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अपेक्षाएँ
(दूसरा पुनरीक्षण)

Vertical Staff Gauges — Functional
Requirements
(Second Revision)

ICS 17.120.01

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FOREWORD

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

For the measurement of the water level in streams, different types of gauges, recording and non-recording, are used. Non-recording type of gauges include the staff gauges, the chain gauges, the wire gauges, the tape gauges, the float gauges, the hook gauges, and the pointer gauges. The vertical staff gauge is the type most used because of its simplicity in installation and reading and because no mechanical device is involved in its simple design.

This standard was first published in 1967 and first revised in 1994. This revision has been brought out to incorporate the latest practice in the field and the use of materials like reinforced cement concrete and steel in vertical staff gauges.

In this revision following changes are made:

- a) Size of wooden/concrete gauge is changed to range of 1.5 m to 2.0 m;
- b) Length of gauge should be measure excluding embedded length and depending on topography;
- c) Minimum size of RCC foundation is added in [A-1.3](#); and
- d) Recommended the overlapping of gauges to 30 cm from 50 cm in the previous version of Indian Standard.

The composition of the Committee responsible for 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 or analysis, shall be rounded off in accordance with IS 2 : 2022 'Rules for rounding off numerical values (*second revision*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

India Standard

VERTICAL STAFF GAUGES — FUNCTIONAL REQUIREMENTS

(*Second Revision*)

1 SCOPE

This standard specifies the functional requirements and materials to be used for vertical staff gauges.

2 REFERENCE

The standard given below contain provisions, which through reference in this text constitute provisions of this standard. At the time of publication, the edition indicated was 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 edition of this standard:

<i>IS No.</i>	<i>Title</i>
IS 1191 : 2016	Hydrometry — Vocabulary and symbols (<i>third revision</i>)

3 TERMINOLOGY

For the purpose of this standard the definitions given in IS 1191 : 2016 shall apply.

4 FUNCTIONAL REQUIREMENTS

Staff gauges shall meet the following requirements:

- a) They shall be simple to manufacture, install and use;
- b) They shall be durable and easy to maintain;
- c) They shall be resistant to wear when exposed to flowing water and the effect of solid matter carried in suspension;
- d) They shall be resistant to alternate drying and wetting and also in respect of the resistance to wear or fading of the markings, and the material shall have low coefficient of expansion with respect to temperature and wetting effect; and
- e) They shall be accurate and clearly marked.

5 MATERIALS

5.1 Reinforced Cement Concrete

If reinforced cement concrete is used for the

manufacture of staff gauges it shall be ensured that the concrete is cast in steel formwork and is well compacted and cured to ensure strength and durability.

5.2 Steel

Standard T-section or angle section shall be used.

5.3 Wood

The wood used shall be straight, uniform, and well-seasoned to avoid warping, shrinkage and swelling due to alternate wetting and drying or due to changes of temperature.

5.4 Paint

A base coat of white enamel should protect the concrete, steel and wood. The paints used for the graduations should be permanent in nature and remain unaffected by water.

6 GRADUATIONS

6.1 The graduations shall be marked clearly, either by etching or by painting on the gauge posts or enamelling on steel plates, which are nailed or screwed to gauge post.

6.2 The graduations shall be such as can be read in centimetres, decimetres and metres distinctly.

6.3 The smallest graduation shall correspond to 5 mm.

6.4 Gauge plates shall be manufactured in suitable lengths with the width of scale not less than 50 mm.

6.5 The markings of the subdivisions shall be accurate to ± 0.5 mm and the cumulative error shall not exceed 0.1 percent or 0.5 mm whichever is greater.

7 SIZES

Each gauge length shall be of 2 m or 1.5 m (excluding embedded length and depending on topography) with cut-water shape on the upstream side of the gauge post.

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IS 4080 : 2024

8 TYPES

Staff gauges are generally classified as follows:

a) Wooden or concrete type; and

b) Vertical enamelled iron gauges fixed on wooden staff.

Typical examples of both types are given in [Annex A](#).

ANNEX A

(Clause 8)

TYPICAL EXAMPLES OF VERTICAL STAFF GAUGES

A-1 DETAILS OF WOODEN OR CONCRETE TYPE VERTICAL STAFF GAUGES
(See Fig. 1)

A-1.1 Size

The size of wooden/concrete gauge is generally 150 mm × 100 mm in 1.5 m to 2 m lengths (excluding embedded length), having cutwater shape on the upstream side.

A-1.2 Paint

For protection of wood or concrete, the gauges should be properly painted with a base coat(s) of white enamel paint. The markings and graduations shall be in metres, decimetres and centimetres and may be either painted in black and white or etched by machine.

A-1.3 Installation

The gauges shall be fixed to steel, concrete or wooden piles driven firmly into the river bed or banks or RCC foundation having minimum size 0.60 m × 0.60 m × 0.60 m so as to be safe from sinking, tilting or washing away due to flood current. Where there is considerable wave action, the gauge may be located in a stilling well to dampen

wave action. When the difference between total rise and fall in water level is beyond the range of a single vertical staff gauge, several gauges should be installed along the line of cross-section running normal to the Row, taking care that the reading of gauges overlap each other by at least 30 cm. It is very important that all such gauges have the same reduced level (RL) for their zero so that they will read in continuation of each other with reference to only one zero reduced level.

A-2 DETAILS OF VERTICAL ENAMELLED IRON GAUGES

A-2.1 These should be of iron or steel plates with the markings and graduations in enamel (instead of paint). Graduations shall be enamelled in black and white paint alternately and the metre, and the decimetre marking and numerical values should be enamelled in red. Holes should be provided at convenient locations to enable it to be screwed on to a smooth wooden/concrete post by means of brass or other non corrodable screws. They should be made of short lengths not exceeding two metres to avoid difficulty and damage in transport.

A-2.2 Installation

The requirements specified in [A-1.3](#) shall apply.

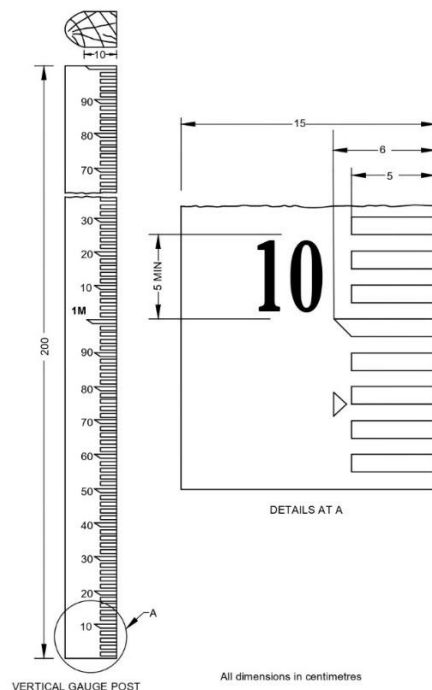


FIG. 1 TYPICAL DETAILS OF VERTICAL STAFF GAUGE

ANNEX B

(Foreword)

COMMITTEE COMPOSITION

Hydrometry Sectional Committee, WRD 01

<i>Organization</i>	<i>Representative(s)</i>
Central Water & Power Research Station, Pune	SHRI R. S. KANKARA (<i>Chairperson</i>)
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