

American National Standard

*for Ophthalmics –
Devices for Low Vision*



Currently in preview, click buy full version

ANSI®
Z80.9-2010 (R2015)
Reaffirmation of
ANSI Z80.9-2010

American National Standard
for Ophthalmics –
Devices for Low Vision

Secretariat
The Vision Council

Approved May 13, 2010
Reaffirmed May 5, 2015

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CAUTION NOTICE: This American National Standard may be revised or withdrawn at any time.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 -

The Vision Council
Z80 Secretariat
225 Reinekers Lane
Alexandria, VA 22314

Published by
The Vision Council
Z80 Secretariat
225 Reinekers Lane
Alexandria, VA 22314

Copyright © 2010 by The Vision Council
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
1 Scope.....	1
2 Normative references	1
3 Terms and definitions	1
4 Classification.....	4
5 Requirements.....	5
5.1 Optical devices.....	5
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	5
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.....	7
5.2.3 Electrical.....	8
6 Environmental conditions of use	8
7 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	9
7.4.1 Optical devices.....	9
7.4.2 Electro-optical devices.....	12
7.5 Procedure for the determination of lateral variation of magnification	13
7.6 Field of view	13
8 Marking, packaging and instructions for use	13
8.1 Marking	13
8.2 Documentation.....	13
Tables	
1 Magnifiers/Near telescopes	6
2 Distance telescopes.....	6
3 Environmental conditions of use.....	8

Figures

1	Example for an optotype with Ronchi rulings	10
2	Example for a test set-up for near-vision devices	10
3	Example for a test set-up for telescopic systems	11
Annex A	Mechanical design	12

Currently in preview, click buy full version

Foreword (This foreword is not part of American National Standard ANSI Z80.9-2010 (R2015).)

This American National Standard specifies optical and mechanical requirements and test methods as applied to optical and electro-optical devices used by persons with low vision. With the wide variety of interpretations applied to commonplace terms, such as magnification, it is important to define terms and outline appropriate use of terms to reduce confusion.

ANSI Z80.9-2010 (R2015) was adapted by a group of experts within the ANSI ASC Z80 Instruments and Low Vision Devices Subcommittee under the chair of William L. Brown, O.D., Ph.D. It is a performance standard.

This document is virtually identical to ANSI Z80.9-2010. The only changes are minor and editorial. This standard originated in 1998, when the ANSI ASC 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 approved the 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 are welcome. They should be sent to the Vision Council, 225 Reinekers Lane, Suite 700, Alexandria, VA 22314.

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

Thomas C. White, M.D., Chair
Quido Cappelli, Vice-Chair
William Benjamin, Secretary
Jeffrey Endres, Secretariat

<i>Organization Represented</i>	<i>Name of Representative</i>
Abbott Medical Optics.....	Leonard Borman
Advance Medical Technologies Association	Michael Pflieger
American Academy of Ophthalmology	Thomas White
American Academy of Optometry.....	David Loshin
American Ceramic Society	Lyle Rubin
American Glaucoma Society	Steven Gedde
American Optometric Association	Karl Citek
American Society of Cataract and Refractive Ophthalmology....	Stephen Klyce
Contact Lens Institute.....	Stan Rogaski
Contact Lens Manufacturers Association	Quido Capelli
Department of Veterans Affairs	John Townsend
Federated Cornea Societies/ASCRS	Michael Belin
Food and Drug Administration CDRH/ Division of Federal Agencies	Don Calogero
National Association of Optometrists & Opticians	Nick Mileti
Optical Laboratory Association.....	Michael Vitale
Opticians Association of America	Tom Hicks
Sunglass Association of America	Frederick Grethel
The Vision Council.....	Jeffrey Endres
US ISO TC 172/SC7.....	Jeffrey Endres

The Subcommittee on Ophthalmic Instruments, which modified this American National Standard, had the following members:

William L. Brown, O.D., Ph.D., Chair

Charles Campbell
Bruce Drum
David Loshin
Sharon Miller
Robert Rosenberg
John Townsend
Thomas White

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 normative documents contain provisions which, through reference in this text, constitute provisions of this Standard. For dated references, subsequent amendments, or revisions of, any of these publications do not apply. However, parties to agreements based on this Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ANSI, ISO and IEC maintain registers of currently valid Standards.

ANSI Z80.1-2010, *Ophthalmics – Prescription Spectacle Lenses*

ANSI Z80.3-2009, *Ophthalmics – Nonprescription Sunglasses and Fashion Eyewear Requirements*

ANSI Z80.5-2010, *Ophthalmics – 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/CISPR 15, *Limits and methods of measurement of radio interference characteristics of power supply with high frequency*

IEC 61000-4-2, *Electromagnetic compatibility (EMC) – Part 4-2: Testing and measuring techniques – Electrostatic discharge immunity test*

IEC 61000-4-3, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test*

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

UL 60906-1, *Requirements for electrostatic discharge*

ISO 12870, *Ophthalmic optics – Spectacle frames – General requirements and test methods*

3 Terms and Definitions

3.1 Low-vision microscope: Alternative term for magnifier (see 3.15.1)