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Indian Standard
SPECIFICATION FOR
PRISMATIC COMPASSES, NON-LIQUID

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INDIAN STANDARDS INSTITUTION
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NEW DELHI 110002

Indian Standard

SPECIFICATION FOR

PRISMATIC COMPASSES, NON-LIQUID

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SPECIFICATION FOR PRISMATIC COMPASSES, NON-LIQUID

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 17 October 1961, after the draft finalized by the Optical and Mathematical Instruments Sectional Committee had been approved by the Engineering Division Council.

0.2 The surveyors compass is an instrument for determining the difference in direction between any horizontal line and a magnetic needle, the needle pointing the magnetic north. Magnetic compasses, though of limited accuracy, have the advantage of giving reading directly in terms of directions or bearings referred to magnetic north. Prismatic compasses, non-liquid, can either be used independently or in conjunction with other angle measuring instruments in orienting a map or plane table and making a survey or traverse.

0.3 Taking into consideration the views of producers and consumers, the Sectional Committee responsible for the preparation of this standard felt that it should be related to the manufacturing practices followed in the country in this field.

0.4 Wherever a reference to any Indian Standard appears in this specification, it shall be taken as a reference to the latest version of the standard.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS: 2-1960 Rules for Rounding Off Numerical Values (*Revised*). The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

0.6 India has changed over to the metric system and all the dimensions in this specification are given in this system.

0.7 This standard is intended chiefly to cover the technical provisions relating to prismatic compasses, non-liquid, and it does not include all the necessary provisions of a contract.

1. SCOPE

1.1 This specification covers the requirements for prismatic compasses, non-liquid. The preferred sizes are 85, 100 and 110 mm.

2. NOMENCLATURE

2.1 The names of different components of the prismatic compass, non-liquid, are shown in Fig. 1.

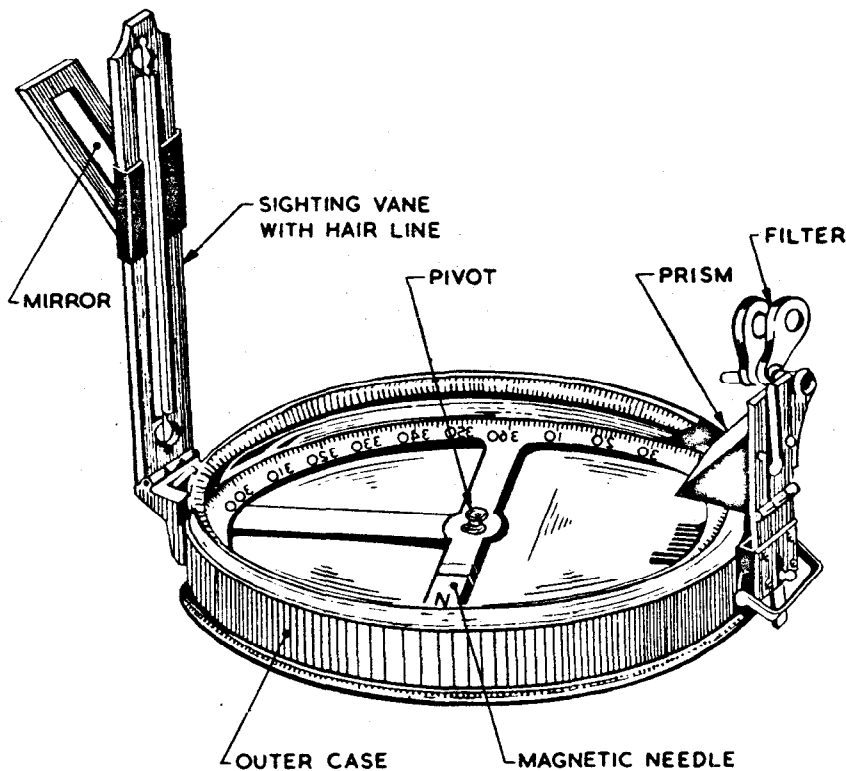


FIG. 1 PRISMATIC COMPASS, NON-LIQUID

3. TERMINOLOGY

3.0 For the purpose of this standard, the following definitions shall apply.

3.1 True Bearing — The horizontal angle measured from the true north in a clockwise direction to desired line.

3.2 Magnetic Bearing — The horizontal angle measured from the magnetic north in a clockwise direction to desired line.

3.3 Traverse — The traverse consists of connected lines, the length and directions of which are measured.

3.4 Declination — The horizontal angle between the true north and the magnetic north.

3.5 Dip — The vertical angle between the horizontal plane and the plane of freely suspended symmetrical magnetic needle pivoted at its centre of symmetry.

NOTE — To overcome this dip, a small weight is placed on one side of the needle so that it can be adjusted until the needle is horizontal.

3.6 Orientation — The determination of the location of points and the establishment of lines of known directions.

3.7 Size of Compass — The size of the compass is indicated by the diameter of the reading edge of the graduated arc.

4. COMPONENTS

4.1 Sighting System — The sighting system shall consist of sighting vanes hinged diametrically opposite to each other on the outer case. The eyeing vane shall have a vertical line slot in the metal housing of the magnifying prism and the front or sighting vane shall have a fine vertical hair line sight. In sizes up to 50 mm the front vane shall preferably be a folding lid containing a disc of clear glass with a vertical line etched on it.

4.2 Magnet Assembly — The magnet assembly shall consist of a thin bar magnet fitted to a conical agate, sapphire, and pivoted on a sharp pin point.

4.3 Bearing Indicating System — The system shall consist of a graduated circular arc which may form integral part of the needle or which may support itself on the outer case.

4.4 Damping-cum-Antiwear System — The system shall consist of a device to lift the needle when the former is moved by one of the vanes normally kept folded when not in use.

4.5 Dip Adjusting Slide — The dip adjusting slide shall consist of a small metal rider which may slide along the needle to balance it in the horizontal plane.

4.6 Protecting Cover — The protecting cover shall consist of a disc of glass fitted on top of the brass case to protect the needle and graduated circle.

4.7 Reading System — The reading system shall consist of a magnifying prism attached to the outer case.

5. MATERIALS AND WORKMANSHIP

5.1 Materials — All parts of the compass, except the magnetic needle, shall be made of non-magnetic materials.

5.2 Magnetic Needle — The magnetic needle shall be of good quality magnet steel. It shall be properly hardened and aged.

5.2.1 The magnetic moment of the needle shall be between 20 and 25 cgs units. Each pole of the magnetic needle shall have a flux of approximately 100 lines.

5.3 Bearing — The bearing shall be of good quality natural or synthetic white sapphire free from inclusions or other defects.

5.4 Pivot Tip — The pivot tip shall be made of hardened steel or iridium.

5.5 Window Glass — The window glass shall be polished plate glass with parallel surfaces and snugly fitted.

5.6 Pivot Mounting — The pivot shall be properly centered and fitted. Line of contact between pivot and mounting shall be continuously smooth and free from irregularities.

5.7 Prism — The prism shall be of good quality optical glass, colourless, free from bubbles, and shall be ground and brought to a high degree of polish on the reflecting and curved surfaces.

5.8 Sealing Glass, Lid Window and Index Glass — Polished plate glass, with parallel surfaces and the edges ground truly circular, shall be used. Compasses of 85 mm and above shall be provided with fixing device at the bottom to take the tripod.

5.9 Dial — The dial, if made of mother-of-pearl, shall be of good quality, free from flaws, and shall be regularly formed and of uniform colour in daylight or of good quality mica.

5.10 Screw Threads — The threads shall conform to IS: 4218 ISO Metric Screw Threads.

6. TESTS

6.1 Plane of Coincidence of the Features in the Sighting Axis — With the compass held level and sighted along the local magnetic meridian as obtained by a standard compass, the following features shall lie in the same vertical plane:

- a) the centre of the prism slide block,
- b) the slot in the prism bracket,
- c) the South line on the outer box below the prism,
- d) the tip of the pivot,
- e) the North line of the outer box,
- f) the centre line marked on the hinge lug, and
- g) the sighting line on the vane.

6.2 Ease of Prismatic Reading — The slide of the prism shall be adjusted to suit the vision of the observer. The edge of the dial, the vane and the figures on the outer circle shall be clearly visible through the eye-hole in the prism bracket. The definition of the prism shall be sharp for all readings of the dial and shall be free from lateral distortion of the divisions on the dial. The normal focus of the prism shall be at half the range of the slide. The slide pins shall work smoothly in the slide block without shake, and shall be friction-tight in any position.

6.3 Range of Tilt — The compass shall be tilted through an angle of 7 degrees either way from the horizontal position, that is, in elevation or in depression so as to give a total range of tilt of not less than 14 degrees, and rotated. The suspension unit shall in no position foul with the inner box.

6.4 Frictional Error — The frictional error of the needle in the compass shall not exceed 15 minutes at 27°C. During the test, the compass shall be level and free from external vibration. Any frictional error may be found by the following methods.

6.4.1 Deflecting the pointer through any angle to one side of any original position by a small iron rod, removing the cause of deflection and noting the reading of the pointer when it comes to rest.

6.4.2 Repeating the deflection through any angle to either side of the original position of the pointer as in **6.4.1**, removing the cause of deflection and noting the reading of the pointer when it comes to rest.

6.4.3 The total angular variation between the two readings so obtained shall be the frictional error and shall not exceed 15 minutes at 27°C.

6.5 Bearing Error — The total error in any magnetic bearing, as read through the prism, shall not exceed ± 30 minutes and the direct reading of the dial against the lubber line on the sealing glass shall agree with the supplementary angle of the magnetic bearing within ± 2 degrees.

7. MARKING

7.1 The compass shall be engraved at a suitable place with the maker's name or trade-mark and the year of manufacture, if required by the purchaser.

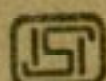
7.1.1 The compasses may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

8. PACKING

8.1 Each compass shall be securely packed in a box to prevent damage to the tips of the pivots.

8.2 A leather case shall be provided if required by the purchaser.



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