert Rosenberg (Alt.) Jeffrey Weaver (Alt.)
American Society of Cataract and Refractive Surgery .....	Stephen Klyce, Ph.D. Jack T. Holladay (Alt.) Stephen H. Johnson (Alt.)
Contact Lens Institute .....	Ed Schilling
Contact Lens Manufacturers Association .....	Quido Cappelli
Food & Drug Administration .....	David Whipple Donald Calogero (Alt.) Robert Landry (Alt.) Ashley Boam (Alt.)

<i>Organization Represented</i>	<i>Name of Representative</i>
National Association of Optometrists & Opticians .....	Arthur Newman
National Academy of Opticianry .....	Diane L. Finisecy
Optical Laboratories Association .....	Daniel Torgersen
	Henry A. Hart (Alt.)
Optical Society of America .....	Richard A. Phillips
Opticians Association of America .....	J. Frank Adkins
Prevent Blindness.....	Carl Helton
	Jeff Todd (Alt.)
Sunglass Association of America .....	Kenneth L. Frederick
	Rick Van Arnam (Alt.)
US Leader to ISO TC 172/SC7 .....	Charles E. Campbell
Veterans Administration .....	John Townsend
	Sharon R. Atkin (Alt.)
Vision Council of America.....	Kenneth O. Wood
	Greg Chavez (Alt.)
	Steve Drake (Alt.)
	Neil Roche (Alt.)
	Dick Whitney (Alt.)

The individuals who worked on the revision of ANSI Z80.9 were:

- Robert Rosenberg, O.D.  
(AOA)
- Donald Pitts, O.D., Ph.D.  
(Commission on Ophthalmic Standards -  
American Optometric Association)
- Kathleen F. Freeman, O.D.  
(Chair, Low Vision Section, American Optometric Association)
- Ian Bailey, O.D.  
(University of California - Berkeley)
- Members of the Low Vision Section, American Optometric Association
- Members of the Low Vision Section, American Academy of Optometry

# American National Standard for Ophthalmics –

## Devices for Low Vision

### 1 Scope

This Standard applies to optical and electro-optical devices specified by the manufacturer for use by visually impaired persons as low-vision devices. It specifies optical and mechanical requirements and test methods. It includes devices with optical and/or electrical and/or electronic components used for image capture or display.

### 2 Normative References

The following standards contain provisions which, through reference in this text, constitute provisions of this American National Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this American National Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

ANSI Z80.1-1999, *Ophthalmics – Prescription ophthalmic lenses – Recommendation*

ANSI Z80.3-2001, *Ophthalmics – Nonprescription sunlenses and fashion eyewear – Requirements*

ANSI Z80.5-2004, *Requirements for ophthalmic frames*

ISO/DIS 15004, *Ophthalmic instruments – Fundamental requirements and test methods*

IEC 598-1, *Safety of Luminaires - Part 1: General requirements and tests*

IEC-CCISPR 15, *Limits and methods of measurement of radio interference characteristics of power supply with high frequency*

IEC 801-2

IEC 801-3

MPRII: MPR 1990:8/MPR 1990:10, *Requirements for low frequency discharge*

UL 60606-1, *Requirements for electrostatic discharge*

ISO 15370, *Ophthalmic optics – Spectacle frames – General requirements and test methods*