इंटरनेट मानक

Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

"जानने का अधिकार, जीने का अधिकार"
Mazdoor Kisan Shakti Sangathan
"The Right to Information, The Right to Live"

"पुराने को छोड नये के तरफ"
Jawaharlal Nehru
"Step Out From the Old to the New"

IS 4464 (1985): Code of practice for presentation of drilling information and core description in foundation investigation [WRD 5: Gelogical Investigation and Subsurface Exploration]

"ज्ञान से एक नये भारत का निर्माण"
Satyanarayan Gangaram Pitroda
"Invent a New India Using Knowledge"

Act Number 22 of 2005
The Indian Parliament
RIGHT TO INFORMATION

Made Available By
Public.Resource.Org

"ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है"
Bhartṛhari—Nītiśatakam
"Knowledge is such a treasure which cannot be stolen"

BLANK PAGE

BRUTUM FULMEN

IGNORANTIA JURIS NON EXCUSAT

PROTECTED BY COPYRIGHT

IS : 4464 - 1985

(Reaffirmed 2004)

Indian Standard

CODE OF PRACTICE FOR PRESENTATION OF DRILLING INFORMATION AND CORE DESCRIPTION IN FOUNDATION INVESTIGATION

(First Revision)

UDC 624·131·343·57 : 627·81 : 624·15·001·5:006·76

© *Copyright* 1986

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

Gr 5 *November* 1986

Indian Standard

CODE OF PRACTICE FOR PRESENTATION OF DRILLING INFORMATION AND CORE DESCRIPTION IN FOUNDATION INVESTIGATION

(First Revision)

Geological Investigation and Subsurface Exploration Sectional Committee, BDC 49

Chairman	*Representing*
Shri B. Ramachandran	Geological Survey of India, Calcutta
Members	
Shri B. Anijaiah	Andhra Pradesh Engineering Research Laboratories, Hyderabad
Shri G. A. Bakshi	Cemindia Co Ltd, Bombay
Shri D. J. Ketkar (*Alternate*)	
Chief Engineer, Mukherian Hydel Project Design	Irrigation Department, Government of Punjab, Chandigarh
Superintending Engineer/ Project Circle (*Alternate*)	
Shri K. R. Datye	In personal capacity (*44, S. Bhagat Singh Road, Colaba, Bombay*)
Director	Central Water and Power Research Station, Pune
Director	Irrigation Research Institute, Roorkee
Director (FED)	Central Water Commission, New Delhi
Shri V. L. Goriani	Larsen and Toubro Ltd, Bombay
Shri V. Gupta (*Alternate*)	
Shri S. K. Kansal	Central Building Research Institute (CSIR), Roorkee
Shri M. R. Soneja (*Alternate*)	
Shri P. N. Khar	National Hydroelectric Power Corporation Ltd, New Delhi
Shri M. R. Bandyopadhyay (*Alternate*)	
Shri A. M. Narurkar	Asia Foundation and Construction (P) Ltd, Bombay
Dr N. V. Nayak (*Alternate*)	

(*Continued on page* 2)

© *Copyright* 1986
INDIAN STANDARDS INSTITUTION
This publication is protected under the *Indian Copyright Act* (XIV of 1957) and reproduction in whole or in part by any means except with written permission of the publisher shall be deemed to be an infringement of copyright under the said Act.

(*Continued from page* 1)

Members	*Representing*
Dr P. S. Nigam	Irrigation Department, Government of Uttar Pradesh, Lucknow
Shri G. Pant	Geological Survey of India, Calcutta
Shri N. K. Pillai	Voltas Ltd, Bombay
Shri A. N. Indurkar (*Alternate*)	
Shri S. N. Pradhan	Irrigation Department, Government of Orissa, Bhubaneshwar
Shri D. S. Reddy	Mineral Exploration Corporation, Nagpur
Research Officer, MERI	Irrigation Department, Government of Maharashtra, Bombay
Shri Ravendra Nath (*Alternate*)	
Senior Geologist	Irrigation Department, Government of Karnataka, Bangalore
Shri C. Sudhindra	Central Soil and Materials Research Station, New Delhi
Deputy Director (Rock Mechanics) (*Alternate*)	
Superintending Engineer, CDO	Irrigation Department, Government of Gujarat, Gandhinagar
Superintending Engineer (Geology) (*Alternate*)	
Superintending Engineer (Bridges)	Roads Wing, Ministry of Shipping and Transport, New Delhi
Shri G. Raman, Director (Civ Engg)	Director General, ISI (*Ex-officio Member*)

Secretary

Shri K. K. Sharma
Joint Director (Civ Engg), ISI

Indian Standard

CODE OF PRACTICE FOR PRESENTATION OF DRILLING INFORMATION AND CORE DESCRIPTION IN FOUNDATION INVESTIGATION

(First Revision)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 20 November 1985, after the draft finalized by the Geological Investigation and Subsurface Exploration Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 With the increased number of river valley projects and other major civil engineering works being undertaken in the wake of planned development of the country, tremendous amount of coring type of diamond drilling is being carried out. Each organization handling the individual projects is maintaining a record of the drilling data in its own way. In some cases (specially in the case of small works) it also happens that no record of the drilling data is maintained at all. As drilling is a very costly process, it is of utmost importance that full information from the holes drilled should be maintained in a standard way for reference and utilization on a future date, should the need arise.

0.3 This Indian Standard was first publised in 1967. Based on experience gained through the use of the standard, present revision has been prepared. Major changes include:

a) numbering system of sheets in the proforma;

b) addition of systematic rock description, rock weathering classification, discontinuity spacing and rock strength; and

c) addition of a new proforma for consolidated drilling log.

0.4 In the formulation of this standard due weightage has been given to international coordination among the standards and practices prevailing in different countries in addition to relating it to the practices in the field in this country.

1. SCOPE

1.1 This standard gives recommended proformas for keeping drill records, and for presenting drilling information relating to foundation investigations for river valley projects. General guidance for core description and for giving details in the proformas is also given.

2. STANDARD PROFORMA FOR KEEPING DRILL RECORDS

2.1 This proforma (*see* Appendix A) is expected to provide an accurate and comprehensive record of the geological conditions encountered together with any other relevant information obtained during drilling.

2.2 One sheet of the proforma should be used for one shift of drilling only, and should be filled by specially trained core observers, who shall be present whole time on the drilling job. The number of core observers required to cover a drilling machine will thus depend on the number of shifts the machine is running.

2.3 The proformas, duly filled, together with the cores should be examined at site by the engineering geologist of the project for preparation of the geological log of the hole.

2.4 Where an engineering geologist is not readily available, the information should be recorded by the core observer in the 'drilling log book' at site, the proforma of which is given in Appendix B, so that field observations are readily available in one register.

3. STANDARD PROFORMA FOR PRESENTING DRILLING INFORMATION

3.1 Proforma — The proforma which should be used for presenting drilling information is given in Appendix C.

3.2 Paper

3.2.1 *Size of Paper* — The overall width of the paper may be so chosen as to avoid wastage of printing paper. The length of the paper may be chosen to accommodate a log of 30 m or 60 m length of the hole as found necessary. It is found from experience that except for deep holes, most of the holes on construction projects are within this depth. For deeper holes, two or more sheets may be used.

3.2.2 It is desirable to use tracing paper for the proforma as this will enable prints being taken directly from the original log and will remove the necessity of tracing the same.

3.3 Scale — In the metric system a scale of 1 : 100 may be used for representing the depth in the bore hole.

NOTE — As a vast number of drilling equipment in use in the country are still in the fps system, a length of paper to accommodate entries for a 30 m (100 ft) or 61 m (200 ft) hole to a scale of 1 : 120 may be used.

3.4 Width of the Columns — The recommended width of each column for convenience of record of geological log of a drill-hole is given in Appendix C. These have been kept at the minimum required for legible filling of the data therein.

3.5 Thickness of the Lines of the Column — The main lines of the columns may be drawn in black ink so that they may come out very prominently on the print. The other lines, which may be drawn in pencil, will come in fainter shade and are meant to serve only as guides for plotting purposes.

3.6 Details of the Columns

3.6.1 *General* — The columns in the proforma are intended to be exhaustive so as to incorporate the full details which can be had from the cores. The number of holes should be prominently given in the rectangle at the right hand top corner. If there are more than one sheet used in one hole, these may be numbered as 16 (sheet 1 of 3), 16 (sheet 2 to 3), 16 (sheet 3 of 3), etc. The procedure given in **3.6.2** should be followed for filling up the proforma.

3.6.2 *Standard Method of Core Description*

3.6.2.1 It is endeavoured to incorporate as much information in the columns, as is conveniently possible, without making the proforma too cumbersome. The general principle adopted is to present the data in graphical form but in some cases where it is not possible to give graphical representation, resort to tabular representation may be made.

3.6.2.2 The horizontal columns on top of the proforma are self explanatory. The detailed procedure for filling the vertical columns are given below:

a) *Elevation* — The depth mark at every metre be shown, while every 3 metre is to be written in the description column. A horizontal line should be drawn and its R. L. written, corresponding to every significant entry in the subsequent columns, for example, at the start and at the end of a litho unit or a major shear zone (the same may be shown in sample log also).

b) *Lithology* — After the cores have been examined carefully, the description in regard to their lithology should be entered in this column using accepted symbols. In cases where many subdivisions of a standard rock type have to be used suitable derivatives from the accepted symbol may be evolved and used but explained.

A horizontal line should be drawn in the description and log column at every change of the lithology of the cores and thus only one symbol would be used in the log column between two horizontal lines. Corresponding to this entry in the log column, the name of the rock type should be entered in block letters against it in the description column of the lithology. Below this line in brackets and in small letters should be entered the depths of the hole between which the particular rock type is met, for example (10 to 15 m). If necessary a brief geological description of the rock type, such as colour, grain size or any other feature (for example, greyish white, fine grained and calcareous) may be given in the column observation and interpretation. Care should be taken that all the entries are accommodated within the vertical space available against the respective log column.

c) *Systematic rock description* — The following standard sequence of systematic description is proposed:

i) Weathered state,

ii) Structure,

iii) Colour,

iv) Grain size:

a) subordinate particle size,

b) texture,

c) alteration state,

d) cementation state as relevant,

v) Rock material strength,

vi)(a) mineral rock type as relevant, and

vi) rock name.

It is considered that the qualifications are more important in core descriptions than the actual rock name and, for this reason, the name should be placed last. Such a system is appropriate to an engineering description where classification by mechanical properties is more significant than classification by mineralogy and texture. The description for each litho unit met with should be written under the columns 'Special Observations and Interpretations of the Proforma'. The following examples are provided for illustrative purposes.

Fresh	Foliated	Dark Grey	Coarse	Very Strong	Hornblende	Gneiss
i	ii	iii	iv	v	vi (a)	vi
Moderately weathered	Thickly bedded	Cream	Medium-grained	Strong	Dolomitic	Limestone
i	ii	iii	iv	v	vi (a)	vi
Completely weathered	Thinly flowbanded	Mid-grey	Very coarse	Perphyritic	Kaolinized	
i	ii	iii	iv	iv (b)	iv (c)	
Weak	Tourmaline	Granite				
v	vi (a)	vi				

Weathering classification — The following system of weathering classification should be followed:

Item	*Description*	*Grade*
Fresh	No visible sign of rock material weathering; perhaps slight discoloration on major discontinuity surfaces.	I
Slightly weathered	Discoloration indicates weathering of rock material and discontinuity surfaces. All the rock material may be discoloured by weathering and may be somewhat weaker externally that in its fresh condition.	II
Moderately weathered	Less than half of the rock material is decomposed and/or disintegrated to a soil. Fresh or discoloured rock is present either as a continuous framework or as core stones.	III
Highly weathered	More than half of the rock material is decomposed and/or disintegrated to a soil. Fresh or discoloured rock is present either as a discontinuous framework or as core stones.	IV
Completely weathered	All rock material is decomposed and/or disintegrated to soil. The original mass structure is still largely intact.	V
Residual soil	All rock material is converted to soil. The mass structure and material fabric are destroyed. There is a large change in volume, but the soil has not been significantly transported.	VI

d) *Size of core pieces* — As the main interest on engineering projects is the evaluation of the physical condition of the rock type, this column is of great interest. A 100 percent core recovery may on one hand be consisting of big rods of cores while on another may be composed of small broken pieces of less than 10 mm each. The entry in this column should be in a graphical manner to give a visual idea of the condition of the core. If the core pieces are bigger than 150 mm each, it means that the rock is massive to blocky and as such 150 mm and above core pieces have been included in one column. On the other hand core pieces of less than 10 mm size are included in one column. As in general the cores are broken in small pieces the lower ranges have been given more representation and the column is divided into 10 mm, 10 to 25 mm, 25 to 75 mm, 75 to 150 mm and above 150 mm groups. A horizontal line should be drawn at each change of the size of core entered and the zone from the zero size line to the size line recorded should be shaded by inclined pencil lines.

e) *Structural condition* — In this column the structural condition of the cores should be entered, for example, heavily sheared and crushed, moderately sheared, blocky, etc. Suitable symbols should be entered in the log column with horizontal lines separating each entry and their description or name with the depths entered in the description column, in the same manner in which the lithology column is filled. Special features, like major joint planes, fractures, faults, etc, may be graphically plotted with their actual amount of dips in the log column here. Other useful details, such as the condition of weathering may also be recorded in this column with suitable symbols as indicated in **3.6.2.2**(c).

f) *Discontinuity spacing* — Considerations of discontinuity spacing should lead to an appraisal of rock mass structure; this may be assisted by field observation. In the case of sedimentary rock, where bedding may be the dominant discontinuity, it is possible to recognize and define a bedding spacing from borehole cores. This system has the advantage that the scale is related to that used in the mechanical analysis of soils. The following classification should be followed:

Classification	*Bedding Plane Spacing*	*Soil Grading*
Very thickly bedded	2 m	Boulders
Thickly bedded	0·6 to 2 m	
Medium bedded	0·2 to 0·6 m	
Thinly bedded	60 to 0·2 m	Cobbles
Very thinly bedded	20 to 60 mm	Coarse gravel
Laminated	6 to 20 mm	Medium gravel
Thinly laminated	< 6 mm	Sand and fine gravel

For igneous and metamorphic rocks the separation of the integral rock discontinuities (such as foliation, flow-banding, etc) may be described by adaptation of the bedding plane spacing scale given above, for example, medium foliated geneiss. It is suggested that 'close' and 'very close' are applied to that part of the scale where a sedimentary rock would be described as 'laminated' or 'thinly laminated'.

Terms such as blocky, intact, uniform, etc, may be used providing these terms are defined in the preamble to the bore-hole records and are based on *in-situ* inspection of the rock mass or by deduction from several boreholes.

g) *Core recovery* — In this column the core recovery should be plotted in graphical form. A horizontal line should be drawn at the interval of each run of drilling and the line representing the percentage of core recovery entered should be shaded by inclined pencil lines. The percentage of core recovery may also be written in the column, in addition.

h) *Rock quality designation (RQD)* — This classification is based on a modified core recovery procedure, which in turn, is based indirectly on the number of fractures and the amount of softening or alteration in the rock mass as observed in the rock cores from a drill hole. RQD shall be based on IS : 11315 (Part 11) - 1985*.

j) *Fracture frequency* — RQD, given above, however, does not take into account the joint opening and condition; a further disadvantage being that with fracture spacing greater than 100 mm the quality is excellent irrespective of the actual spacing. This difficulty is overcome by using fracture frequency. The rock quality relation between RQD and Fracture Frequency is given as under:

Description of Rock Quality	*RQD, Percent*	*Fracture Frequency per* m
Very poor	0-25	Over 15
Poor	25-50	15-8
Fair	50-75	8-5
Good	75-90	5-1
Excellent	90-100	Less than 1

k) *Size of hole* — A horizontal line should be drawn at the change of the size of the hole and a vertical line with arrow heads with

*Method for quantitative description of discontinuities in rock masses: Part 11 Core recovery and rock quality.

the size of the hole (NX, BX, etc) written in the middle of it should be drawn in the entire portion of the column, representing the particular size of the hole. Thus if the entire hole is of NX size only one vertical line will be drawn from top to bottom of the column with arrow heads on both the ends with NX written along it, midway. But if there is a change, one portion, with the two arrow heads, will have NX written in it, while the other will have BX; and so on for AX and EX.

m) *Casing* — Each vertical column in this heading is meant for different sizes of the casings normally used during drilling. The blank column is meant to cover any special size which might have been used in some cases. A horizontal line should be drawn in each column at the depth to which the respective sizes of the casing have been lowered and as all of these have to extend up to the top, vertical line from top to the horizontal lines drawn below with arrow heads on each end should be drawn in each of the columns. Horizontal lines may further be drawn within the columns to indicate the stages in which the individual type of casing was lowered to its final depth.

n) *Depth of water level* — The depth of the water level as observed during drilling should be recorded in this column. A horizontal line should be drawn at the depth to which the hole had progressed when the reading was taken and just above this line, the depth to water level from surface should be entered. For example, if the depth to water in the hole was 25 m when the hole had been drilled to 30 m depth, a horizontal line should be drawn in this column at 30 m depth and 25 m should be recorded just above it.

p) *Drill water loss* — The loss of drilling water should be recorded graphically in this column. A horizontal line should be drawn separating the different drilling runs. The percentage of water loss in individual runs should be entered by vertical lines corresponding to the respective losses and the portion between the zero percent loss and the line representing the loss in the run should be shaded by inclined pencil lines. In case the losses are given in qualitative terms rather than percent of loss, for example, complete, partial or no water loss, 100 percent, 50 percent and 0 percent values respectively, as shown in the title of the column may be used [*see also* Note *under* (s)].

q) *Permeability* — The permeability of the material of any section, as calculated, may be entered in this column. The permeability values should either be entered in Lugeons or mm/s.

NOTE — A Lugeon unit of permeability is a water loss of one litre per minute per metre of drill hole at a pressure of 10 atmospheres maintained for 10 minutes.

r) *Penetration rate* — The rate of penetration is primarily dependent on the type of the rock. It, of course, depends on many other factors like the intensity of joints, nature of infilling material, degree of weathering of the rock, etc; even then it is very useful in interpreting the geological conditions together with other details. It is, therefore, suggested that a suitable vertical column for the graphical or numerical presentation of the rate of penetration in mm/minute may be provided. The number of core boxes (for example, 1/3, 2/3, 3/3) housing the cores of different depths can be recorded suitably in the proforma.

s) *Special observations and interpretations* — This column is meant for recording the interpretations drawn on the basis of factual data recorded in the previous columns. The physical condition and quality of the overburden and rock, causes as to breaking up of the drill core, presence of confined or free ground water conditions, and record of grouting done, if any, and results of percolation and permeability data should be detailed in relation to the foundation features. In addition to the tests specified above it will be desirable to carry out standard penetration test (*see* IS : 2131-1981*) specially for weathered rock for assessing its bearing capacity.

NOTE — In interpreting water losses caution should be exercised to eliminate the effect of water losses occurring at a horizon other than that for which the observation is recorded. In this connection interpretation on the basis of a combined study will be advantageous.

t) *Conclusions* — The entries in this column should be restricted to the specific results for which the exploratory hole was drilled. Dependent on the requirements of the civil engineering structure, significant data and interpretations may be drawn for the following:

1) Nature and depth of overburden material;
2) Depth and elevation to fresh and sound rock;
3) Depth of recommended stripping/foundation level;
4) Permeability of foundation rocks and need or otherwise of grouting;
5) Nature and depth of ground water table (free, confined or perched);
6) Results of tests conducted on cores/weak zones, etc; and
7) Possible implications of significant weak zones and methods of remedial treatment, etc.

*Method of standard penetration test for soils (*first revision*).

3.6.2.3 *General*

a) If data for filling any column has not been observed or is not available, the respective column should be left blank;

b) Details of all the reaches of the cores recovered should be entered even if they may belong to the overburden zone. In many cases the classification and composition of the overburden assumes great significance both for the project and for academic purpose;

c) Endeavour should be made to record all the information which can be had from the hole, though it may look irrelevant for the specific job in hand. Drilling being a very costly affair, this information will otherwise be lost forever; and

d) *Strength* — It will be desirable to indicate in the final presentation of drilling data the strength characteristics of the rock mass. For this purpose, a scale of strength, based on uniaxial compressive tests, is recommended as under:

Strength, N/mm²	*Term*
Up to 1·25	Very weak
1·25 to 5	Weak
5 to 12·5	Moderately weak
12·5 to 50	Moderately strong
50 to 100	Strong
100 to 200	Very strong
200	Extremely strong

APPENDIX A

(*Clause* 2.1)

DAILY DRILL REPORT

Project **Location** **Feature**

Drill No. and type:
Screw feed/hydraulic feed:
Collar elevation:
Ground elevation:
Date:
Shift: From......h to ...... h:
Depth of water level:

At start of shift:

At end of shift:

Pump No.:
Capacity and pressure used:
Hole No.:
Co-ordinates:
Bearing of hole:
Angle with vertical:
Depth drilled during the shift:
From To

Run		Length Drilled mm	Type and Size of Hole	Colour of Return Water	Type of Soil/ Rock	Water Loss with Depth	Core Recovery			Rate of Penet-ration mm/ min	Remarks
From m	To m						Length	Per-cen-tage	Sl No. of Cores		
1	2	3	4	5	6	7	8	9	10	11	12

Supplies				Casing Lowered			Bits Used			
Petrol	Diesel	Motor oil	Misc	Size	From depth	To depth	Type and size	From depth	To depth	Old or new with number

Drill Foreman/Supervisor

Operator

Officer-in-Charge

Drill Observer

DRILL OBSERVER'S REMARKS

1) Water loss during drilling may either be recorded as:

(i) complete when no water is coming out; partial; or nil water loss; or (ii) in percentage of return water [100 percent loss when no water is coming back and no water loss (0 percent) when all the drilling water is coming back].

2) Penetration speed in special zones (soft or broken zones); and other details of drilling like heavy vibration recorded during drilling.

3) Reasons for heavy core loss as integrated with speed of drilling.

4) Any special conditions not recorded; for example, depth at which blasting was done while driving casing, depth at which hole was grouted, artesian water conditions (if any observed) during drilling.

5) If water flows are encountered at the collar of the drill, then the pressure head and discharge at the collar should be recorded. On completion of the hole, the pressure decline over a period of time should also be recorded.

APPENDIX B

(*Clause* 2.4)

CONSOLIDATED DRILLING LOG

Top R.L.

Project Site:	Angle from vertical:	Machine:
Hole No.:	Bearing of angle hole:	Driller:
Location:	Water table R.L.:	Logged by:
Co-ordinates:	River water R.L. :	

												Percolation Test								Pentration Test		
Date and time	Size of hole	Depth of casing	Depth of hole	Length drilled	Core run	Percent core recovery and RQD	Serial No. of cores	Wash water colour	Type of core barrel and bit used	Description of strata	Other drilling notes	Depth slab	Pressure in N/mm^2	Water Meter Reading		Loss in litres	Time in minutes	Loss in litres per minute	Lugeons	No. of blows	Penetration	Standard Promotion Test (S.P.T.) value
														Initial	Final							
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	5.	16.	17.	18.	19.	20.	21.	22.	23.

APPENDIX C

(*Clauses* 3.1 *and* 3.4)

PROFORMA FOR PRESENTING DRILLING INFORMATION

PROJECT ______________ | HOLE NO. ______ | SHEET NO. ____

GEOLOGICAL LOG OF DRILL HOLE

LOCATION ______________ CO-ORDINATES ______________ FEATURE ______________

BEARING OF HOLE ______________ ANGLE WITH HORIZONTAL ______________ TOTAL DEPTH ______________

COLLAR ELEVATION ______________ GROUND ELEVATION ______________ TYPE(S) OF CORE BARREL ______________

STARTED ______________ COMPLETED ______________ DRILLING AGENCY ______________

ELEVATION, m	LITHOLOGY		SIZE OF CORE PIECES					STRUCTURAL CONDITIONS		PERCENT CORE RECOVERY	TYPE OF BIT	R.Q.D.	FRACT. FREQUENCY/m	SIZE OF HOLE	CASING	DEPTH OF WATER LEVEL	DRILL WATER LOSS		PERMEABILITY		PENETRATION RATE mm/min	SPECIAL OBSERVATIONS AND INTERPRETATIONS
	DESCRIPTION	LOG	< 10 mm	10 TO 25 mm	25 TO 75 mm	75 TO 150 mm	> 150 mm	DESCRIPTION	LOG	0 20 40 60 80 100							PARTIAL	COMPLETE	TEST SECTION	mm/s OR LUGEON		
		3																				
		6																				
		9																				
		21																				
		24																				
		27																				
		30																				

ORGANISATION ______________
DEPARTMENT ______________
GOVERNMENT OF ______________

LOGGED BY ______________
CHECKED BY ______________

APPROVED BY ______________

DRAWING NO ______
DATE ______

INDIAN STANDARDS INSTITUTION

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*
*Western : Manakalaya, E9 MIDC, Marol, Andheri (East), BOMBAY 400093	6 32 92 95
†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
Branch Offices:	
'Pushpak', Nurmohamed Shaikh Marg, Khanpur, AHMADABAD 380001	2 63 48 2 63 49
'F' Block, Unity Bldg, Narasimharaja Square, BANGALORE 560002	22 48 05
Gangotri Complex, Bhadbhada Road, T. T. Nagar, BHOPAL 462003	6 67 16
22E Kalpana Area, BHUBANESHWAR 7510014	5 36 27
53/5 Ward No. 29, R.G. Barua Road, 5th By-lane GUWAHATI 781003	—
5-8-56C L. N. Gupta Marg, 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
Hantex Bldg (2nd Floor), Railway Station Road, TRIVANDRUM 695001	7 66 37
Inspection Office (With Sale Point):	
Institution of Engineers (India) Building, 1332 Shivaji Nagar, PUNE 411005	5 24 35

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

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

Printed at Swatantra Bharat Press, Delhi (India)