*भारतीय मानक*

भू-बरमा (सर्पिल प्रकार) **―** विशिष्टि

**(*पहला पुनरीक्षण* )**

*Indian Standard*

**Earth Augers (Spiral Type) ― Specification**

(*First Revision*)

(ICS 93.020; 13.080.20)



*September* 2024

**Price Group XX**

Soil and Foundation Engineering Sectional Committee, CED 43

**FOREWORD**

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Soil and Foundation Engineering Sectional Committee had been approved by the Civil Engineering Division Council.

There are a series of standards on methods of testing of soils. It has been recognized that reliable and inter-comparable test results can be obtained only with the standard testing equipment capable of giving the desired level of accuracy. With this objective, a series of specifications covering the requirements of equipment used for testing soils have been published to encourage their development and manufacturing in the country.

The equipment covered in this standard is used for piling work, soil boring and sampling works.

This standard was first published in 1983. The present revision has been taken up with a view to incorporate the modifications found necessary as a result of experience gained in the use of this standard. Also, in this revision, the standard has been brought into latest style and format of Indian Standards, and references to Indian Standards, wherever applicable have been updated. The other major modifications incorporated in this revision of the standard are given below:

1. Relevant grade of carbon and alloy tool steel as per the revised IS 1570 (Part 6) : 1996 'Schedules for wrought steels: Part 6 Carbon and alloy tool steels (first revision)' has been specified.
2. BIS certification marking clause has been modified to align with the revised *Bureau of Indian Standards Act, 2016*.

This standard contributes to the Sustainable Development Goal 9 - Industry, Innovation and Infrastructure: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.

The composition of the Committee responsible for formulation of the standard is given in Annex A.

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 2:2022 ‘Rules for rounding off numerical values (*second revision*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

*Indian Standard*

**Earth Augers (Spiral Type) ― Specification**

(*First Revision*)

**1 SCOPE**

This standard covers dimensional and general requirements for earth augers (spiral type), used in piling, soil boring and sampling works.

**2 REFERENCES**

The following standards contain provisions, which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated are valid. All standards are subject to revision, and parties to agreement based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

|  |  |
| --- | --- |
| *IS No.* | *Title* |
| IS 513 (Part 1) : 2016 | Cold reduced carbon steel sheet and strip: Part 1 Cold forming and drawing purpose (*sixth revision*) |
| IS 1239 (Part 1) : 2004 | Steel tubes, tubulars and other wrought steel fittings ― Specification: Part 1 Steel tubes (*sixth revision*) |
| IS 1501 (Part 1) : 2020/ ISO 1507-1 : 2018 | Metallic materials ― Vickers hardness test: Part 1 Test method (*fifth revision*) |
| IS 1570 (Part 6) : 1996 | Schedules for wrought steels: Part 6 Carbon and alloy tool steels (*first revision*) |

**3 SIZES, DIMENSIONS AND TOLERANCES**

These shall be as given in Table 1, read with Fig. 1. The nominal size refers to the diameter bored by augers.



THE ANGLE OF TAPER FOR BLADES SHALL BE 30±5°.

FIG. 1 EARTH AUGER (SPIRAL TYPE)

**Table 1 Sizes, Dimensions and Tolerances of Auger**

(*Clause* 3)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Sl No.** | **Nominal Size*****D*** | **Pilot Bits** | **Blades** | **Base Plate** | **Spirals** | **Shaft** |
|  |  |  |  |  |  |
|  | $$L\_{1}\_{-3}^{+5}$$ | $$W\_{1}\_{-3}^{+5}$$ | $$T\_{1}\_{-1}^{+1}$$ | $$L\_{2}\_{-3}^{+5}$$ | $$W\_{2}\_{-3}^{+5}$$ | $$T\_{2}\_{-1}^{+1}$$ | *N*1  | $$D\_{1}\_{-4}^{+5}$$ | $$T\_{3}\_{-1}^{+1}$$ | $$D\_{2}\_{-4}^{+5}$$ | $$T\_{4}\_{-0.5}^{+1}$$ | *P*1 | *N*2 | *N*3 | *L*3 +5 | $$D\_{3}\_{-0.5}^{+0.5}$$ | *L*4+5 | *D*4+0.5 |
|  | mm | mm | mm | mm | mm  | mm | mm | Nos | mm | mm | mm | mm | mm | Nos | Nos | mm | mm | mm | mm |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) | (16) | (17) | (18) | (19) | (20) |
| i) | 100 | 60 | 25 | 6 | 50 | 40.0 | 6 | 1 | 90 | 8 | 85 | 3 | 85 ± 5 | 3 | 1 | 250 | 26.9 | 750 | 26.9 |
| ii) | 150 | 90 | 40 | 6 | 80 | 57.5 | 6 | 1 | 140 | 8 | 135 | 3 | 85 ± 5  | 3 | 1 | 300 | 33.8 | 700 | 33.8 |
| iii) | 200 | 115 | 50 | 8 | 115 | 77.5 | 8 | 1 | 185 | 8 | 150 | 3 | 110 ± 5 | 3 | 1 | 400 | 42.5 | 600 | 42.5 |
| iv) | 250 | 115 | 50 | 8 | 115 | 102.5 | 8 | 1 | 235 | 8 | 230 | 3 | 110 ± 5 | 3 | 1 | 400 | 42.5 | 600 | 42.5 |
| v) | 300 | 115 | 50 | 8 | 125 | 127.5 | 8 | 1 | 285 | 8 | 280 | 3 | 110 ± 5 | 3 | 1 | 400 | 42.5 | 600 | 42.5 |
| vi) | 375 | 150 | 100 | 12 | 150 | 147.5 | 10 | 2 | 360 | 10 | 350 | 4 | 165 ± 5 | 2 | 1 | 550 | 76 | 450 | 42.5 |
| vii) | 400 | 150 | 100 | 12 | 150 | 160.0 | 10 | 2 | 385 | 10 | 375 | 4 | 165 ± 5 | 2 | 1 | 550 | 76 | 450 | 42.5 |
| viii) | 450 | 150 | 100 | 12 | 150 | 185.0 | 10 | 2 | 435 | 12 | 425 | 4 | 165 ± 5 | 2 | 1 | 550 | 76 | 450 | 48.4 |
| ix) | 500 | 150 | 100 | 12 | 150 | 210.0 | 10 | 2 | 485 | 12 | 475 | 4 | 165 ± 5 | 2 | 1 | 550 | 76 | 450 | 48.4 |
| x) | 550 | 150 | 100 | 12 | 150 | 235 | 10 | 2 | 535 | 12 | 520 | 4 | 200 ± 10 | 2 | 1 | 650 | 88.7 | 350 | 60.2 |
| xi) | 600 | 150 | 100 | 12 | 150 | 260 | 10 | 2 | 585 | 12 | 570 | 4 | 200 ± 10 | 2 | 1 | 650 | 88.7 | 350 | 60.2 |

**4 MATERIALS**

The materials of construction for various components of earth augers (spiral type) shall be as given in Table 2.

**Table 2 Materials of Construction for Components of Earth Auger (Spiral Type)**

(*Clause* 4)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sl No.** | **Part** | **Material** | **Specific Requirement, if any** | **Relevant Grade/Conforming to Indian Standard** |
| (1) | (2) | (3) | (4) | (5) |
|  | Pilot bit | Steel | - | Grade TC 11 of IS 1570 (Part 6) |
|  | Blades | Steel | - | Grade TC 11 of IS 1570 (Part 6) |
|  | Base plate | Mild steel | - | IS 513 (Part 1) |
|  | Spirals | Mild steel | - | IS 513 (Part 1) |
|  | Pipe shaft | Mild steel |  | Heavy grade as specified in IS 1239 (Part 1) |
|  | Couplers | Mild steel | Hardened and tempered to produce a hardness reading within range 360 to 420 HV 10 [*see* IS 1501 (Part 1)] | IS 513 (Part 1) |
|  | Extension rods | Mild steel  | - | Heavy grade as specified in IS 1239 (Part 1) |
|  | Handles and extension to handles | Mild steel | - | Heavy grade as specified in IS 1239 (Part 1) |

**5 CONSTRUCTION**

The blade shall be either plain or toothed (*see* Fig. 1). The edges of the blade shall be backed with non-erodible welding so as to have hardness 600 × 700 HV 10 [*see* IS 1501 (Part 1)]. The angle of taper for blades shall be 30 ± 5°. The pilot bit, blades, spirals and coupler shall be welded to the shaft. The plate coupler shall be of size 100 × 75 × 8 mm except for auger sizes 550 mm and 600 mm, for which it shall be 125 × 100 × 8 mm.

**6 PERFORMANCE TEST**

The auger shall bore satisfactorily a minimum depth of spiral length in a fairly consolidated soil. The auger shall be withdrawn after it reaches to the required depth. At the end of the test, the auger shall show no sign of damage, fracture or flaw.

**7 WORKMANSHIP**

The blades and pilot bits shall be free from cracks, seams, etc.

**8 TREATMENT**

The auger shall be coated with one coat of red oxide as primer and anti-corrosive paint.

**9 MARKING**

**9.1** The following information shall be clearly and indelibly marked on each auger:

a) Name of the manufacturer or his registered trade-mark or both;

b) Type (*see* **5**); and

b) Date of manufacture.

**9.2** **BIS Certification Marking**

The product conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act, 2016* and the Rules and Regulations framed thereunder, and the product may be marked with the Standard Mark.

**ANNEX A**

(*Foreword*)

**COMMITTEE COMPOSITION**

Soil and Foundation Engineering Sectional Committee, CED 43

| *Organization* | *Representative(s)* |
| --- | --- |
|
| In Personal Capacity, *473, Vinayak Apartments, BHEL Housing Society, Plot No. C-58/19, Sector 62, Noida, Uttar Pradesh* - *201301* | Shri C. Pushpakaran **(*Chairperson*)** |
| AFCONS Infrastructure Limited, Mumbai | Dr Sunil Basarkar Dr Lakshmana Rao Mantri (*Alternate-I*) Shri Budhmal Jain (*Alternate-II*) |
| AIMIL Limited, New Delhi | Shri Rohitash Barua  Smt Aarti Bhargava (*Alternate-I*) Shri Anil Singh (*Alternate-II*) |
| Bharat Heavy Electricals Ltd, New Delhi | Shri T. M. S. Rao Shri Vikram S. (*Young Professional*) |
| CEM Engineers and Consultants Pvt Ltd, Bhubaneswar | Shri Ashok Basa Shri Dilip Basa (*Alternate*) |
| Cengrs Geotechnica Pvt Ltd, Noida | Shri Sanjay Gupta Shri Ravi Sundaram (*Alternate*) Shri Sorabh Gupta (*Young Professional*) |
| Central Board of Irrigation and Power, New Delhi | Director |
| Central Electricity Authority,  New Delhi | Shri Baleshwar Thakur  Shri Deepak Singh Raghuvansi (*Alternate*) |
| Central Public Works Department, New Delhi | Shri Nagendra Prasad Shri Amrendra Kumar Jalan (*Alternate*) |
| Central Soil and Materials  Research Station, New Delhi | Dr Manish Gupta  Ms Swapna Varma (*Alternate*) |
| CSIR-Central Building Research  Institute, Roorkee | Shri Manojit SamantaDr S. Ganesh Kumar (*Alternate*)Shri Kaushik Pandit (*Young Professional*) |
| CSIR-Central Road Research  Institute, New Delhi | Dr Kanwar Singh Dr P. S. Prasad (*Alternate*) |
| CSIR-Structural Engineering  Research Centre, Chennai | Dr P. Kamatchi Smt R Sreekala (*Alternate*) Dr A. Thirumalaiselvi (*Young Professional*) |
| D-CAD Technologies,  New Delhi | Dr K. G. Bhatia  |
| Delhi Development Authority,  New Delhi | Shri Arun Kumar Shri Harindar Pal (*Alternate*) |
| Delhi Technological University,  New Delhi | Prof. Ashok Kumar Gupta  |
| Engineers India Limited,  New Delhi | Shri V. K. Panwar Shri Sampat Raj (Alternate-I) Shri Anil Banoth (*Young Professional*) |
| Geodynamics Ltd, Vadodara | Dr Ravikiran Vaidya Shri Sujan Kulkarni (*Alternate*) |
| Geological Survey of India,  Kolkata  | Dr Timir Baran Ghosal Shri Prashant Tukaram Ilamkar (*Alternate*) |
| Ground Engineering Limited,  New Delhi | Shri Ashok Kumar Jain  Shri Neeraj Kumar Jain (*Alternate*) |
| Hindustan Construction Company  Limited, Mumbai | **Representative**  |
| Indian Geotechnical Society,  New Delhi | Prof H. N. Ramesh Dr Anil Joseph (*Alternate*) Prof D. Neelima Satyam (*Alternate-II*) |
| Indian Institute of Science,  Bengaluru | Prof Jyant KumarProf G. Madhavi Latha (*Alternate*) |
| Indian Institute of Technology  Delhi, New Delhi  | Dr G. V. Ramana Dr J. T. Shahu (Alternate-I) Dr Prashanth Vangla (*Young Professional*) |
| Indian Institute of Technology  Kanpur, Kanpur  | Prof Priyanka Ghosh |
| Indian Institute of Technology  Madras, Chennai | Prof Subhadeep Banerjee Prof Ramesh K Kandasami (*Alternate*) |
| Indian Institute of Technology  Bombay, Mumbai | Prof Deepankar Choudhury Prof Dasaka Murty (*Alternate*) |
| Indian Institute of Technology  Roorkee, Roorkee | Dr Mahendra Singh Dr Vishwas A. Sawant (*Alternate*) |
| Indian Road Congress, New Delhi | Secretary General  Director (T) (*Alternate*) |
| Indian Society of Earthquake  Technology, Roorkee | Prof B. K. Maheswari Prof Vasant A. Matsagar (*Alternate*) |
| ITD Cementation India Ltd, Kolkata | Shri Manish Kumar  Shri Aminul Islam (*Alternate*) |
| Jadhavpur University, Kolkata  | Prof Sibapriya Mukherjee  Prof Ramendu Bikas Sahu (*Alternate*) |
| Keller Ground Engineering Pvt Ltd, Chennai | Shri V. V. S. Ramadas Shri Madan Kumar Annam (*Alternate*) |
| L&T GeoStructure Private Limited, Chennai | Shri M. KumaranShri A. Vetriselvan (*Alternate*) |
| Military Engineer Services,  Engineer-in-Chief's Branch,  Integrated HQ of MoD (Army), New Delhi | Shri Manoj BapnaShri Ajay Kumar Sinha (*Alternate*) |
| MECON Limited, Ranchi | Shri Shankar Ray Shri Ayush Srivastava (*Alternate*) |
| Ministry of Ports, Shipping and  Waterways, New Delhi | Shri H. N. Aswath Shri Anil Pruthi (*Alternate*) |
| Mumbai Port Trust, Mumbai | Dy Chief Engineer (Design) Superintending Engineer (Design) (*Alternate*) |
| Nagadi Consultants Pvt Limited,  New Delhi | Dr V. V. S. Rao  Shri N. Santosh Rao (*Alternate*) |
| National Capital Region Transport  Corporation, New Delhi | Shri Jitender Kumar |
| National High Speed Rail  Corporation Ltd, Mumbai | **Representative**  |
| National Institute of Disaster Management, New Delhi | Dr Chandan Ghosh Dr Amir Ali Khan (*Alternate*) |
| NTPC Limited, Noida | Shri Mohit Jhalani |
| Power Grid Corporation of India  Limited, Gurugram | **Representative** |
| Research Designs and Standards  Organization (Ministry of  Railways), Lucknow | Shri Sameer Singh  Shri S. K. Ojha (*Alternate*) |
| RITES Limited, Gurugram | Shri Koshy Vaidyan Shri Sumeet Mahajan (*Alternate*) |
| Safe Enterprises, Mumbai | Shri Vikram Singh Rao  Shri Suryaveer Singh Rao (*Alternate*) |
| STUP Consultants Pvt Ltd, Mumbai | Shri Anirban Sengupta Shri Yogesh Waingankar (*Alternate*) |
| Tata Consulting Engineers Limited, Mumbai | Shri Sanjeev Gupta  Shri B. N. Nagaraj (*Alternate*) |
| Telangana State Research  Laboratories, Hyderabad | Shri A. G. Manoj Kumar Shri Ashirwadam Jakkula (*Alternate-I*) Smt M. Manjula (*Alternate-II*)  |
| The Pressure Piling Co (I) Pvt  Limited, Mumbai | Shri V. C. Deshpande  Shri Pushkar V. Deshpande (*Alternate*) |
| Unique Geocivil Services Pvt Ltd,  Surat | Shri Nehal H. Desai Shri Hitesh H. Desai (*Alternate-I*) Shri Dhruval D. Shah (*Alternate-II*) |
| In Personal Capacity, *1-B, Villakkupattam Palace, First Floor, 48, New Avadi Road, Kilpauk, Chennai 600010* | Dr V. Balakumar |
| BIS Directorate General | Shri Dwaipayan Bhadra, Scientist ‘E’/ Director and Head (Civil Engineering) [Representing Director General (*Ex-officio*)] |
| *Member Secretary*Shri Dheeraj DamachyaScientist ‘B’ / Assistant Director (Civil Engineering), BIS |