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Optics and optical instruments — Medical endoscopes and endoscopic accessories —

Part 3:

Determination of field of view and direction of view of endoscopes with optics

*Optique et instruments d'optique — Endoscopes médicaux et leurs
accessoires —*

*Partie 3: Détermination du champ d'observation et de la direction
d'observation des endoscopes optiques*

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Foreword

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International Standard ISO 8600-3 was prepared by Technical Committee ISO/TC 172, *Optics and optical instruments*, Subcommittee SC 5, *Microscopes and endoscopes*.

ISO 8600 consists of the following parts, under the general title *Optics and optical instruments — Medical endoscopes and endoscopic accessories*:

- *Part 1: General requirements*
- *Part 2: Particular requirements for rigid bronchoscopes*
- *Part 3: Determination of field of view and direction of view of endoscopes with optics*
- *Part 4: Determination of maximum width of insertion portion*

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Optics and optical instruments — Medical endoscopes and endoscopic accessories —

Part 3:

Determination of field of view and direction of view of endoscopes with optics

1 Scope

This part of ISO 8600 specifies requirements and recommends test methods for measuring the field of view and direction of view of endoscopes.

2 Requirements

2.1 Measuring accuracy (field of view)

The minimum accuracy of the test method used to measure the field of view shall be:

± 5 % of the reading for rigid endoscopes;

± 10 % of the reading for flexible endoscopes.

2.2 Measuring accuracy (direction of view)

The minimum accuracy of the test method used to measure the direction of view shall be:

± 3° for rigid endoscopes;

± 10° for flexible endoscopes.

3 Apparatus

3.1 Optical bench, or equivalent device, to support the optical endoscope being tested and allowing adjustment of the central axis of the field of view to the centre of the target to measure the field of view at a distance of 50 mm between the distal window surface of the endoscope and the centre of the graduated scale situated at right angles to the centreline.

3.2 Target holder and protractor, graduated in degrees (see figure 1).

3.3 Target for field of view and direction of view tests, round, having circles showing the field of view β , in degrees, from a distance of 50 mm computed as

$$D_{\text{mm}} = 100 \tan \frac{\beta}{2}$$

and mounted on the device (see figure 2).

Major divisions shall be marked every 10° with the corresponding number in degrees.

Between each major division, four finer marks shall indicate every 2° .

3.4 Illumination source

A white-light target illumination with a minimum intensity of 500 lux shall be provided, using either the endoscope illumination or an external source.

4 Test method for field of view and direction of view

The following test method is recommended; however, other test methods may be used if the same results are obtained.

4.1 Mount the target (3.3) into the device according to 3.1.

4.2 Mount the endoscope to be tested in the endoscope holder (3.1) in such a manner that the centre of the distal window is $50 \text{ mm} \pm 0,2 \text{ mm}$ from the target centre.

4.3 Adjust the endoscope holder by looking through the endoscope, so that the circles marked on the target and the circumference of the field of view are centred.

4.4 Determine the largest visible circle and record it as the field of view, in degrees. For a non-circular image, only segments of the largest circle may be visible.

4.5 Read and record as the direction of view the angular position, in degrees, of the protractor relative to the perpendicular axis of the endoscope.

4.6 Repeat steps 4.3 to 4.5 until a sufficient number of results have been obtained to verify the required statistical accuracy of the endoscope.

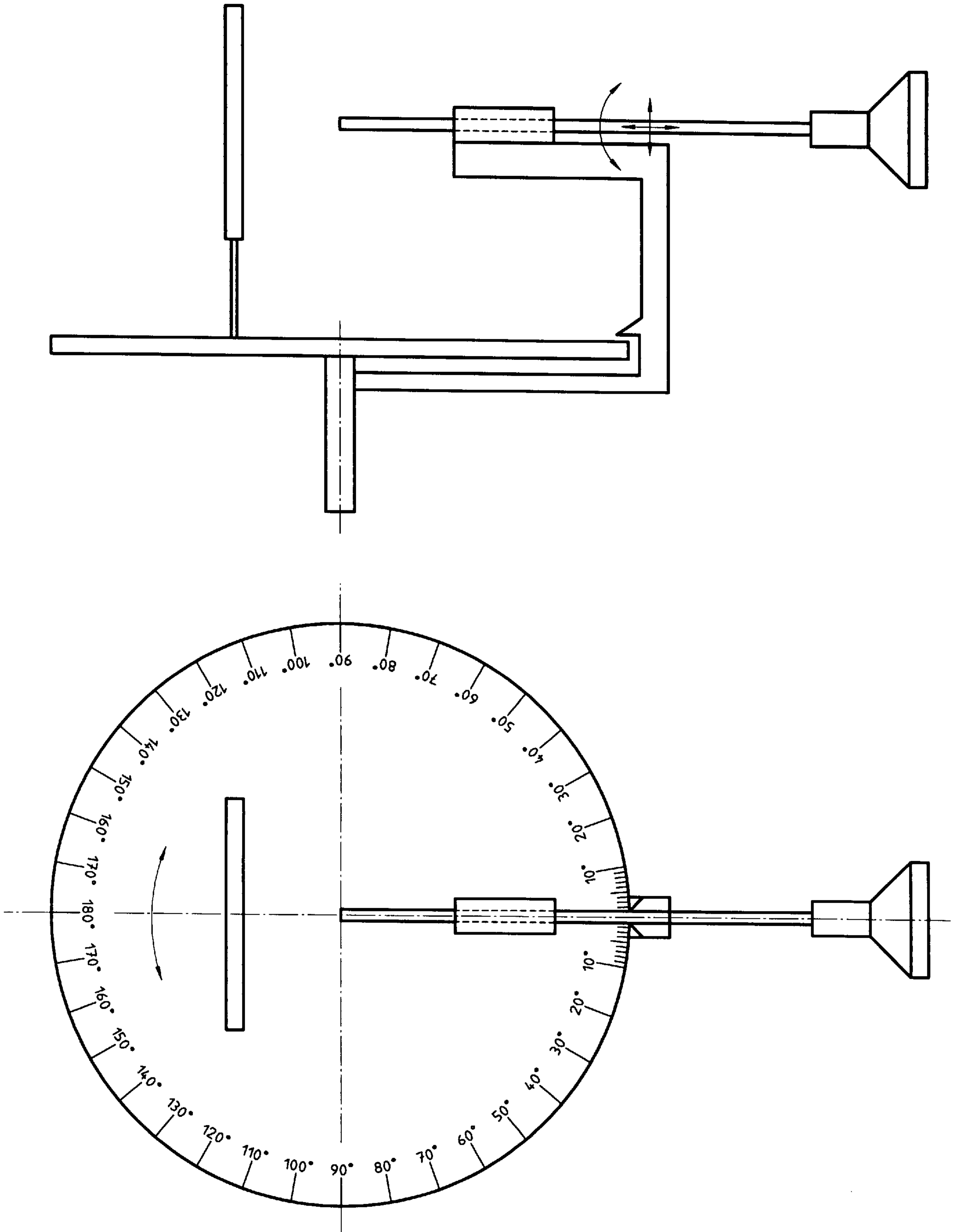


Figure 1 — Example of a test device (not to scale)

Dimensions in millimetres
Angles in degrees

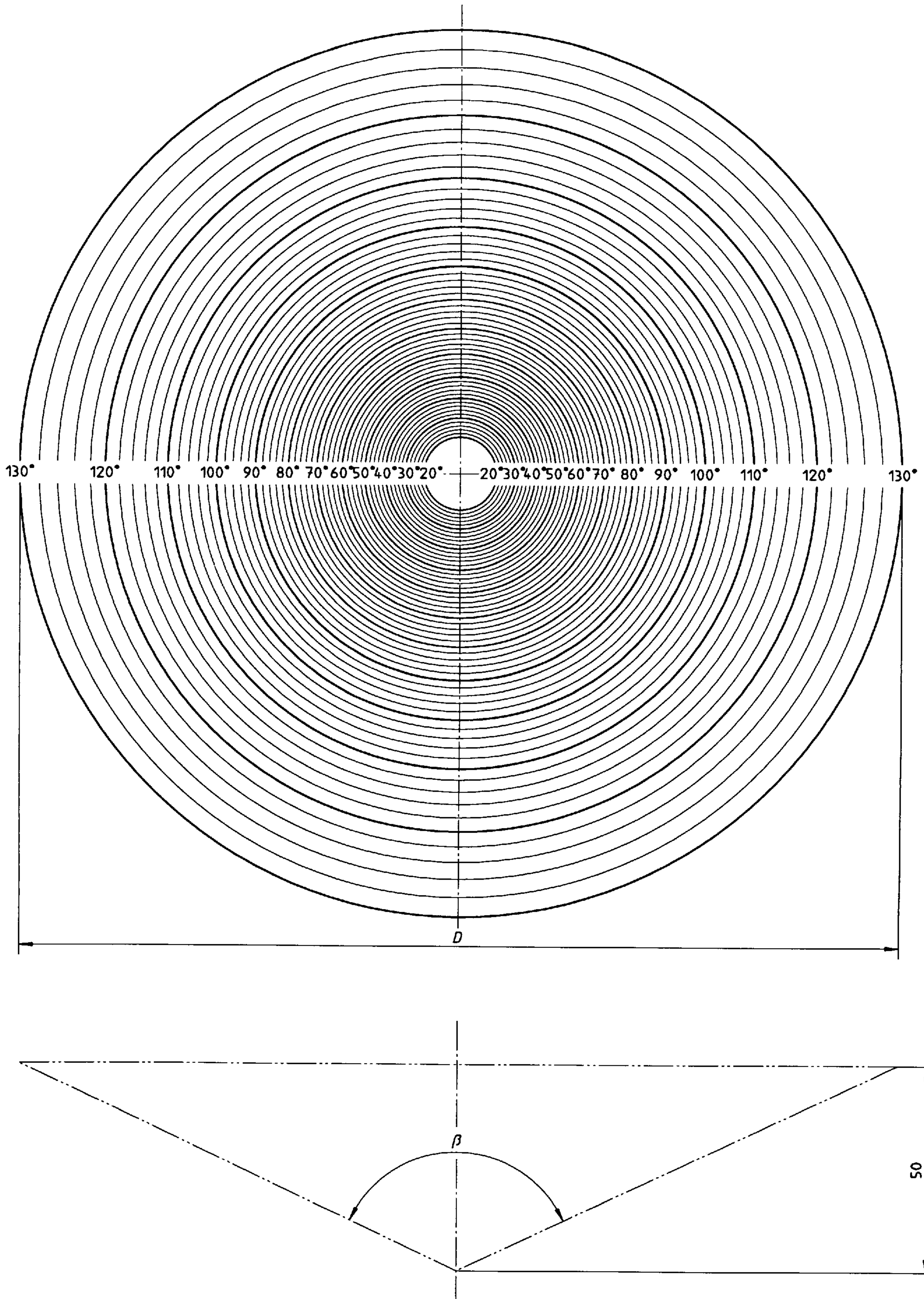


Figure 2 — Target for field of view and direction of view tests (not to scale)

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Descriptors: optics, optical equipment, medical equipment, endoscopy apparatus, tests, optical tests, determination, field of visibility.

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