INTERNATIONAL STANDARD

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Optics and photonics — Vocabulary for telescopic systems —

Part 2: Terms for binoculars, monoculars and spotting scopes

Optique et photonique — Vocabulaire relatif aux systèmes télescopiques —
Partie 2: Termes pour jumelles, monoculaires et lunettes

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Contents

Page

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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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT), see the following URL: Foreword — Supplementary information.

The committee responsible for this document is ISO/TC 172, *Optics and photonics*, Subcommittee SC 4, *Telescopic systems*.

This second edition cancels and replaces the first edition (ISO 14132-2:2002), which has been technically revised with the following changes:

a) the term "telescopic system" has been introduced replacing the term "telescope" where appropriate;

b) clearer distinction between "*b* — distance between centres of eyepieces", "*b'* — interpupillary distance" and "*B* — distance between centres of objectives", see 3.1.11 and 3.1.14;

c) the previous term "wide-angle binocular" is now defined in ISO 14132-1 as "wide angle telescopic system";

d) a new term was added: "false pupils" (3.5).

ISO 14132 consists of the following parts, under the general title *Optics and photonics — Vocabulary for telescopic systems*:

— *Part 1: General terms and alphabetical indexes of terms in ISO 14132*

— *Part 2: Terms for binoculars, monoculars and spotting scopes*

— *Part 3: Terms for telescopic sights*

— *Part 4: Terms for astronomical telescopes*

— *Part 5: Terms for night vision devices*

Optics and photonics — Vocabulary for telescopic systems —

Part 2: Terms for binoculars, monoculars and spotting scopes

1 Scope

This part of ISO 14132 gives terms, definitions and letter symbols used in relation with binoculars, monoculars, and spotting scopes.

The alphabetical index of terms that are common for all published parts of ISO 14132 are published in ISO 14132-1.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

3.1
binoculars
telescopic observational instrument that contains two telescopic systems and is designed as two interlinked monocular telescopic systems having parallel optical axes

3.1.1
prism binoculars
binoculars with prism erecting systems

3.1.2
lens binoculars
binoculars with lens erecting systems

Note 1 to entry: Galilean binoculars are types of all-lens binoculars (no prisms).

3.1.3
variable power binoculars
binoculars that provide a means of changing magnification

Note 1 to entry: Variable power binoculars may be either zoom binoculars or binoculars with discrete change of magnification.

3.1.4
zoom binoculars
binoculars that provide a mechanism for a continuous change of magnification

3.1.5
binoculars with centre focusing
binoculars in which focusing is accomplished by the simultaneous movement of optical components within both telescopic systems

3.1.6
binoculars with individual focusing
binoculars in which focusing is accomplished by moving optical elements in each telescopic system separately

3.1.7
binoculars with internal focusing
binoculars in which focusing is accomplished by moving optical elements inside the telescope while the external optical elements are stationary

3.1.8
waterproof binoculars
binoculars that can withstand submersion in water without loss of function

3.1.9
water resistant binoculars
binoculars that can withstand exposure to splashes, for example rain, without loss of function

3.1.10
hinge of binoculars
mechanism for the adjustment of interpupillary distance

3.1.11
interpupillary distance
b'
distance between the centres of exit pupils in binoculars

Note 1 to entry: The design of binoculars usually provides a means for changing the interpupillary distance. There also exist models with a fixed interpupillary distance.

3.1.12
interpupillary scale
scale on binoculars that serves to set the value of the interpupillary distance

3.1.13
disparity of image rotations
angular difference between the orientations of the images produced by the two telescopic systems of binoculars

3.1.14
specific plasticity
P_l
ratio of the distance between the centres of objectives to that of eyepieces

Note 1 to entry: Specific plasticity is determined in accordance with the formula:

$$P_l = \frac{B}{b}$$

where B is the visual base that represents the distance between the centres of objectives of the instrument; b is the distance between centres of eyepieces.

Note 2 to entry: Sometimes it is better to consider interpupillary distance b', rather than the distance between centres of eyepieces b.

3.1.15
plasticity
P
numeric value that characterizes the enhancement of stereoscopic perception of space when using the binocular instrument over that of the unaided eye

Note 1 to entry: The plasticity is assessed in accordance with the formula:

$$P = \Gamma \cdot P_1$$

where Γ is the magnification of the instrument; P_1 is the specific plasticity.

3.1.16
range of stereoscopic vision
R_0
limiting distance at which an observer ceases to perceive objects stereoscopically

Note 1 to entry: The range of stereoscopic vision, R_0, is defined in accordance with the formula:

$$R_0 = \frac{B}{\eta_e} \cdot \Gamma$$

where B is the visual base that represents the distance between the centres of objectives of the instrument; η_e is the standard threshold of stereoscopic vision of the unaided eye, in radians, (η_e = 10″ approximately 5×10^{-5} rad).

3.1.17
threshold depth of stereoscopic vision
ΔR
shortest axial distance in depth between objects which can be perceived with stereoscopic vision

Note 1 to entry: The threshold depth of stereoscopic vision is defined by the formula:

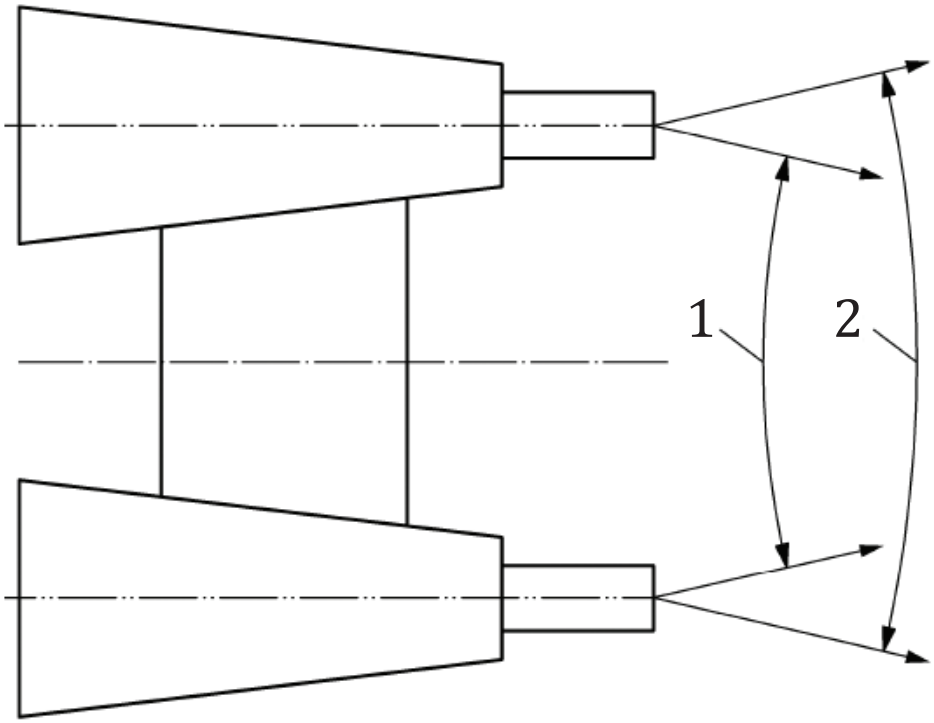
$$\Delta R = \frac{R^2}{B} \cdot \frac{\eta_e}{\Gamma}$$

where R is the distance to the object that defines the depth of stereoscopic vision.

3.1.18
binocular alignment
parallelism between the optical axes of two telescopic systems of binoculars

3.1.19
convergence of axes
lack of parallelism of axes of bundles emergent from the eyepieces of a binocular instrument, measured in a plane through the centres of the exit pupils and the axial image point at infinity, under the condition that the vertex of the angle formed by the axes of bundles lies behind the exit pupils

Note 1 to entry: See Figure 1.



Key

1 convergence

2 divergence

NOTE In many texts and specifications, the terms "convergence" and "divergence" have a sense opposite to that used here and refer to the direction of sight and not the emergent beam.

Figure 1 — Illustration of convergence and divergence of axes

3.1.20
divergence of axes
lack of parallelism of axes of bundles emergent from the eyepieces of a binocular instrument, measured in a plane through the centres of the exit pupils and the axial image point at infinity, under the condition that the vertex of the angle formed by the axes of bundles lies in front of the objectives

Note 1 to entry: See Figure 1.

3.1.21
dipvergence of axes
lack of parallelism of axes of bundles emergent from the eyepieces of a binocular instrument, measured in a plane through the axial image point at infinity and perpendicular to the line passing through the centres of the exit pupils

3.1.22
relative difference in magnification
difference of the magnifications between telescopic systems of binoculars related to the lower of the two magnifications

3.2
monocular
hand-held single telescopic system with a magnification generally less or equal to 15×

3.3
spotting scope
tripod- or clamp-mounted single telescopic system with a magnification generally greater than 15×

3.3.1
variable power spotting scope
spotting scope that provides a means of changing magnification

Note 1 to entry: Variable power spotting scopes may be either zoom spotting scopes or spotting scopes with discrete changes of magnification.

3.3.2
binocular spotting scope
spotting scope that enables the observation of remote objects with two eyes

3.4
periscopic telescope
telescopic system designed for observations of remote objects over a shelter or opaque objects

3.5
false pupils
pupils located in the vicinity of the exit pupil which arise from light which travels along unplanned paths in a prism system