BS ISO 14135-1:2014

BSI Standards Publication

Optics and photonics — Specifications for telescopic sights

Part 1: General-purpose instruments

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National foreword

This British Standard is the UK implementation of ISO 14135-1:2014. It supersedes BS ISO 14135-1:2003 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee CPW/172, Optics and Photonics.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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INTERNATIONAL STANDARD

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Second edition
2014-10-01

Optics and photonics — Specifications for telescopic sights —

Part 1: General-purpose instruments

Optique et photonique — Spécifications pour lunettes de pointage —

Partie 1: Instruments pour usage général

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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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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 14135-1:2003) which has been technically revised.

ISO 14135 consists of the following parts, under the general title *Optics and photonics — Specifications for telescopic sights*:

— *Part 1: General-purpose instruments*

— *Part 2: High-performance instruments*

INTERNATIONAL STANDARD **ISO 14135-1:2014(E)**

Optics and photonics — Specifications for telescopic sights —

Part 1: General-purpose instruments

1 Scope

This part of ISO 14135 applies to general-purpose telescopic sights, used on hand-held firearms and airguns. It contains a classification to the usage of telescopic sights and specifies interfaces, minimum requirements, and tolerances to their performances.

High-performance telescopic sights are specified in ISO 14135-2.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 10109-4, *Optics and optical instruments — Environmental requirements — Part 4: Test requirements for telescopic systems*

ISO 14132-1, *Optics and photonics — Vocabulary for telescopic systems — Part 1: General terms and alphabetical indexes of terms in ISO 14132*

ISO 14132-3, *Optics and photonics — Vocabulary for telescopic systems — Part 3: Terms for telescopic sights*

ISO 14490-1, *Optics and optical instruments — Test methods for telescopic systems — Part 1: Test methods for basic characteristics*

ISO 14490-3, *Optics and optical instruments — Test methods for telescopic systems — Part 3: Test methods for telescopic sights*

ISO 14490-5, *Optics and optical instruments — Test methods for telescopic systems — Part 5: Test methods for transmittance*

ISO 14490-7, *Optics and optical instruments — Test methods for telescopic systems — Part 7: Test methods for limit of resolution*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 14132-1 and ISO 14132-3 apply.

4 Classification

Due to different requirements, telescopic sights shall be classified according to their end use, thus:

— telescopic sights for airguns;

— telescopic sights for pistols (e.g. handgun scopes);

— telescopic sights for rifles (e.g. hunting telescopic sights).

5 Interfaces

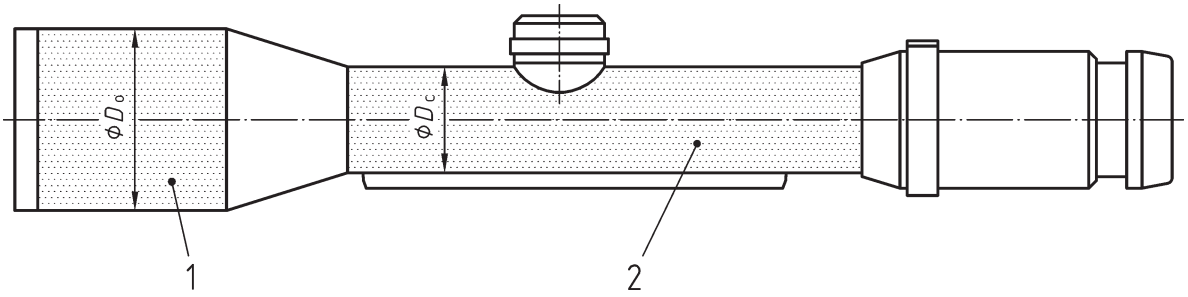
Telescopic sights shall have interfaces to mounting systems for interconnection with firearms.

The interface areas shall be the central tube and, if of different size, the objective tube.

The interface areas shall be cylindrical in shape. Alternatively, the central tube may have a dovetail at the bottom side.

Recommended interface dimensions are given in Annex A.

For interface areas, see Figure 1.



Key

D_o diameter of objective tube

D_c diameter of central tube

1 objective tube

2 central tube

Figure 1 — Interface areas (schematic)

6 Fundamental requirements

Fundamental requirements are defined by minimum values or tolerances for the important characteristics of telescopic sights.

Tolerances specify maximum deviations between measured and nominal values. Nominal values shall be laid down by the manufacturing or trading company.

Telescopic sights shall comply with the environmental requirements relative to the respective instrument type, as appropriate. These environmental requirements are specified in ISO 10109-4.

Compliance of the telescopic sight with the requirements given in Table 1 and Table 2 shall be tested according to the test methods specified in ISO 14490-1, ISO 14490-3, ISO 14490-5, and ISO 14490-7.

Table 1 — Minimum values for characteristics of general-purpose telescopic sights

Characteristics	Type of telescopic sight	Minimum value/requirement
Eye relief, in millimetres	For airguns	50
	For pistols	250
	For rifles	70

[a] D is the entrance pupil diameter, in millimetres, in accordance with ISO 14132-1.

[b] Γ is the magnification in accordance with ISO 14132-1.

[c] Independent for both elevation and windage adjustment.

Table 1 *(continued)*

Characteristics	Type of telescopic sight	Minimum value/requirement
Resolution, in arc seconds (exit pupil ≤4,5 mm)	All	centre ≤400/D[a]
Resolution, in arc seconds (exit pupil >4,5 mm)	For airguns	≤2 × 60/Γ[b]
	For pistols	≤1,5 × 60/Γ
	For rifles	≤1,5 × 60/Γ
Dioptre adjustment range (total), in dioptres	For pistols or rifles	3
Total reticle adjustment range[c], in arc minutes	For rifles or pistols	30
Transmission	All	Each glass-to-air surface shall be antireflection-coated.

[a] D is the entrance pupil diameter, in millimetres, in accordance with ISO 14132-1.

[b] Γ is the magnification in accordance with ISO 14132-1.

[c] Independent for both elevation and windage adjustment.

Table 2 — Tolerances for characteristics of general-purpose telescopic sights

Characteristics	Type of telescopic sight	Maximum deviation		
Magnification	All	$\Gamma \leq 3$	$\Gamma > 3$	Zoom
		±10 %	±5 %	±10 %
Field of view	All	±5 %		
Entrance pupil diameter[a]	For airguns	±5 %		
	For rifles or pistols	±3 %		
Zero setting of dioptre scale[b], in dioptres	All	$\Gamma \leq 2$	$\Gamma > 2$	
		not required	±0,5	
Parallax of reticle[c], in arc minutes		$\Gamma < 6$	$\Gamma \geq 6$	
	For airguns	6/Γ	—	
	For pistols	4,5/Γ	—	
	For rifles	3/Γ	0,5	
Centre of reticle[d], in relation to total field of view	For airguns	±1,5 %		
	For rifles or pistols	±1,5 %		
Reticle tilt, in degrees	All	±2		
Reticle tracking, in degrees	For rifles or pistols	±2		
Line of sight shift due to zooming[c], in arc minutes	Reticle in 1st image plane	—		
	Reticle in 2nd image plane[e]	$\Gamma \leq 2$	$2 < \Gamma \leq 6$	$\Gamma > 6$
		3	6/Γ	1

[a] At maximum magnification on zoom-telescopic sights.

[b] This tolerance includes focus shift due to zooming.

[c] Angular deviation in object space.

[d] In relation to centre of field of view.

[e] Γ is the minimum magnification of the zoom system.

7 Consumer information

7.1 Marking

For identification and operation, telescopic sights shall have, as a minimum, the markings listed in Table 3.

Table 3 — Marking

Characteristics	Marking	
	Required	Recommended
Magnification or range of magnification[a]	×	
Entrance pupil diameter[a]	×	
Name of manufacturer or registered trade mark	×	
Product name or identification		×
Country of origin		×
Serial number		×
Position for zero dioptre		×
Value of reticle adjustment per click		×
Direction of adjustment for point of impact		×

[a] Basic designation is given by the combination of magnification and diameter of entrance pupil, e.g. 6 × 42 or 3 – 10 × 50.

7.2 Information brochures

Product catalogues, user manuals, and other technical information brochures for telescopic sights shall provide complete information at least on the technical characteristics given in Table 4.

7.3 Compliance

Products complying with the requirements given in this part of ISO 14135 may be designated as *"General-purpose instruments in accordance with this International Standard, i.e.* ISO 14135-1".

NOTE Products complying with the requirements given in ISO 14135-2 may be designated as *"High-performance instruments in accordance with* ISO 14135-2".

Table 4 — Product information

Characteristics	Information	
	Required	Recommended
Magnification or range of magnification	×	
Entrance pupil diameter (mm)	×	
Name of manufacturer or registered trade mark	×	
Product name or identification	×	
Country of origin		×
Field of view (m/100 m or ft/100 yd or degree)	×	
Exit pupil diameter (mm)	×	
Resolution or MTF		×
Light transmission		×
Type of coating		×

Table 4 *(continued)*

Characteristics	Information	
	Required	**Recommended**
Twilight number		×
Eye relief range (mm)	×	
Dimension/subtense of reticles		×
Parallax-free distance (m or yd)	×	
Total reticle adjustment range		×
Value of reticle adjustment per click		×
Direction of adjustment for point of impact		×
Mechanical dimensions (mm)	×	
Mass	×	
Operational temperature range		×
Storage temperature range		×
Watertightness	×	

Annex A
(informative)

Recommended interface dimensions

For recommended interface dimensions, see Table A.1.

Table A.1 — Recommended interface dimensions

Shape	Dimension[a]		Tolerance	Application
	D_c	D_o		
Cylindrical	19 mm or 22 mm	All	±0,1 mm	For airguns
Cylindrical	25,4 mm (1 in) or 30 mm	All	±0,1 mm	For handguns
Cylindrical	25,4 mm (1 in) or 30 mm	1 in, 26 mm, 30 mm, 36 mm; for D_o > 36 mm every integer value in mm	±0,1 mm	For rifles
With dovetail (see Figure A.1)	Manufacturer's specification	1 in, 26 mm, 30 mm, 36 mm; for D_o > 36 mm every integer value in mm	±0,1 mm	For rifles

[a] D_c is the central tube diameter; D_o is the objective tube diameter.

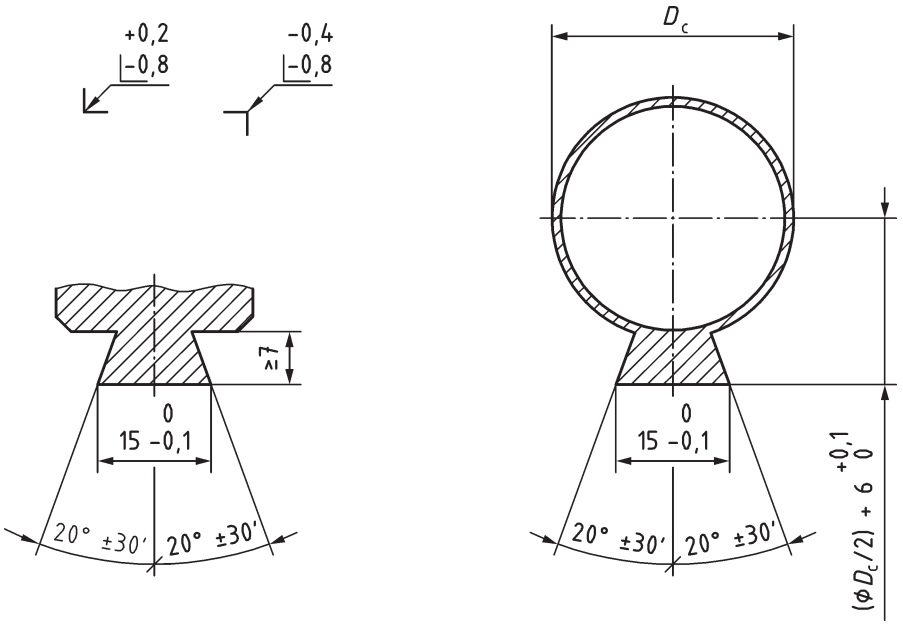


Figure A.1 — Example of central tube with dovetail (cross section)

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