

नदी घाटी परियोजनाओं से सम्बंधित
पारिभाषिक शब्दावली

भाग 11 जल विज्ञान

अनुभाग 1 सामान्य शर्ते

(पहला पुनरीक्षण)

Glossary of Terms Relating to River
Valley Projects

Part 11 Hydrology

Section 1 General Terms

(First Revision)

ICS 01.040.93

© BIS 2024



भारतीय मानक ब्यूरो

BUREAU OF INDIAN STANDARDS

मानक भवन, 9 बहादुर शाह ज़फर मार्ग, नई दिल्ली - 110002

MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG

NEW DELHI - 110002

www.bis.gov.in www.standardsbis.in

October 2024

Price Group 5

FOREWORD

This Indian Standard (Part 11/Sec 1) (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Ground Water and Related Investigations Sectional Committee had been approved by the Water Resources Division Council.

The Part 11/Sec 1 was first published in 1972. The first revision of this standard has been brought out in the view of changing glossary/terminologies over the period of time. Some of the terminologies such as brook, drought, ice sheet, ice cap, etc are redefined.

A number of Indian Standards have been published covering various aspects of river valley projects and a large number of similar standards is in the process of formulation. These standards include technical terms, the precise definitions of which are required to avoid ambiguity in their interpretation. To achieve it, this standard was brought in various part.

Part 11 of the standard covers the important field of hydrology which is a separate science by itself. In view of the vastness of the subject, it has been brought out to cover the subject in different sections. Section 1 covers general terms. Other sections in the series are as follows:

Section 2	Precipitation and run off
Section 3	Infiltration and water losses
Section 4	Hydrographs
Section 5	Floods
Section 6	Ground water
Section 7	Quality of water

Other parts of this series are given in [Annex A](#).

The composition of the Committee responsible for the formulation of this standard is given in [Annex B](#).

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, shall be rounded off in accordance with IS 2 : 2022 '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*GLOSSARY OF TERMS RELATING TO RIVER VALLEY
PROJECTS

PART 11 HYDROLOGY

SECTION 1 GENERAL TERMS

*(First Revision)***1 SCOPE**

This standard (Part 11/Sec 1) covers definitions of general terms relating to hydrology.

2 GENERAL TERMS

2.1 Anchor Ice — Ice formed below the surface of a stream or other body of water on the stream bed or upon a submerged body or structure.

2.2 Arid — A term applied to regions where precipitation is so deficient in quantity, or occurs at such times, that agriculture is impracticable without irrigation.

2.3 Avalanche — A moving mass of debris, snow and ice, sliding rapidly down a mountain slope.

2.4 Barograph — An instrument designed for automatic recording of atmospheric pressure.

2.5 Barometer — An instrument for measuring pressure of the atmosphere.

2.6 Brook — Small shallow stream, usually continuous in its discharge, which flows in somewhat turbulent manner, its channels are usually irregular in shape and have numerous boulders ledges or small drops which cause the turbulent flow.

2.7 Climatic Cycle — Actual or supposed recurrences of such weather phenomena as wet and dry years, hot and cold years, at more or less regular intervals, in response to long-range terrestrial and solar influences.

2.8 Climatic Year — Continuous twelve-month period selected for presentation of hydrologic and meteorologic data.

2.9 Climatology — It is a subdivision of meteorology which deals with the average or normal or collective state of the atmosphere over a given area within a specified period of time. It implies the study of climate including the statistical relations, mean values, normals, frequencies,

variations and distribution of meteorologic elements.

2.10 Cryology — The science of ice in all its forms, such as snow, ice and hail.

2.11 Drainage Area Drainage Basin, Catchment, Catchment Area, Catchment Basin, River Basin — The area from which a lake, stream or waterway and reservoir receives surface flow which originates as precipitation.

2.12 Drought — Variability of rainfall leading to rainfall deficiency and water shortage causes; in general, an extended period of dry weather or a period of deficient rainfall that may extend over an indefinite number of days (without any set quantitative standard) by which to determine the degree of deficiency needed to constitute a drought.

Draughts may be:

- a) *Meteorological drought* — referring to lack of precipitation;
- b) *Agricultural drought* — referring to lack of moisture in the soil where crops grow;
- c) *Hydrological drought* — referring to low levels of water in reservoirs; and
- d) *Socio-economic drought* — referring to water shortages affecting people in society, which impacts availability of foodgrains, fodder, etc.

2.13 Dry Weather Flow — The flow of water in a stream during the non-rainy season.

2.14 Effluent Stream, Gaining Stream — A stream or stretch of stream which receives water from ground water in the zone of saturation. The water surface of such a stream stands at a lower level than the water table or piezometric surface of the ground water body from which it receives water. Also, a stream flowing out of another stream or out of a lake.

2.15 Ephemeral Stream — Stream that flows only in direct response to precipitation, receiving

no water from springs and no long-continued supply from melting snow or other surface source its channel is at all times above the water table.

2.16 Frazil Ice — Fine spicules of ice found in water too turbulent for the formation of sheet ice. It forms in supercooled water when the air temperature is far below freezing. In some cases, the number of spicules per m³ is very large and it resembles a mass of snow. Frazil ice may extend to the bottom of the stream and dam its flow, thus causing property damage or stopping water wheels.

2.17 Frost — A light feathery deposit of ice caused by the condensation of water vapour directly in the crystalline form on terrestrial objects whose temperature is below freezing, the process being the same by which dew is formed except that the latter occurs only when the temperature of the bedewed object is above freezing.

2.18 Geo-hydrology or Ground Water Hydrology — That branch of hydrology relating to sub-surface or subterranean waters.

2.19 Glacier — Body of land ice formed from recrystallized snow accumulated on the ground may form where annual accretion of snow is greater than ablation by run off and evaporation. There are two broad classes:

- a) *Ice streams* — which form in mountain valleys and move down slope under gravity; and
- b) *Ice caps* — which cover large land masses and spread out radially because of great pressures built up by their weight (see [2.32](#)).

2.20 Glacier Burst — A sudden release of a volume of water which has been impounded within or by a glacier.

2.21 Glaciometer — An instrument for measuring glacial motion.

2.22 Head Water

- a) The water upstream of a structure; and
- b) The flow in the upper reaches of a stream near its source.

2.23 Humid — Term applied to land or climates where precipitation is adequate in amount and occurs at such times that agriculture can be carried out without irrigation.

2.24 Hydrogeology — That branch of geology relating to effect of water on earth.

2.25 Hydrography — The science of measuring and analysing the flow of water, precipitation, evaporation, and allied phenomena, also the science of measuring charting and mapping and studying oceans, seas, rivers, and other waters and their marginal land areas.

2.26 Hydrologic Cycle — A phenomena relating to circulation of water from the sea, through the atmosphere to the land and hence, often with many delays, back to the sea or ocean through various stages and processes, for example, precipitation, interception, run off, infiltration, percolation, ground-water storage, evaporation, and transpiration. Also the many short circuits of the water that is returned to the atmosphere without reaching the sea.

2.27 Hydrologic Equation — The water inventory equation (inflow = outflow ± change in storage) which expresses the basic principle that during a given time interval the total inflow to an area must equal the total outflow plus the net change in storage.

NOTE — For any hydrologic system the terms are explained further in [2.27.1](#), [2.27.2](#) and [2.27.3](#).

2.27.1 Inflow — This term as implied in the hydrologic equation includes:

- a) precipitation;
- b) surface inflow;
- c) water piped or channelled into the area; and
- d) ground water inflow while considering a ground water body.

2.27.2 Outflow — This term includes:

- a) surface outflow;
- b) ground water;
- c) water piped or channelled out of the area;
- d) evaporation;
- e) transpiration; and
- f) interception, that is, precipitation intercepted by foliage and buildings and returned to the atmosphere without reaching the ground.

2.27.3 Change in Storage — This term relates to the cumulative change in storage of:

- a) ground water;
- b) soil moisture;
- c) snow cover;
- d) surface reservoir water and depression storage; and
- e) water temporarily existing on the surface of the ground as flowing water (called channel storage if in channels or detention storage if not in channels).

2.28 Hydrology — The applied science concerned with the water of the earth in all its states – their occurrences, distribution and circulation through the unending hydrologic cycle of:

- a) precipitation;
- b) consequent run off;
- c) stream flow;
- d) infiltration and storage;
- e) eventual evaporation; and
- f) reprecipitation.

It is concerned with the physical, chemical and physiological reactions of water with the rest of the earth, and its relation to the life of the earth.

2.29 Hydrometeorology — Meteorology concerned with water in the atmosphere as rain clouds, snow, hail and its effects on surface and/or subsurface flows, agriculture, etc.

2.30 Hydrometry — The measurement and analysis of the flow of water as well as the measurement of the specific gravity of water or suspensions of finely divided solids in water.

2.31 Hydrosphere — Aqueous envelope of the earth including all oceans, lakes, streams, underground waters, ice in all its forms and the aqueous vapour in the atmosphere.

2.32 Ice Cap — Perennial cover of ice and snow over an extensive area of land or sea; it is a glacial ice covering fewer than 50 000 square kilometers.

2.33 Ice Sheet — Perennial cover of ice and snow over an extensive area of land or sea; it is glacial ice covering more than 50 000 square kilometers.

2.34 Influent Stream or Losing Stream — A stream or stretch of stream which contributes water to the zone of saturation. The water surface of such stream stands at a higher level than the water table or piezometric surface of the ground water body to which it contributes water.

2.35 Intermittent Stream — Stream which flows during a season.

2.36 Isobars — Lines joining points of equal atmospheric pressure.

2.37 Isotherms or Isothermal Lines — Lines joining points of equal temperatures.

2.38 Limnology — That branch of hydrology relating to inland water bodies – lakes, reservoirs ponds etc.

2.39 Meteorology — That branch of science which deals with atmospheric phenomena and the basic laws that produce and control such phenomena.

2.40 Pack Ice — A large body of floating pieces of ice moving together as a continuous cover or a rugged mass.

2.41 Perennial — Flowing during all the year, for example, perennial stream, perennial canal.

2.42 Potamology — That branch of hydrology which pertains to surface streams, the science of rivers.

2.43 Regeneration — Regeneration, as distinct from return flow, is the water which enters the river (or stream) as percolation or seepage through its bed and banks.

2.44 Return Flow — Return flow is that portion of the water diverted from a river or stream which ultimately finds its way back through surface run off (visible flow) and as percolation or seepage through the bed and banks (invisible flow).

2.45 River — A large stream for conveying water.

2.46 Semi-arid or Sub-arid — A term applied to an area or climate, neither entirely and nor strictly humid but with a pronounced tendency towards arid character in which certain types of crops can be grown without irrigation.

2.47 Semi-humid or Sub-humid — Land or climate, neither entirely arid nor strictly humid, with pronounced tendency towards humid character.

2.48 Slush Ice — An unfrozen mixture of water and ice.

2.49 Stream — A natural channel for conveying water.

2.50 Torrent — A stream of water flowing with great velocity or turbulence, as during a freshet or down a steep incline.

2.51 Thermograph — An instrument designed for automatic recording of temperatures.

2.52 Water Year — Continuous twelve-month period selected for maintaining or presenting records of flow, and or use of water or any river system.

ANNEX A

(Foreword)

OTHER PARTS OF IS 4410 SERIES

<i>IS No.</i>	<i>Title</i>	<i>IS No.</i>	<i>Title</i>
IS 4410	Glossary of terms relating to river valley projects:	(Part 7) : 1982	Engineering geology (<i>first revision</i>)
(Part 1) : 1991	Irrigation practice (<i>first revision</i>)	(Part 8) : 1992	Dams and dam sections (<i>first revision</i>)
(Part 2) : 1967	Project planning	(Part 9) : 1982	Spillways and siphons (<i>first revision</i>)
(Part 3) : 1988	River and river training (<i>first revision</i>)	(Part 10) : 1988	Hydro-electric power station including water conductor system (<i>first revision</i>)
(Part 4) : 1982	Drawings (<i>first revision</i>)		
(Part 5) : 2023	Canals (<i>second revision</i>)		
(Part 6) : 2022	Reservoirs (<i>second revision</i>)		

To access Indian Standards click on the link below:

https://www.services.bis.gov.in/php/BIS_2.0/bisconnect/knowyourstandards/Indian_standards/isdetails/

ANNEX B

(Foreword)

COMMITTEE COMPOSITION

Ground Water and Related Investigations Sectional Committee, WRD 03

<i>Organization</i>	<i>Representative(s)</i>
Central Ground Water Board, Faridabad	SHRIMATI T. S. ANITHA SHYAM (<i>Chairperson</i>)
Central Electricity Authority, New Delhi	SHRI BALWAN KUMAR SHRIMATI ARPITA UPADHYAY (<i>Alternate</i>)
Central Ground Water Board, Faridabad	SHRI SANJEEV MEHROTRA
Central Pollution Control Board, New Delhi	SHRIMATI SUNITI PARASHAR
Central Water and Power Research Station, Pune	DR MANDIRA MAJUMDER SHRI B. SURESH KUMAR (<i>Alternate I</i>) SHRI G. A. PANVALKAR (<i>Alternate II</i>)
Central Water Commission, New Delhi	SHRI AJAY KUMAR SHRI VIMAL KUMAR (<i>Alternate</i>)
Centre for Water Resources Development and Management, Kozikode	DR C. P. PRIJU DR ARUN P. R. (<i>Alternate</i>)
CSIR - National Geophysical Research Institute, Hyderabad	DR M. J. NANDAN
G. B. Pant National Institute of Himalayan Environment, Almora	SHRI VAIBHAV EKNATH GOSAVI
Geological Survey of India, New Delhi	SHRI SANTOSH KUMAR TRIPATHI SHRI SANJEEV SHARMA (<i>Alternate</i>)
Groundwater Surveys and Development Agency, Pune	DR VIJAT PAKHMODE
Gujarat Engineering Research Institute, Vadodara	SHRI N. R. MAKWANA SHRI R. K. CHAUHAN (<i>Alternate</i>)
Gujarat Water Supply & Sewerage Board, Vadodara	SHRI NARESH GOR SHRI ROHIT LALJIBHAI CHAUDHARI (<i>Alternate</i>)
ICAR - Indian Institute Soil & Water Conservation Research & Training Institute, Dehradun	DR P. R. OJASVI DR SHAKIR ALI (<i>Alternate</i>)
ICAR - Central Soil Salinity Research Institute, Karnal	DR M. J. KALEDHONKAR

IS 4410 (Part 11/Sec 1) : 2024

<i>Organization</i>	<i>Representative(s)</i>
India Meteorological Department, New Delhi	SHRI B. P. YADAV MISS HEMLATA (<i>Alternate</i>)
Ministry of Environment Forest and Climate Change, New Delhi	SHRI YOGESH PAL SINGH SHRI SOURABH UPADHAY (<i>Alternate I</i>) SHRI SOURABH KUMAR (<i>Alternate II</i>)
National Bank for Agriculture and Rural Development, Mumbai	SHRI SANJAY KUMAR SONI SHRI JAY NIGAM (<i>Alternate</i>)
National Hydroelectric Power Corporation, Faridabad	SHRI SHYAM LAL KAPIL SHRI VACHASPATI PANDEY (<i>Alternate I</i>) SHRI VIPUL NAGAR (<i>Alternate II</i>)
National Institute of Hydrology, Roorkee	DR ANUPAMA SHARMA DR SURJEET SINGH (<i>Alternate</i>)
National Remote Sensing Centre, Hyderabad	DR I. C. DAS DR BIDYUT KUMAR BHADRA (<i>Alternate</i>)
North Eastern Regional Institute of Water and Land Management, Tezpur	DR AMULYA CHANDRA DEBNATH DR UZZAL MANI HAZARIKA (<i>Alternate</i>)
Tamil Nadu Water Supply and Drainage Board, Chennai	ENGINEERING DIRECTOR SENIOR HYDROGEOLOGIST (<i>Alternate</i>)
Uttarakhand Irrigation Department, Dehradun	SHRI DINESH CHANDRA SHRI SHANKAR KUMAR SAHA (<i>Alternate</i>)
Water Resources Department, Government of Maharashtra, Nashik	SHRI B. J. GADE SHRI M. R. AWALAGNOKAR (<i>Alternate</i>)
Water Resources Department, Government of Punjab, Chandigarh	SHRI VIJAY KUMAR GARG SHRI TUSHAR GOYAL (<i>Alternate I</i>) SHRI RAJAT GROVER (<i>Alternate II</i>)
In Personal Capacity (<i>House No. 1, New Campus I.I.T. Delhi, Hauz Khas, New Delhi 110016</i>)	DR A. K. KESARI
In Personal Capacity (<i>Flat No. 1503, Tower 7A, Suncity Parikarma Sector 20 Panchkula-134116</i>)	SHRI SANJAY MARWAHA
BIS Directorate General	SHRI R. BHANU PRAKASH, SCIENTIST 'E'/DIRECTOR AND HEAD (WATER RESOURCES) [REPRESENTING DIRECTOR GENERAL (<i>Ex-officio</i>)]

Member Secretary
SHRI AJAY MEENA
SCIENTIST 'B'/ASSISTANT DIRECTOR
(WATER RESOURCES), BIS

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act, 2016* to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Copyright

BIS has the copyright of all its publications. No part of these publications may be reproduced in any form without the prior permission in writing of BIS. This does not preclude the free use, in the course of implementing the standard, of necessary details, such as symbols and sizes, type or grade designations. Enquiries relating to copyright be addressed to the Head (Publication & Sales), BIS.

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 website-www.bis.gov.in or www.standardsbis.in.

This Indian Standard has been developed from Doc No.: WRD 03 (21368).

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 110002

Telephones: 2323 0131, 2323 3375, 2323 9402

Website: www.bis.gov.in

Regional Offices:

	Telephones
Central : 601/A, Konnectus Tower -1, 6 th Floor, DMRC Building, Bhavbhuti Marg, New Delhi 110002	{ 2323 7617
Eastern : 8 th Floor, Plot No 7/7 & 7/8, CP Block, Sector V, Salt Lake, Kolkata, West Bengal 700091	{ 2367 0012 2320 9474
Northern : Plot No. 4-A, Sector 27-B, Madhya Marg, Chandigarh 160019	{ 265 9930
Southern : C.I.T. Campus, IV Cross Road, Taramani, Chennai 600113	{ 2254 1442 2254 1216
Western : Manakalya, 5 th Floor/MTNL CETTM, Technology Street, Hiranandani Gardens, Powai Mumbai 400076	{ 25700030 25702715

Branches : AHMEDABAD, BENGALURU, BHOPAL, BHUBANESHWAR, CHANDIGARH, CHENNAI, COIMBATORE, DEHRADUN, DELHI, FARIDABAD, GHAZIABAD, GUWAHATI, HARYANA (CHANDIGARH), HUBLI, HYDERABAD, JAIPUR, JAMMU, JAMSHEDPUR, KOCHI, KOLKATA, LUCKNOW, MADURAI, MUMBAI, NAGPUR, NOIDA, PARWANOO, PATNA, PUNE, RAIPUR, RAJKOT, SURAT, VIJAYAWADA.