IS : 1764 - 1961
(Reaffirmed 1996)

Indian Standard

SPECIFICATION FOR TROUGH COMPASS

(Third Reprint OCTOBER 1989)

UDC 538.74

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Gr 2

May 1961

Indian Standard

SPECIFICATION FOR TROUGH COMPASS

Optical and Mathematical Instruments Sectional Committee, EDC 36

Chairman	
DR C. S. RAO	Ministry of Defence (R & D)
Members	
ASSISTANT DIRECTOR STANDARDIZATION (CIVIL)	Research Designs and Standards Organisation (Ministry of Railways)
SHRI BALVIR SINGH	Grah Udyog Sahakari Samiti Ltd,, Roorkee
COMMANDER O. J. BAPTISTA	Indian Navy
SHRI P. N. DEOBHAKTA	Development Wing, Ministry of Commerce & Industry
SHRI V. KRISHNAMOORTHY (*Alternate*)	
DR S. P. VERMA (*Alternate*)	
SHRI D. P. JETHWANI	Central Water & Power Commission
COL R. S. KALHA	Survey of India
COL S. K. S. MUDALIAR (*Alternate*)	
SHRI B. G. NAVLAKHI	J. V. Navlakhi & Co, Bombay
SHRI B. V. DALAL (*Alternate*)	
SHRI PREM PRAKASH	National Physical Laboratory (CSIR), New Delhi
SHRI M. K. SEN GUPTA (*Alternate*)	
SHRI E. B. RAJDEMKAR	Raj-Der-Kar and Co, Bombay
SHRI E. N. NAIR (*Alternate*)	
DR I. RAMAKRISHNA RAO	Madras Institute of Technology, Madras
PROF S. HARIHARAN (*Alternate*)	
SHRI A. N. SEN	National Instruments Ltd, Calcutta
SHRI R. R. CHAKRAVARTY (*Alternate*)	
SHRI A. R. SEN	Office of the Development Commissioner (Small Scale Industries), New Delhi
SHRI BALRAM SETHI	Directorate General of Ordnance Factories, Ministry of Defence
SHRI P. V. SUBBA RAO	The Andhra Scientific Co Ltd, Masulipatam
SHRI M. PANDURANGA RAO (*Alternate*)	
SHRI H. C. VERMA	Associated Instrument Manufacturers (India) Private Ltd, New Delhi
SHRI D. NIRODY (*Alternate*)	
SHRI K. VUDAYAGHALAM	Central Public Works Department
DR LAL C. VERMA (*Ex-officio*)	Director, ISI
Secretaries	
SHRI M. V. PATANKAR	Assistant Director (Eng), ISI
SHRI P. N. KOHLI	Senior Technical Assistant (Eng), ISI

Surveying Instruments Subcommittee, EDC 36 : 3

Convener	
COL R. S. KALHA	Survey of India
Members	
COL S. K. S. MUDALIAR (*Alternate* to Col R. S. Kalha)	
SHRI BALVIR SINGH	Grah Udyog Sahakari Samiti Ltd, Roorkee
COMMANDER O. J. BAPTISTA	Indian Navy
SHRI S. S. DHARMAYYA	Ministry of Defence (R & D)
SHRI A. N. BHATTACHARYYA (*Alternate*)	
SHRI M. K. KOUNDINYA	Central Public Works Department,
SHRI PREM PRAKASH	National Physical Laboratory (CSIR), New Delhi
SHRI M. K. SEN GUPTA (*Alternate*)	
SHRI A. N. SEN	National Instruments Ltd, Calcutta

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Indian Standard

SPECIFICATION FOR TROUGH COMPASS

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 8 March 1961, after the draft finalized by the Optical and Mathematical Instruments Sectional Committee had been approved by the Engineering Division Council.

0.2 Unlike surveyors or prismatic compasses, trough compasses do not by themselves form a complete surveying instrument; rather they work as adjuncts to some other surveying instruments. They are intended to give the direction of magnetic north.

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 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 or analysis, 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 the standard.

0.5 This standard is intended chiefly to cover the technical provisions relating to trough compass, and it does not include all the necessary provisions of a contract.

---

1. SCOPE

1.1 This standard covers the requirements for 125-mm trough compass used in conjunction with plane tables.

2. NOMENCLATURE

2.1 The nomenclature of different parts of trough compass is given in Fig. 1.

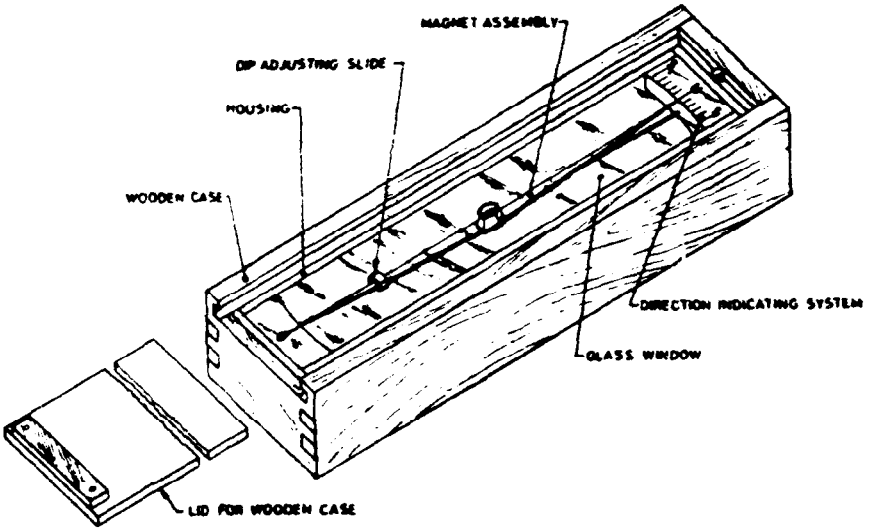

FIG. 1 TROUGH COMPASS

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 connected lines, the lengths 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 and location of a line in the direction of the magnetic north.

3.7 Size of Compass — The size of the compass is indicated by the length of the needle.

4. COMPONENTS

4.1 Magnet Assembly — The magnet assembly shall consist of a long thin bar magnet tapering to pointed ends fitted with agate, sapphire, ruby or suitable hard metal bearing at the centre. The north seeking end shall have a distinctive mark.

4.2 Trough or Housing — The trough shall consist of a rectangular brass or aluminium box, the sides of which shall be straight and parallel to each other so that they may be used as a ruler when required. It shall lie flat on a plane table.

4.2.1 *Wooden Case* — The compass shall be snugly fitted into a wooden case, whose longitudinal side being parallel to the edge of the housing.

4.3 Direction Indicating System — The system shall consist of a block of metal fitted internally at each end of the housing with top surface at the same level as the needle, with a zero line along with a very short graduated arc extending about 5° on either side of the central zero mark.

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

4.5 Damping Cum Anti-Wear System — The system shall consist of tongue or lever, fitted to the housing, which is worked from outside for liftir the needle and keeping it clear when the instrument is not in use.

4.6 Window — The window shall consist of a plate glass.

5. DIMENSIONS

5.1 The external dimensions of the metal trough shall be $150 \times 30 \times 20$ mm and the length of the needle shall be 125 mm.

6. MATERIALS

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

6.2 Bearing — shall be of good quality natural or synthetic white sapphire, ruby, agate, or hard metal, free from inclusions or other defects.

6.3 Pivot Tip — shall be made of hardened steel or iridium.

6.4 Magnetic Needle — shall be of good quality magnet steel. It shall be properly hardened and aged.

6.5 Wooden Case — shall be made of thoroughly seasoned hardwood, free from knots and shakes, and with a close straight grain.

7. CONSTRUCTION AND WORKMANSHIP

7.1 Scale Blocks — The graduations on each side of the zero line (on the north side) shall be straight, fine and deep. The lines shall be filled in black.

7.2 Pivot — The two zero lines and the pivot shall be in the same vertical plane through the centre of the instrument and parallel with the sides of the metal box.

7.3 Needle — The top surface of the needle shall be flush with the upper surface of the scale blocks. With the compass set in the magnetic meridian, the needle ends shall be coincident with both the zero marks. The pivoting and magnetization of the needle shall be such that the needle moves freely. When the compass is placed in its wooden case, the lid shall operate the lifting device so that the needle is firmly clamped without shake.

7.4 Glass Window — shall be smoothly ground at the edges and accurately fitted on to the metal trough to preclude the entrance of dust, and strong wind.

8. TESTS

8.1 Frictional Error — On deflecting the needle through any angle to one side of its original position and then removing the cause of deflection, position of the needle shall be read. Then deflecting the needle in a similar manner on the other side of the original position and on removing the cause of deflection, the position of the needle shall be again read. The total angular variation between the two readings shall not exceed 15 minutes.

8.2 Bearing Error — Each compass shall be tested against a magnetic meridian determined by a standard compass or magneto-meter. The total error in any magnetic bearing as indicated by the north seeking end of the compass shall not exceed 30 minutes.

8.3 Range of Tilt — When the compass is tilted through an angle of $2\frac{1}{2}^\circ$ either way from the horizontal position, that is in elevation or depression, the suspension unit shall in no position foul with the inner box.

8.4 Free Oscillations — When drawn aside from its position of rest by 3° the needle shall execute five complete oscillations.

9. MARKING

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

9.1.1 The compass 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.

10. PACKING

10.1 Each compass shall be securely packed and placed upside-down in a box to prevent damage to the tips of the pivots.

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

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002

Telephones: 331 01 31, 331 13 75 Telegrams: Manaksanstha (Common to all Offices)

Regional Offices:	*Telephone*
Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002	331 01 31 331 13 75
*Eastern : 1/14 C. I. T. Scheme VII M, V. I. P. Road, Maniktola, CALCUTTA 700054	36 24 99
Northern : SCO 445-446, Sector 35-C, CHANDIGARH 160036	2 18 43 3 16 41
Southern : C. I. T. Campus, MADRAS 600113	41 24 42 41 25 19 41 29 16
†Western : Manakalaya, E9 MIDC, Marol, Andheri (East), BOMBAY 400093	6 32 92 95

Branch Offices:

'Pushpak', Nurmohamed Shaikh Marg, Khanpur, AHMADABAD 380001	2 63 48 2 63 49
‡Peenya Industrial Area 1st Stage, Bangalore Tumkur Road BANGALORE 560058	38 49 55 38 49 56
Gangotri Complex, 5th Floor, Bhadbhada Road, T. T. Nagar, BHOPAL 462003	6 67 16
Plot No. 82/83, Lewis Road, BHUBANESHWAR 751002	5 36 27
53/5, Ward No. 29, R.G. Barua Road, 5th Byelane, GUWAHATI 781003	3 31 77
5-8-56C L. N. Gupta Marg (Nampally Station Road), HYDERABAD 500001	23 10 83
R14 Yudhister Marg, C Scheme, JAIPUR 302005	6 34 71 6 98 32
117/418 B Sarvodaya Nagar, KANPUR 208005	21 68 76 21 82 92
Patliputra Industrial Estate, PATNA 800013	6 23 05
T.C. No. 14/1421, University P.O., Palayam TRIVANDRUM 695035	6 21 04 6 21 17

Inspection Offices (With Sale Point):

Pushpanjali, First Floor, 205-A West High Court Road, Shankar Nagar Square, NAGPUR 440010	2 51 71
Institution of Engineers (India) Building, 1332 Shivaji Nagar, PUNE 411005	5 24 35

*Sales Office in Calcutta is at 5 Chowringhee Approach, P. O. Princep Street, Calcutta 700072 — 27 68 00

†Sales Office in Bombay is at Novelty Chambers, Grant Road, Bombay 400007 — 89 65 28

‡Sales Office in Bangalore is at Unity Building, Narasimharaja Square, Bangalore 560002 — 22 36 71

Reprography Unit, BIS, New Delhi, India