SLOVENSKI STANDARD
oSIST prEN ISO 7921:2023

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Očesna optika in instrumenti - Tablice za preverjanje bližinskega vida (ISO/DIS 7921:2023)

Ophthalmic optics and instruments - Near reading charts (ISO/DIS 7921:2023)

Augenoptik und ophthalmische Instrumente - Nahsehschärfetafeln (ISO/DIS 7921:2023)

Optique et instruments ophtalmiques - Tableaux d'optotypes utilisés en vision de près (ISO/DIS 7921:2023)

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Ophthalmic optics and instruments — Near vision charts

ICS: 11.040.70

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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This document was prepared by Technical Committee ISO/TC *172*, *Optics and photonics*, Subcommittee SC 7, *Ophthalmic optics and instruments*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

This document provides the terms, definitions, and requirements for standardized charts for the assessment of near reading acuity. Reading is a complex visual task that involves more than the mere identification or recognition of individual letters, symbols, or other optotypes. The charts used to assess near reading acuity are intended for the practical purpose of demonstrating whether or not a patient can read sentences or paragraphs of text of a particular size. This document is not meant to replace or supplant standards for visual acuity charts for research or for basic clinical assessments, such as visual acuity measurements before and after cataract surgery.

A patient's reading ability can be labelled using terms such as "difficult" or "easy", or "with errors" or "fluent or error-free". Proper assessment of reading ability requires the use of text that is appropriate for the patient, for example, based on the patient's age or educational level. However, the actual determination of a patient's near reading acuity based on these and possibly other factors involves clinical evaluation that is beyond the scope of this document.

This document bases the nominal near acuity grade on values given as the logarithm of reading acuity determination (logRAD). LogRAD is similar to the logarithm of minimum angle of resolution (logMAR), used in standard visual acuity testing, in that both are based on the angular size of the test target at a particular viewing distance. However, logRAD specifically depends on the height of lowercase letters, which occur more frequently than uppercase letters, numbers, and symbols in typical text. On the other hand, logMAR is determined by the width of an individual line or the size of a gap. For ease of clinical application, equivalent near acuity grades are provided for several common recording notations, including decimal reading acuity, M size, N size, and reduced Snellen fractions.

This document allows for the use of either of two common typefaces that have been demonstrated to produce equivalent reading results and already are in use in reading charts that are currently available. Times New Roman, a typeface with serifs, is widely used for printed text. Helvetica, a sans serif typeface, is commonly used for both printed charts and electronic displays, such as computer monitors, laptops, and smartphones. Other typefaces can be used by chart manufacturers when they have demonstrated in a scientific investigation that the results are equivalent to either of the two accepted typefaces. In addition, this document applies to the Latin alphabet. It can also apply to similar alphabets, such as Greek and Cyrillic, that can be expressed with either of the two accepted typefaces. For other writing systems, such as Chinese, Japanese, and Korean, this document can be used as a reference, especially for researchers who wish to demonstrate equivalence of near reading charts using those writing systems with charts using the Latin alphabet.

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Ophthalmic optics and instruments — Near vision charts

1   Scope

This document applies to printed, projected, and electronic displays of high-contrast text that are designed for assessment and measurement of near reading acuity under photopic conditions

The definitions and requirements of this document apply to the Latin alphabet.

2   Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 3:1973, *Preferred numbers — Series of preferred numbers*

ISO 15004-1, *Ophthalmic instruments — Fundamental requirements and test methods — Part 1: General requirements applicable to all ophthalmic instruments*

IEC 60601-1, *Medical electrical equipment — Part 1: General requirements for basic safety and essential performance*

3   Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
near reading acuity grade
number assigned to a *font* (3.2.1) or text size at a specified reading distance

Note 1 to entry: Five different scaling systems are used to describe near reading acuity grade: *logRAD* (3.1.2), decimal reading acuity, *M size* (3.1.3), *N size* (3.1.4), and reduced Snellen fraction. See Table 1

3.1.1
reading acuity angle
one-fifth of *x-height* (3.3) for reading text at the standardized distance of 40 cm (400 mm)

Note 1 to entry: Reading acuity angle is measured in minutes of arc.

EXAMPLE   Given an *x*-height of 0,582 mm, the reading acuity angle is calculated by

$$60 \cdot tan^{-1}\left(\frac{0,582/5}{400}\right) = 1,00 \, arc \, min$$

3.1.2
logarithm of reading acuity determination
logRAD
logarithm (base 10) of *reading acuity angle* (3.1.1)

1

3.1.3
M size
M notation
the distance, in metres, at which *x-height* ([3.3](#)) subtends 5 minutes of arc

Note 1 to entry: M size is commonly written as the value followed by the capital letter, "M", such as 2M and 0,4M.

3.1.4
N size
the body height of a *font* ([3.2.1](#)) expressed in typographical points, based on the height of a flat capital letter, such as "E" or "H", and space for diacritical marks above and below the letters

Note 1 to entry: See [Figure 1](#).

Note 2 to entry: 1 point is approximately 1/72 inch or 0,353 mm.

Note 3 to entry: N size is commonly written as the capital letter, "N", followed by the point size, such as N12.

3.2
typeface
a complete set of characters forming a family in a particular design

3.2.1
font
a complete set of characters for one *typeface* ([3.2](#)) at one particular style and type size

EXAMPLE   Times New Roman, bold, 9 point

3.2.2
serif
a small line, projection, or stroke attached to the end of a larger stroke in a character of a particular *typeface* ([3.2](#))

3.2.3
sans serif
a *typeface* ([3.2](#)) whose characters do not include *serifs* ([3.2.2](#))

3.3
x-height
the height of a flat lowercase letter excluding *ascenders* ([3.4](#)) and *descenders* ([3.5](#)), such as x or z.

Note 1 to entry: See [Figure 1](#).

Note 2 to entry: *x*-height is measured in millimetres.

Note 3 to entry: Desired *x*-height at 40 cm is calculated from the given *logRAD* ([3.1.2](#)) value using [formula (1)](#)

$$x - height = 0,582 \cdot 10^{logRAD}$$

(1)