**IS 12097 : 2024**

***भारतीय मानक***

***Indian Standard***

**जल कूप वेधन के लिए वेधनरिग का वर्गीकरण और चयन**

*( दूसरा पुनरीक्षण )*

**Classification and Selection of**

**Drilling Rigs for Water Well Drilling**

( *Second Revision )*

ICS 73.100.30

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भारतीय मानक ब्यूरो

BUREAU OF INDIAN STANDARDS

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**November 2024 Price Group X**

Diamond Core and Waterwell Drilling Sectional Committee, MED 21

FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards after the draft finalized by the Diamond Core and Waterwell Drilling Sectional Committee, had been approved by the Mechanical Engineering Divisional Council.

This standard was first published in 1987 and subsequently revised in 1994. This standard is being revised again to keep pace with the latest technological developments and international practices. Also, in this revision, the standard has been brought into the latest style and format of Indian Standards, and references of Indian Standards, wherever applicable have been updated. BIS certification marking clause has been modified to align with the revised *Bureau of Indian Standards Act*, 2016.

This revision has been taken up with a view incorporating the modification found necessary as a result of experience gained in the use of this standard. Also, in this revision, the standard has been brought into the latest style and format of Indian Standards, and references to Indian Standards, wherever applicable have been updated.

The composition of the Committee responsible for the formulation of this 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*

**CLASSIFICATION AND SELECTION OF**

**DRILLING RIGS FOR WATER WELL DRILLING**

(*Second Revision*)

**1 SCOPE**

**1.1** This standard specifies the classification and recommendations for selection of drilling rigs for drilling of water wells and bore holes.

**1.2** The recommendations for selection of drilling rigs include the suitability aspects of different types of drilling rigs and their proper selection for drilling water wells and bore holes in different geological formations.

**2 TYPE**

The following types of drilling rigs are generally used for drilling of water wells and bore holes:

1. Percussion (cable tool);
2. Rotary:
   1. Direct circulation; and
   2. Reverse circulation;
3. Down-the-hole (DTH);
4. Combination (rotary-cum-percussion); and
5. DTH-cum-rotary.

**3 CLASSIFICATION AND SELECTION**

The classification and selection of drilling rigs into light, medium, and heavy duty as specified in Table 1 are based on the diameter of the hole, depth of the hole, size of the drill rods, tool weight, and formation to be encountered during drilling.

**Table 1** **Classification and Selection of Drilling Rigs**

(*Clause* 3)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Sl No.** | **Type of Drilling Rig** | **Classification** | **Diameter of Hole**  (mm) | **Depth of Hole**  (m) | **Size of Drill Rods/Tool Weight** |
| (1) | (2) | (3) | (4) | (5) | (6) |
|  | Percussion (cable tool): Suitable for drilling in semi-consolidated hard and bouldery formation | Light | 200 | Up to 100 | Tool weight up to 1 000 kg |
| Medium | 200 | Up to 200 | Tool weight 1 001 to 2 000 kg |
| Heavy | 200 | Above 200 | Tool weight 2 001 kg and above |
|  | 1) Rotary-direct circulation: Suitable for drilling in hard abrasive alluvial, soil, clay shell, etc., formation | Light | 200 | Up to 250 | Up to 73 mm |
| Medium | 200 | Up to 450 | Up to 89 mm |
| Heavy | 200 | Above 450 | 89 mm and above |
| 2) Rotary reverse circulation: Suitable for drilling in soft alluvial, clay, small gravel and cobble formulations | Medium | 500/600 | Up to 170 | 150 mm |
| Heavy | 600/700 | Up to 200 | 150 mm |
|  | Down the hole (DTH Hammer): Suitable for drilling in hard rocks, like granite, gneiss, traps, basaltic formations | Light | 114 | Up to 50 | 76 mm |
| Medium | 150 | Up to 170 | 89/114 mm |
| Heavy | 200 | Above 170 | 114 mm |
|  | Combination (Rotary-cum-percussion): Suitable for drilling in alluvial, clay hard and bouldery formations | Medium |  |  |  |
| Rotary | 200 | Up to 300 | Up to 89 mm |
| Percussion | 300 | Up to 170 | Tool weight  1 001 to 2 000 kg |
| Heavy |  |  |  |
| Rotary | 200 | Up to 300 | Up to 89 mm |
| Percussion | 450 | Up to 170 | Tool weight 2 001 kg and above |
|  | DTH-cum-Rotary: Suitable for drilling in soft alluvial overburden and hard rock formation | Medium |  |  |  |
| DTH | 150 | Up to 170 | 89/114 mm |
| Rotary | 250 | Up to 50 | 114 mm |
| Heavy |  |  |  |
| DTH | 150 | Above 170 | 114 mm |
| Rotary | 250 | Above 50 | 114 mm |

**ANNEX A**

(*Foreword*)

**COMMITTEE COMPOSITION**

**Diamond Core and Waterwell Drilling Sectional Committee, MED 21**

|  |  |
| --- | --- |
| *Organization* | *Members* |
| Geological Survey of India, New Delhi | Shri Ajay Agarwal (***Chairperson***) |
| Aqseptence Group (India) Pvt. Ltd. (Formaly Known as Johanson Screens India Pvt. Ltd.) Sanand | Shri Shiv Narayan Singh  Shri Shiven Amin (*Alternate*) |
| Atlas Copco (I) Ltd. Pune | Shri Shudhanshu Nigam  Shri S. Datta Majumdar (*Alternate*) |
| Central Ground Water Board, Faridabad | Shri G. L. Meena  Shri Nidhish Verma (*Alternate*) |
| Central Mine Planning and Design Institute, Ranchi | Shri Anil Savanur  Shri A.V. Ramakrishna (*Alternate*) |
| Epiroc Mining India Limited, Nashik | Shri Sujeet Kumar  Shri Chandan Ghosh (*Alternate*) |
| Geological Survey of India, New Delhi | Shri Anup Kumar Johri  Shri C. B. Tiwari (*Alternate* I)  Shri S. Shankar (*Alternate* II) |
| Indian Institute of Technology, Kanpur | Prof J. Ramkumar  Prof Sudhanshu Shekhar Singh (*Alternate*) |
| Indian Institute of Technology, Kharagpur | Prof Khanindra Pathak  Shrimati Sunita Mishra (*Alternate*) |
| Indian Institute of Technology, Roorkee | Prof B.K. Gandhi  Shri Varun Kumar Sharma (*Alternate*) |
| Indian Pump Manufacturers Association, Mumbai | Shri Yogesh Mistry  Shri Utkarsh A. Chhaya (*Alternate*) |
| Indian Institute of Technology (ISM), Dhanbad | Mohammed Hamid Siddique  Shri Pawan Gupta (*Alternate* I)  Shri Vinay Kumar Rajak (*Alternate* II) |
| Kores (India) Ltd, Mumbai | Shri Sandeep Dholi |
| Mining Associates Pvt Ltd, Asansol | Shri Ram Babu Bansal |
| Rites Ltd, Gurgaon | Shri S. Kunal |
| Rockdrill (India), Jodhpur | Shri Kamal Kishor Gupta  Shri Ravindra Ku. Gupta (*Alternate*) |
| Sandvik Smith Asia Limited, Medak | Shri Rangayya Naidu  Shri N. Bhaskara Reddy (*Alternate*) |
| In Personal Capacity (*90 Mayur Vihar, Sec 48,*  *Chandigarh*) | Shri Mahesh Chandra Jindal |
| In Personal Capacity (*F-401, Maruti Sadan,*  *Begumpet, Hydrabad*) | Shri A. B. Anand |
| In Personal Capacity (*D-5/10, Rail Vihar, Indirapuram, Ghaziabad*) | Shri P. C. Dewli |
| BIS Directorate General | Shri K. V. Rao, Scientist ‘F’/Senior Director and Head (Mechanical Engineering) [Representing General (*Ex-officio*)] |

*Member Secretary*

Shri Shubham Yadav

Scientist ‘C’/Deputy Director

(Mechanical Engineering), BIS