

# इंटरनेट

# मानक

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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 छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 4986 (2002): Installation of Raingauge (Non-Recording Type) and Measurement of Rain - Code of Practice [WRD 1: Hydrometry]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”



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भारतीय मानक  
वर्षा मापी (गैर-रिकार्डिंग टाइप) के संस्थापन  
और वर्षा मापन — रीति संहिता  
(दूसरा पुनरीक्षण)

*Indian Standard*  
INSTALLATION OF RAINGAUGE  
(NON-RECORDING TYPE) AND MEASUREMENT  
OF RAIN — CODE OF PRACTICE  
(*Second Revision*)

ICS 17.060

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

## FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Ground Water and Related Investigation Sectional Committee had been approved by the Water Resources Division Council.

All forms of precipitation shall be measured on the basis of vertical depth of water or water equivalent which will accumulate on a level surface if the precipitation accumulates without loss. The measurement of precipitation, therefore, presumes that the observations made at a point is representative of certain area around the point to which the measurements refer to.

The choice of instrument for a site, the exposure condition of the instrument and prevention of loss of precipitation by evaporation or wind are important points to be considered. Before analyzing the rainfall data from raingauges within a catchment, the condition of the raingauge, its maintenance, period of data and control exercised on the quality of data collected should be examined.

In the formulation of this standard, due weightage has been given to International co-ordination among the standards and practices prevailing in different countries in addition to relating it to the practices in the field in this country.

This standard was first published in 1968 and subsequently revised in 1983. Based on changes in meteorological measurement practices, this revision has been taken up based on suggestions of Indian Meteorological Department. Important changes effected in this revision are the provision of an illustratory map delineating the location of a raingauge with reference to the surrounding objects and the modifications made in the form for reporting hail storms.

There is no ISO standard on the subject. This standard has been prepared based on indigenous manufacturers' data/practices prevalent in the field in India.

The composition of the Committee responsible for the formulation of this standard is given at Annex D.

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 this standard.

## *Indian Standard*

# INSTALLATION OF RAINGAUGE (NON-RECORDING TYPE) AND MEASUREMENT OF RAIN — CODE OF PRACTICE ( *Second Revision* )

## 1 SCOPE

This standard covers the details regarding the installation of raingauge (non-recording type), method of measurement and recording of precipitation.

## 2 REFERENCES

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

<i>IS No.</i>	<i>Title</i>
4849 : 1992	Meteorology — Rain measures ( <i>first revision</i> )
5225 : 1992	Meteorology — Raingauge, non-recording ( <i>first revision</i> )

## 3 EXPOSURE OF RAINGAUGE

**3.1** The amount of precipitation collected by a raingauge depends on its exposure and the details given in 3.1.1 to 3.1.5 shall be specially taken into consideration in selecting a suitable site.

**3.1.1** The gauge shall be placed on level ground not upon a slope or terrace and never on a wall or roof.

**3.1.2** On no account the raingauge shall be placed on a slope such that the ground falls away steeply on the side of the prevailing wind.

**3.1.3** The distance between the raingauge and the nearest object should generally be four times the height of the object, but never shall be less than twice the height of the object.

**3.1.4** Great care shall be taken at mountain and coastal stations that the gauges are not unduly exposed to the sweep of the wind. A belt of trees or a wall on the side of the prevailing wind at a distance, preferably four times its own height but exceeding at least twice its height, shall form an efficient shelter.

**3.1.5** Where the observations have to be made on an extensive sloping surface such as the side of a

mountain, effort should be made to expose the gauge on a smooth side which is sufficiently large in area and whose slope and orientation correspond to the average slope and orientation of the surrounding. The raingauge should be installed on stable slopes in hilly areas.

## 4 INSTALLATION OF RAINGAUGE

**4.1** The raingauge shall be fixed on a masonry or concrete foundation 600 mm × 600 mm × 600 mm sunk into the ground. It may also be fixed using steel structure.

**4.2** Into this foundation, the base of the gauge shall be cemented so that the rim of the gauge is horizontal and exactly 300 mm above ground level. This height is necessary to prevent more than a negligible amount of water splashing into the gauge. If the height exceeds 300 mm the amount of rain collected decreases owing to wind eddies set up by the gauge.

**4.3** In order that observations at different stations may be comparable, the exposure must be as uniform as possible at all stations.

**4.4** In flood-prone areas the level of the raingauge shall be kept 300 mm above the maximum flood line.

**4.5** After the Installation of the raingauge, a plan or sketch showing various objects with their heights and their distances from the raingauge shall be prepared and kept in record.

## 5 PROTECTION OF RAINGAUGE

**5.1** The raingauge shall be protected from being damaged (particularly by stray cattle) by erecting a fence around it as shown in Fig. 2. This may be made of any suitable material. The fence shall be such that the top of the fence is not higher than half the distance of the fence from the gauge.

**5.2** The raingauge shall be kept locked and periodically painted to prevent its surface from corroding or deteriorating.

## 6 MEASUREMENT OF RAIN FALL

**6.1** To measure the rainfall, the water in the bottle shall be poured into the glass measuring cylinder (*see*

IS 4849) which shall be placed on a level surface. Care shall be taken to avoid spilling of the collected water. The eye shall then be brought horizontal at the bottom of the curved surface of the water (meniscus) and its reading shall be taken. If the bottom surface of the water rests between two divisions, the rainfall should be estimated to the nearest 0.1 mm.

**6.2** If there is more water in the bottle, than the measuring glass can hold, the glass shall be filled up nearly to the top most graduation mark and the reading noted shall be written down. This water shall then be thrown away and the above process repeated till all the water collected has been individually measured and written down. The total rainfall shall be the sum of all these measurement.

**6.3** The rain water in the gauge shall be measured every day at 0830 h Indian Standard Time (IST) and the raingauge shall be examined every day at that hour even when in the observer's opinion no rain has fallen.

**6.4** The observer at each station shall maintain a written record of the rainfall measured at 0830 h Indian Standard Time daily. A recommended form in which the record is to be maintained is given at Annex A. The amount of rainfall measured shall entered against the date of measurement irrespective of the fact whether the rainfall was received on the date of measurement or on the previous date.

**6.5** Raingauge of appropriate capacity as specified in IS 5225 shall be used to ensure the measurement of extremes of rainfall in the event of the observer being unable to take observations repeatedly on the day of such heavy rainfall.

**6.6** If it is raining at the time of observation, all operations shall be completed as quickly as possible to avoid errors. If rainfall is heavy at the time of observation, a spare bottle shall be placed inside the receiver immediately after the one inside is taken out for measurement, in order that no rain is missed during the interval. The bottle shall then be replaced quickly and the rainfall collected in the spare bottle shall be poured into it.

**6.7** If owing to neglect of the directions given in 6.6, the bottle has overflowed, the overflow receiver shall be taken up, and its contents measured and added to those of the bottle. If there is water in the overflow receiver when the bottle is not full, the bottle should be examined for leaks.

**6.8** In order to avoid damage to the rim of the collector, the following procedure should be adopted while handling the raingauge:

- a) The collector should be removed gently and held in one hand;

- b) The receiver should be taken out with the other hand;
- c) The collector should be replaced;
- d) After measurement of the rainfall, the collector should be again removed and held in one hand and the receiver should be restored to its position in the raingauge with the other hand; and
- e) The collector should be replaced in its prescribed position for locking.

**6.9** Proper instructions and training shall be given to an observer before being given the charge of a raingauge station.

## 7 MEASUREMENT OF SNOW AND FROZEN RAINWATER

**7.1** At high altitude stations (such as in the Himalayas) precipitation during winter is often in the form of snow or a mixture of snow and rain. Where snowfall is predominant it is essential to install a snowgauge, in addition to the raingauge for the measurement of snowfall.

**7.2** If only a standard raingauge is installed, the amount of snow or frozen rainwater collected in the raingauge shall be melted, by adding through the tunnel an adequate quantity of warm water, previously measured accurately with the measuring glass. The total water content in the receiver shall then be measured using the measuring glass. The measurement thus obtained would give the total of the precipitation and the added warm water. By subtracting the amount representing the added warm water, the amount of precipitation can be determined which shall be entered in the register.

**7.3** When snowfall is heavy, the reading of the raingauge might be unreliable in the event of the gauge being entirely buried under snow or in the event of the snow being blown away by wind. Under such conditions separate measurements as given in 7.3.1 and 7.3.2 should be made.

**7.3.1** The amount of water (actual rain or melted snow) already in the receiver shall be measured first. Then all the snow accumulated over the collector shall be pressed into the funnel. This snow shall be melted and its equivalent water obtained as described in 7.2. The sum of the two measurements gives the total amount of precipitation, which shall be entered in the register. Remarks that 'both snow and rain were present' shall be recorded in the register.

**7.3.2** The depth of snow (fresh and undrifted) shall be measured by vertically plunging a pole or rod, graduated in millimetre into the snow where it lies on a previously prepared hard surface of level ground. A number of measurements shall be taken and mean

depth of snow in millimetres divided by 10, approximately gives the water equivalent of snow in millimetres and tenths of a millimetre that should be entered in the register.

#### 7.4 Method of Measurement of Snowfall

When the precipitation is only in the form of snow, the method for measurement of snowfall as given in 7.4.1 shall be adopted.

##### 7.4.1 Pole Platform Method

A square platform 2 m × 2 m and 75 mm thick made of cement concrete shall be constructed at ground level in a place where there is least drifting due to wind. A scale may be permanently fixed at the centre of the platform. The scale shall be a 50 mm square wooden pole projecting 3 m above the level of the platform and grouted 1 m below it. The graduations shall be in metric units and painted on the four sides of the pole. Another scale in the form of a wooden stick 25 mm square having metric graduations shall also be provided to the station. While taking observation, the observer shall first read the scale at the centre for the depth up to which it is submerged in snow. With the help of the other scale the depth of snowfall at four corners of the platform shall be read. The mean of the five readings shall be taken as the amount of snowfall. At the end of each observation, the observer shall clear the platform of snow so that the next snowfall measurement is not vitiated by the snow accumulation which has already been measured. The mean depth of snowfall in millimetres divided by 10, approximately gives the water equivalent of snow in millimetres.

#### 8 BREAKAGE OF THE MEASURING GLASS

8.1 Every raingauge station shall be provided with at least two measuring glasses. When the measuring glass in regular use is broken, the spare measuring glass shall be brought into use at once, and another measuring glass shall be procured at the same time.

8.2 If it should be happen that the spare measuring glass at any station is also broken, special arrangements shall be made for the measurement of the rainfall during the interval between the breakage of the measuring glass and the arrival of a new measuring glass. An apothecary's fluid measuring glass shall be temporarily used to measure the rainfall until the broken measuring glass is replaced. In the event of the measuring glass being broken and the apothecary's measuring glass not being procurable, the rainfall collected on each day shall be stored up in a separate bottle, and kept corked. Each bottle containing the rainfall for each particular day shall be labelled and on receipt of a new measuring glass the rainfall shall be measured and entered in the register.

#### 9 INSPECTION OF RAINGAUGES

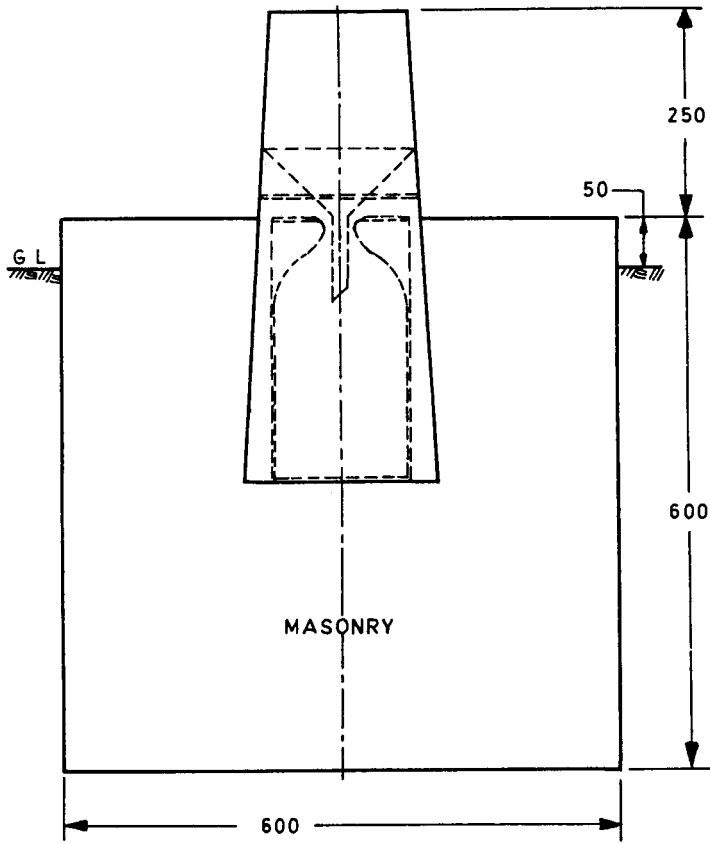
9.1 Raingauges shall be inspected periodically, at least twice a year, as the observers often allow large changes to take place in the exposure of a gauge without being aware that action is necessary. Inspections should be suitably spaced so that there is at least one inspection before the monsoon. The main object of inspection shall be to determine:

- a) whether the site conditions confirms to Fig. 1 and Fig. 2;
- b) whether the instrument is suitably placed and is in order;
- c) whether spare cylinder is readily available;
- d) whether the observer notes the rainfall measurements correctly and enters them properly in the rainfall records;
- e) whether the rainfall records are properly and neatly kept and are in good order;
- f) whether the observer makes his measurements at 0830 h IST;
- g) whether any part of the raingauge requires repair or replacement;
- h) whether there has been any change of site;
- j) at places where exceptionally heavy rainfall is recorded, it shall be ascertained that the bottle inside the receiver is of suitable capacity and not likely to overflow on days of heavy rainfall; and
- k) whether data are entered accurately in the input files of the data base software, if available.

9.1.1 In order to determine whether the instrument is suitably placed and is in good order, the following points shall be ascertained:

- a) whether there is any tree growing up or houses being built which are likely to affect the exposure, or whether it is likely to be flooded in the event of heavy rain;
- b) whether the gauge is firmly fixed, so that it is not likely to be blown over;
- c) whether the rim, when pressed home, is level. As all gauges are made level when first erected, it may not be necessary to use spirit level at the time of inspection. However, it shall be checked that no obvious displacement of the raingauge has taken place;
- d) Whether the rim, or mouth, of the collector is circular; and
- e) the drains of storm water if any, be maintained properly so that there is no accumulation of rainwater to affect the gauges.





All dimensions in millimetres.

FIG. 1 INSTALLATION OF RAINGAUGE

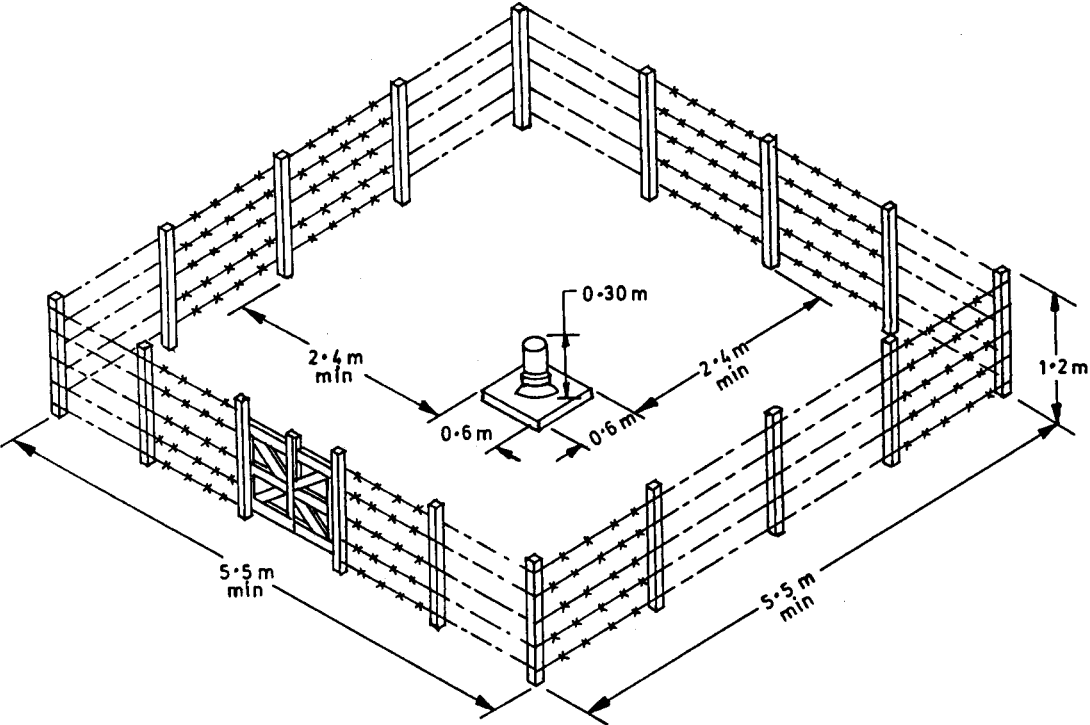


FIG. 2 A RAINGAUGE INSTALLED WITHIN FENCE

**9.1.2** In order to ascertain whether the observer can measure rainfall accurately and make entries correctly, the bottle shall be partially filled two or three times with different quantities of water and the observer shall be required to measure them and write down the entries. If he cannot do this correctly, the inspecting officer should instruct the observer fully.

**9.1.3** The inspector shall also see that the rainfall register is in good condition and the entries in it are carefully and neatly made. He shall also verify that the observer knows how to make entries correctly in

the register. The inspector shall prepare the inspection report in the proforma given in Annex B.

## **10 HAIL STORM REPORTS**

Hail is precipitation of frozen water in the form of balls or irregular lumps of ice, more or less transparent and usually occurs in association with violent thunder storms. The observer-in-charge of the raingauge station shall report to the nearest meteorological centre, the details regarding the hail storm in the proforma given at Annex C.

ANNEX A

(Clause 6.4)

FORM FOR THE RECORD OF RAINFALL

Daily rainfall for the year.....  
Sub-catchment .....  
River .....  
Catchment .....  
Station ..... District..... State.....  
Height above }  
mean sea level }      Metres      Latitude..... Longitude.....

Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1												
2												
3												
4												
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27												
28												
29												
30												
31												

Total rainfall  
Total rainy days<sup>1)</sup>

NOTE — Annual totals shall be given in the small spaces at the end of the last two rows.

<sup>1)</sup> If rainfall recorded during 24 hours ending at 0830 h IST against any date in 2.5 mm or more, then the particular date is counted as rainy.

**ANNEX B***(Clause 9.1.3)***RAINGAUGE INSPECTION REPORT**

Inspection report received from inspector on .....

Inspection report of raingauge (RG) station at .....

District ..... State ..... Latitude ..... N Longitude ..... E

Inspected on .....

By ..... Height above M.S.L ..... Metres

*Remarks at Scrutinizing Office<sup>1</sup>***1 RAINGAUGE DISTRICTS, ADDRESSES OF OFFICES, ETC**

- a) RG situated in.....  
(Mention exact place). On plain land/hilly slope/hill top/plateau. Name of the river catchment/  
sub-catchment
- b) When was the RG installed at/shifted to the present site ?
- c) Name and distance from RG of the nearest  
Telegraph office.....  
Post office.....  
Dak bungalow or hotel or any place where  
the inspecting officer may stay.....  
Railway station/landing pier/bus station.....
- d) Type of conveyance available

**1.1 Offices**

<i>Office</i>	<i>Name, Designation and Address</i>
Honorary superintendent	
Observer	
Deputy observer	
Controlling authority	
RG maintained by	
RG belongs to	
P.W.D. or equivalent authority	

**2 REPORTS OF RAINFALL**

- a) Prescribed time(s) of taking observation(s) IST
- b) Rainfall reports sent by post, telegram/fax/E-mail (code of telegram/fax no./E-mail address, if any)
- c) Period during which sent
- d) Date of last inspection
- e) Date of following inspection
- f) Heavy rainfall report sent to :  
Code address  
Period during which sent  
Amount of rainfall
- g) Arrangements, if any, for special observations

**3 EXPOSURE**

- a) Nature of nearby object
- b) Its distance  $d$  in metres from RG
- c) Its height  $h$  in metres
- d)  $\frac{h}{d}$
- e) Direction with respect to RG

**3.1** General remarks about the surrounding areas (if there are trees growing up or buildings being built that are likely to affect the exposure, give details as above. There should be no object like a tree or building in the neighbourhood such that its height is greater than half its distance from the RG, though some objects in conformity with the above may be present in order to mitigate the effects of wind. Mention special features, if any, such as proximity to the sea or a river, sandy or rocky soil, etc)

**3.2** Mention whether a photograph or sketch or plan of the RG is attached to this report. Whenever practicable this should be done

**4 DETAILS OF COLLECTOR**

- a) Funnel and Tube
 

Condition	No.	Maker
Rim horizontal?		
Height of rim above ground		
Funnel diameters	Dented ?	
Is the funnel tube clean and free from choking due to dust or dirt or insects?		
- b) Base and Body
 

Firmly fixed in ground and how?
Condition of paint
General condition
- c) Receiver in use
 

Max capacity of bottle	mm
Max capacity of overflow receiver	mm
Leaking?	
Likely to overflow in heavy rain	
- d) Measure glass No. Maker to measure
 

mm
General condition
Clean?
Sub-division suited for funnel in use?
Calibration test
- e) Fence : Dimensions ( $l \times b \times h$ ) Condition
- f) Whether provided with lock and key?
- g) Any other remarks

**5 PARTICULARS ABOUT OBSERVER/DEPUTY OBSERVER**

Observer/Deputy  
Observer

- a) Can he read to tenth of an mm ?
- b) Does he take observation(s) at the prescribed time?

- c) Are observations entered in pocket rainfall register direct or on slips of paper in the first instance ?
- d) Does he pick up instructions readily ?
- e) Does he know how to measure rain on days of snow or hail ?
- f) Is he acquainted with the current instructions regarding issue of heavy rainfall telegrams ?
- g) Distance of residence from RG site
- h) Are rainfall records and correspondence properly maintained ?
- j) Are returns sent regularly ?
- k) Special instructions given, if any
- m) Other remarks

## 6 FLOODS

- a) Have there been floods during which the RG was submerged ?
- b) Is the RG at its present site likely to be submerged in the event of flooding of the station?
- c) Report on interview with superintendent or other authority
- d) Periods for which the past records are available and the authorities maintaining them
- e) Maintenance of present records including authority
- f) Publication(s) in which the rainfall data appear
- g) Other remarks

## 7 DETAILS OF MISCELLANEOUS ITEMS

- a) Stores and instruments, including spare parts (Particularly measure glass)
- b) Details, publications, stationery, etc

## 8 INSPECTOR'S RECOMMENDATIONS<sup>2)</sup>

## 9 ORDERS OF SCRUTINIZING OFFICE

- a) Orders, notes and action taken (to be given by scrutinizing office)
- b) Orders
- c) Notes, including notes for next inspection

<sup>1)</sup> Scrutinizing Office means the office of the Rainfall Registration Authority like the Director of Agriculture, Director of Land Records, etc, to whom this report shall be forwarded.

<sup>2)</sup> Recommendations shall include those for removal or reduction of height of obstacle if possible, or shifting of the RG. If shifting is recommended a plan of the new site showing the proposed positions of the RG and the neighbouring objects, if any, together with their distance from the RG and their heights should be given.

ANNEX C

(Clause 10)

A TYPICAL HAIL STORM REPORT

<i>Date (Day, Month &amp; Year)</i>	<i>Area Affected by Storm</i>	<i>Hour of Occurrence</i>	<i>Duration of Storm</i>	<i>Direction From Which it Came</i>	<i>Approximate Size or Weight of Largest Stone</i>	<i>Character Storm</i>	<i>Estimate of Damage Caused by Storm</i>
25-05-1960	About 50 km <sup>2</sup>	1610 IST	About 10 minutes	South West	About one cm in diameter	Ordinary not violent	A little damage to onion and tomato crops

Signature.....

Rain Recording Officer/Observer

## ANNEX D

## ( Foreword )

## COMMITTEE COMPOSITION

## Ground Water and Related Investigation Sectional Committee, WRD 3

<i>Organization</i>	<i>Representative(s)</i>
Central Ground Water Board, New Delhi	SHRI D. K. CHADHA ( <i>Chairman</i> )
Central Pollution Control Board, New Delhi	SHRI T. VENUGOPAL SHRIMATI MITA SHARMA ( <i>Alternate</i> )
Central Electricity Authority, New Delhi	SHRI MAJOR SINGH SHRI S. B. ATRI ( <i>Alternate</i> )
Central Ground Water Board, New Delhi	DR SURAJ KUMAR SHARMA SHRI SANTOSH KUMAR SHARMA ( <i>Alternate</i> )
Central Soil & Material Research Station, New Delhi	SHRI N. K. VERMA CHIEF RESEARCH OFFICER (III) ( <i>Alternate</i> )
Central Soil Salinity Research Institute, Karnal	DR S. K. GUPTA
Central Water Commission, New Delhi	CHIEF ENGINEER YAMUNA BASIN SUPERINTENDING ENGINEER (PLANNING CIRCLE) ( <i>Alternate</i> )
Central Water & Power Research Station, Pune	SHRI N. GHOSH SHRI RAM TEKA ( <i>Alternate</i> )
Center for Water Resources Development & Management, Kerala	DR E. J. JAMES EXECUTIVE DIRECTOR ( <i>Alternate</i> )
Geological Survey of India, Lucknow	SHRI S. KUMAR SHRI Y. DEVA ( <i>Alternate</i> )
Ground Water Surveys & Development Agency, Pune	SHRI F. J. JADHAV SHRI S. P. BAGDE ( <i>Alternate</i> )
Gujarat Water Resources Development Corporation, Gandhinagar	SHRI V. V. AYACHIT SHRI A. A. KHAN ( <i>Alternate</i> )
India Meteorological Department, New Delhi	DR J. K. KHANNA
Irrigation Department, Government of Karnataka, Bangalore	SENIOR GEOLOGIST
Irrigation Department, Government of Maharashtra, Nagpur	SUPERINTENDING ENGINEER
Irrigation Department, Government of Punjab, Chandigarh	CHIEF ENGINEER DIRECTOR ( <i>Alternate</i> )
Irrigation Department, Government of Uttar Pradesh, Dehra Dun	CHIEF ENGINEER (INVESTIGATION AND PLANNING) SUPERINTENDING ENGINEER (INVESTIGATION AND PLANNING) ( <i>Alternate</i> )
Ministry of Environment & Forest, New Delhi	DR (SHRIMATI) NALINI BHAT JOINT DIRECTOR ( <i>Alternate</i> )
Narmada & Water Resources Department, Government of Gujarat, Vadodara	DIRECTOR (GERI)
National Bureau of Soil Survey & Land Use Planning, Nagpur	DIRECTOR
National Hydroelectric Power Corporation Ltd, Faridabad	DR L. G. DHAWAN SHRI N. K. MATHUR ( <i>Alternate</i> )
National Institute of Hydrology, Roorkee	DR G. C. MISHRA SHRI S. K. SINGH ( <i>Alternate</i> )
National Remote Sensing Agency, Hyderabad	SHRI P. R. REDDY
River Research Institute, West Bengal	SHRI R. CHAKRABORTY
Survey of India, New Delhi	BRIG. AMRIK SINGH BRIG M. C. DHAMIJA ( <i>Alternate</i> )
Water Technology Centre for Eastern Region, Bhubaneswar	DR S. R. SINGH DR R. C. SRIVASTAVA ( <i>Alternate</i> )
BIS Directorate General	SHRI S. S. SETHI, Director & Head (WRD) [Representing Director General ( <i>Ex-officio</i> )]

*Member Secretary*

SHRI R. S. JUNEJA  
Joint Director (WRD), BIS



**Bureau of Indian Standards**

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**Review of Indian Standards**

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of ‘BIS Catalogue’ and ‘Standards: Monthly Additions’.

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**Amendments Issued Since Publication**

Amend No.	Date of Issue	Text Affected

**BUREAU OF INDIAN STANDARDS**

Headquarters :

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110 002  
Telephones : 323 01 31, 323 33 75, 323 94 02

Telegrams : Manaksanstha  
(Common to all offices)

Regional Offices :

	Telephone
Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg NEW DELHI 110 002	{ 323 76 17 323 38 41
Eastern : 1/14 C.I.T. Scheme VII M, V. I. P. Road, Kankurgachi KOLKATA 700 054	{ 337 84 99, 337 85 61 337 86 26, 337 91 20
Northern : SCO 335-336, Sector 34-A, CHANDIGARH 160 022	{ 60 38 43 60 20 25
Southern : C.I.T. Campus, IV Cross Road, CHENNAI 600 113	{ 254 12 16, 254 14 42 254 25 19, 254 13 15
Western : Manakalaya, E9 MIDC, Marol, Andheri (East) MUMBAI 400 093	{ 832 92 95, 832 78 58 832 78 91, 832 78 92

Branches : AHMEDABAD. BANGALORE. BHOPAL. BHUBANESHWAR. COIMBATORE. FARIDABAD. GHAZIABAD. GUWAHATI. HYDERABAD. JAIPUR. KANPUR. LUCKNOW. NAGPUR. NALAGARH. PATNA. PUNE. RAJKOT. THIRUVANANTHAPURAM. VISAKHAPATNAM.