IS : 9401 (Part 6) - 1984

(Reaffirmed 1995)

Indian Standard

METHOD OF MEASUREMENT OF WORKS IN RIVER VALLEY PROJECTS (DAMS AND APPURTENANT STRUCTURES)

PART 6 VENTILATION PIPES AND OTHER EMBEDDED MATERIALS

UDC 69·003·12 : 627·8 : 697·922·5 : 621·643·2

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

Gr 2

March 1985

Indian Standard

METHOD OF MEASUREMENT OF WORKS IN RIVER VALLEY PROJECTS (DAMS AND APPURTENANT STRUCTURES)

PART 6 VENTILATION PIPES AND OTHER EMBEDDED MATERIALS

Measurement of Works of River Valley Projects Sectional Committee, BDC 69

Chairman

SHRI S. P. CAPRIHAN
Redecon (India) Pvt Ltd,
B-92, Himalaya House,
Kasturba Gandhi Marg, New Delhi

Members	*Representing*
SHRI K. D. ARCOT SHRI G. K. NATRAJAN (*Alternate*)	Engineers India Limited, New Delhi
SHRI J. BAHADUR	Irrigation Department, Government of Bihar, Patna
SHRI MAHAVIR BIDASARIA SHRI ASHOK BIDASARIA (*Alternate*)	Ferro-Concrete Consultants Pvt Ltd, Indore
CHIEF ENGINEER (NSP) CHIEF ENGINEER (SP) (*Alternate*)	Irrigation Department, Government of Andhra Pradesh, Hyderabad
CHIEF ENGINEER (PROJECTS) DEPUTY CHIEF ENGINEER (IRRIGATION) (*Alternate*)	Water and Power (Irrigation) Department, Government of Kerala, Trivandrum
SHRI S. M. DEB	Irrigation & Waterways Department, Government of West Bengal, Calcutta
DIRECTOR (R & C)	Central Water Commission, New Delhi
SHRI OM PRAKASH GUPTA	Irrigation Department, Government of Uttar Pradesh, Lucknow
SHRI S. M. JOSHI	Gammon India Limited, Bombay
SHRI G. G. KARMARKAR	Institution of Surveyors, Delhi
PROF S. KRISHNAMOORTHY	Indian Institute of Technology, New Delhi
SHRI B. N. MATHUR	Irrigation Department, Government of Rajasthan, Jaipur

(*Continued on page* 2)

(*Continued from page* 1)

Members	*Representing*
SHRI G. A. MUSTAFFA	Public Works Department, Government of Jammu & Kashmir, Srinagar
SHRI R. C. PATEL	Irrigation Department, Government of Gujarat, Gandhinagar
SHRI T. RANGANNA	Karnataka Power Corporation Ltd, Bangalore
SHRI M. B. VITTAL RAO	Irrigation Department, Government of Karnataka, Bangalore
SHRI P. S. RAO	Haryana Irrigation Department, Chandigarh
SHRI D. M. SAVUR	Hindustan Construction Co Ltd, Bombay
SHRI P. S. SUBRAMANIAM	Tarapore and Company, Madras
SUPERINTENDING ENGINEER (NIPC)	Irrigation Department, Government of Maharashtra, Bombay
SHRI V. VENKATESWARALU	National Projects Construction Corporation Limited, New Delhi
DR VARSHNEY (*Alternate*)	
SHRI VITHAL RAM	National Hydro-electric Power Corporation Limited, New Delhi
KUMARI E. DIVATIA (*Alternate*)	
SHRI G. RAMAN, Director (Civ Engg)	Director General, ISI (*Ex-officio Member*)

Secretary

SHRI K. M. MATHUR
Senior Deputy Director (Civ Engg), ISI

Indian Standard

METHOD OF MEASUREMENT OF WORKS IN RIVER VALLEY PROJECTS (DAMS AND APPURTENANT STRUCTURES)

PART 6 VENTILATION PIPES AND OTHER EMBEDDED MATERIALS

0. FOREWORD

0.1 This Indian Standard (Part 6) was adopted by the Indian Standards Institution on 14 December 1984, after the draft finalized by the Measurement of Works of River Valley Projects Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 In measurement of quantities, in construction of river valley projects a large diversity of methods exists at present according to local practices. This lack of uniformity creates complication regarding measurements and payments. This standard is intended to provide a uniform basis for measurement of ventilation pipes and other embedded materials in the construction of river valley projects.

0.2.1 The provisions contained in this standard shall generally have precedence over the provisions in IS : 1200 (Part 2)-1974*. However, the provisions of both the standards may be considered complimentary and supplementary to each other.

0.3 In reporting the result of measurement made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS : 2-1960†.

---

1. SCOPE

1.1 This standard (Part 6) covers the method of measurement of ventilation pipes and other embedded material in river valley projects, such as dams, hydraulic structures, canals and power houses.

*Method of measurement of building and civil engineering works: Part 2 Concrete works (*third revision*).

†Rules for rounding off numerical values (*revised*).

2. GENERAL

2.1 Clubbing of Items — Items may be clubbed together provided these are on the basis of the detailed description of items stated in this standard.

2.2 Booking of Dimensions — In booking dimensions, the order shall be consistent and generally in the sequence of length, breadth or width and height or depth or thickness.

2.3 Description of Items — The description of each item shall, unless stated otherwise, be held to include where necessary, conveyance and delivery, handling, loading, unloading, storing, fabrication, hoisting, lowering, all labour for finishing to required shape and size.

2.4 Measurements — All works shall be measured net in decimal system, as fixed in its place as given in **2.4.1** and **2.4.2**.

2.4.1 Dimensions shall be measured to the nearest 0·01 m.

2.4.2 Weight shall be worked out to the nearest 0·01 kg.

3. MEASUREMENT OF PIPES AND EMBEDDED MATERIALS

3.0 Items included in this standard are as follows:

a) Ventilation pipes;

b) Grout pipes;

c) Foundation, drainage/uplift pressure pipes;

d) Internal drainage pipes in dams;

e) Sewer pipe drains;

f) Metal pipes embedded for post-cooling concrete;

g) Steel liners for air-vents, plumb bob wells, etc;

h) Embedded parts for trashracks, control gates, etc, steel ladders, metal hand rails, manhole frames, covers and other miscellaneous metal work;

j) Electrical metal conduits; and

k) Anchor rods, anchor bolts.

3.1 Ventilation / Grout / Foundation / Drainage / Uplift Pressure Pipes — The pipes shall be classified according to their nominal diameter,

the quality of pipe, kind of material and the method of jointing and shall be measured in running metres, inclusive of all joints. The measurement shall be taken along the central line of the pipes and fittings or specials. All fittings or specials shall be enumerated separately as extra over the pipes. Cutting and jointing the pipes to such fittings or specials shall be deemed to be included with the item of fittings or specials.

3.2 Internal Drainage Pipes in Dams — Measurement for porous concrete pipes shall be on the basis of the length of pipe in metre laid in the body of dam. The nominal diameter and type of the pipe shall be specified.

3.3 Sewer Pipe Drains — Measurement for perforated sewer pipe and constructing drains shall be made in metres along the centre lines of the pipe, from end to end of the pipe in place and no allowance shall be made for laps at joints. The nominal diameter and type of the pipe shall be specified.

3.4 Metal Pipes Embedded for Post-Cooling of Mass Concrete — The pipes shall be classified according to their nominal diameter, the quality of pipe, kind of material and the method of jointing and shall be measured in running metres, inclusive of all joints. The measurement shall be taken along the central line of the pipes and fittings or specials. All fittings or specials shall be enumerated separately as extra over the pipes. Cutting and jointing the pipes to such fittings or specials shall be deemed to be included with the item of fittings or specials.

3.5 Steel Liners for Air-Vents, Plumb Bob Wells, etc — Measurement for the lining plates and other structural steel shall be on the basis of mass in kilograms of plates and structural steel actually embedded in the structure.

3.6 Embedded Parts for Trashracks, Control Gates, etc, Steel Ladders, Metal Hand Rails, Manhole Frames, Covers and Other Miscellaneous Metal Work — Measurement for these items shall be on the basis of weight in kilograms of metal work actually installed and left in place.

3.7 Electrical Metal Conduits — Measurement for various types and sizes of electrical metal conduit shall be on the basis of length in running metres of conduits, actually embedded in the structure.

3.8 Anchor Rods, Anchor Bolts — Measurement for anchor rods and anchor bolts shall be made on the basis of weight in kilograms of anchor bolts or anchor rods actually embedded. In case of anchor bolts the weight shall include the weight of bolt, nut, washers, wedges and bearing plates.

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

Quantity	Unit	Symbol
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

Quantity	Unit	Symbol
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

Quantity	Unit	Symbol	Definition
Force	newton	N	1 N = 1 $kg.m/s^2$
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m^2
Frequency	hertz	Hz	1 Hz = 1 c/s (s^{-1})
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress,	pascal	Pa	1 Pa = 1 N/m^2

AMENDMENT NO. 1 MAY 1993
TO
IS 9401 (Part 6) : 1984 METHOD OF MEASUREMENT OF WORKS IN RIVER VALLEY PROJECTS (DAMS AND APPURTENANT STRUCTURES)

PART 6 VENTILATION PIPES AND OTHER EMBEDDED MATERIALS

(*Page* 5, *clauses* 3.1 *and* 3.4, *line* 5) — Substitute 'centre' *for* 'central'.

(*Page* 5, *clause* 3.5, *line* 3) — substitute 'weight' *for* 'mass'.

(RVD 23)

Reprography Unit, BIS, New Delhi, India