IS : 4410 (Part XI/Sec 1) - 1972
(Reaffirmed 1995)

Indian Standard

GLOSSARY OF TERMS RELATING TO RIVER VALLEY PROJECTS

PART XI HYDROLOGY

Section 1 General Terms

(Second Reprint JUNE 1986)

UDC 001.4 : 627.81 : 551.49

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

Gr 3

December 1972

Indian Standard

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Terminology Relating to River Valley Projects
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GLOSSARY OF TERMS RELATING TO RIVER VALLEY PROJECTS

PART XI HYDROLOGY

Section 1 General Terms

0. FOREWORD

0.1 This Indian Standard (Part XI/Sec 1) was adopted by the Indian Standards Institution on 24 February 1972, after the draft finalized by the Terminology Relating to River Valley Projects Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 A number of Indian Standards has 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 this, the Institution is bringing out 'Indian Standard Glossary of terms relating to river valley projects' (IS : 4410) which is being published in parts. The other parts of this standard so far published are given on P 10.

0.3 Part XI covers the important field of hydrology which is a separate science by itself. In view of the vastness of the subject, it is proposed to cover the subject in different sections. Section 1 covers general terms. Other sections in the series will be the following:

Section 2	Precipitation and run off
Section 3	Infiltration and water losses
Section 4	Hydrographs
Section 5	Floods
Section 6	Ground water
Section 7	Discharge measurements
Section 8	Quality of waters

0.4 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 has been met by deriving assistance from the following publications:

UNITED NATIONS. ECONOMIC COMMISSION FOR ASIA AND THE FAR EAST. Glossary of hydrologic terms used in Asia and Far East. 1956. Bangkok.

INDIA. INTERNATIONAL COMMISSION ON IRRIGATION AND DRAINAGE. Multilingual technical dictionary on irrigation and drainage, 1967.

INDIA. CENTRAL BOARD OF IRRIGATION AND POWER. Glossary of irrigation and hydro-electric terms and standard notations used in India, 1954. Manager of Publications, Delhi.

American Society of Civil Engineers. Nomenclature for hydraulics. 1962. New York.

0.4.1 All the definitions taken from 'Multilingual Technical Dictionary on Irrigation and Drainage' are marked with asterisk (*) in the standard.

1. SCOPE

1.1 This standard (Part XI/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 — A small shallow stream turbulent in character.

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 — 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. Qualitatively, it may be denned by its effects, as a dry period sufficient in length and severity to cause at least partial crop failure.

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 — A stream or portion of a stream which flows only in direct response to precipitation.

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 m^3 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 also* **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 thence, 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 $\pm$ 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 finery 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.

2.33 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.

2.34 Intermittent Stream — Stream which flows during a season.

2.35 Isobars* — Lines joining points of equal atmospheric pressure.

2.36 Isotherms or Isothermal Lines* — Lines joining points of equal temperatures.

2.37 Limnology — That branch of hydrology relating to water of lakes and ponds.

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

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

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

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

2.42 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.

2.43 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).

2.44 River — A large stream for conveying water.

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

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

2.47 Sheet Ice — Ice formed on the surface of water in lakes, ponds, and streams where the velocity is low. It starts forming near the banks and then gradually extends towards the centre.

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.

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GLOSSARY OF TERMS RELATING TO RIVER VALLEY PROJECTS

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IS : 4410 (Part I)-1967 Irrigation practice
IS : 4410 (Part II)-1967 Project planning
IS : 4410 (Part III)-1967 River and river training
IS : 4410 (Part IV)-1967 Drawings
IS : 4410 (Part V)-1968 Canals
IS : 4410 (Part VI)-1968 Reservoirs
IS : 4410 (Part VII)-1968 Engineering geology
IS : 4410 (Part VIII)-1968 Dams and dam sections
IS : 4410 (Part IX)-1968 Spillways and siphons
IS : 4410 (Part X)-1969 Civil works of hydro-electric generation system including water conductor system