भारतीय मानक

चिनाई और कंक्रीट वाले बाँधों के अनुप्रस्थ संकोच जोड़ों पर जल-रोधकों के प्रावधान के लिए रीति-संहिता

(पहला पुनरीक्षण)

Indian Standard

PROVISION OF WATER-STOPS AT TRANSVERSE CONTRACTION JOINTS IN MASONRY AND CONCRETE DAMS — CODE OF PRACTICE

(First Revision)

ICS 23.040.45; 93.160

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

December 2001

Price Group 3

FOREWORD

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

The opening of the contraction joints provides passages through the dam which unless sealed, would permit the leakage of water from the reservoir to the downstream face. To stop this leakage, water-stops should be installed in the joints adjacent to the upstream face.

Advancement in the specifications and the manufacture of material have resulted in the acceptance of polyvinyl chloride (PVC) as suitable material for joint seal. The material can be manufactured for a number of shapes and sizes suiting to the specific requirement. In view of this, the matter regarding the replacement of copper water-stop and asphalt water-stop by PVC water-stops has been under consideration for quite some time. Experience in India and abroad has suggested that asphalt water-stops become defunct for want of adequate heating arrangement and as a result, it has been felt that the same should be replaced by PVC water-stops. Copper water-stops can accommodate only a small lateral movement. Experience in the Pacific North West of United States has shown that the sheet-type copper water-stop is very vulnerable to failure especially in high navigation lock. In Indian condition, project authorities have reported difficulties in properly brazing the copper sheets and also its missing from the structure during construction. Accordingly, it has been felt that the copper water-stop should be replaced by PVC water-stops. This standard was first published in 1987. In this revision of the standard use of only PVC water-stops have been recommended and provision of other materials have been deleted.

There is no ISO standard on the subject. This standard has been prepared based on the data received from indigenous manufacturers' and also taking into consideration the pactices prevalent in the field in India.

The composition of the Committee responsible for the formulation of this standard is given in Annex A.

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

PROVISION OF WATER-STOPS AT TRANSVERSE CONTRACTION JOINTS IN MASONRY AND CONCRETE DAMS — CODE OF PRACTICE

(First Revision)

1 SCOPE

This standard deals with the provision of PVC water-stops across ungrouted transverse contraction joints in masonry and concrete dams.

2 REFERENCES

The Indian Standards given 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.

IS No.	*Title*
290 : 1961	Specification for coal-tar black paint
456 : 2000	Code of practice for plain and reinforced concrete (*fourth revision*)
15058 : 2001	PVC water-stops at transverse contraction joints for use in masonry and concrete dams — Specification

3 PVC (POLYVINYL CHLORIDE) WATER-STOPS

3.1 Material

The water-stop should be fabricated from a plastic compound, the basic resin of which shall be polyvinyl chloride. The compound shall contain additional resins, plasticizers, inhibitors or other materials such that when the material is compounded, it shall meet the requirements given in IS 15058 : 2001.

3.2 Shape and Dimensions

The typical shape and dimensions of PVC water-stops are given in Fig. 1. However, the section of PVC water-stop will vary depending on head and site requirements.

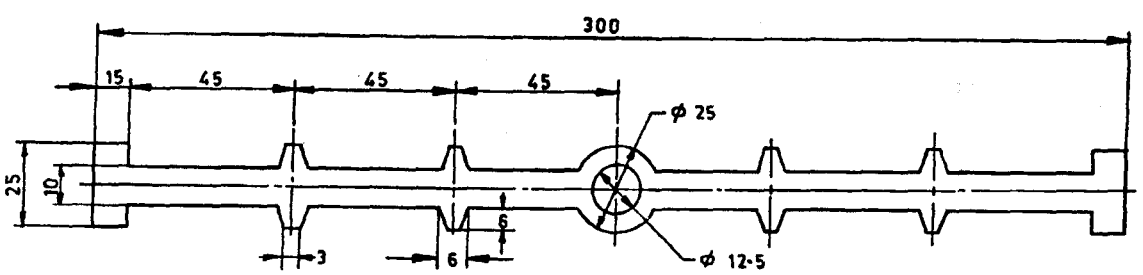
4 INSTALLATION OF WATER-STOPS

4.1 In the case of masonry dams, the surface adjacent to the blockouts (shown by dotted lines in Fig. 2) shall be irregular and the joints in the masonry shall be raked out when mortar is green, with some stones protruding beyond dotted lines regularly in both directions. No such blockouts shall be provided in concrete dams where concreting on either side of the water-stops is done along with the concreting of the rest of the block.

4.2 The blockout may be concreted in lifts not more than 1.5 m. Minimum grade of concrete to be used in the blockout shall be M 20 (*see* IS 456).

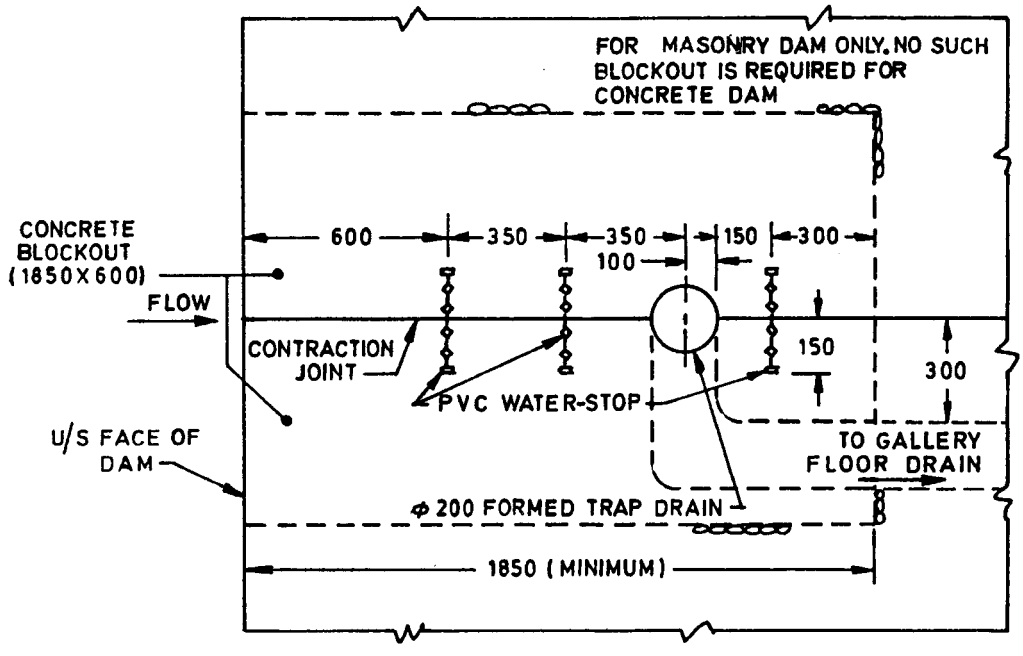
4.3 The blockout of one block may be concreted first and the joint face given a coat of coaltar black paint conforming to IS 290 and then only the blockout of the second block should be concreted so as to have a clear contraction joint.

4.4 Typical details of water-stop arrangement (at contraction joints between two monoliths of a dam)



All dimensions in millimetres.

FIG. 1 TYPICAL CROSS-SECTION OF PVC WATER-STOP

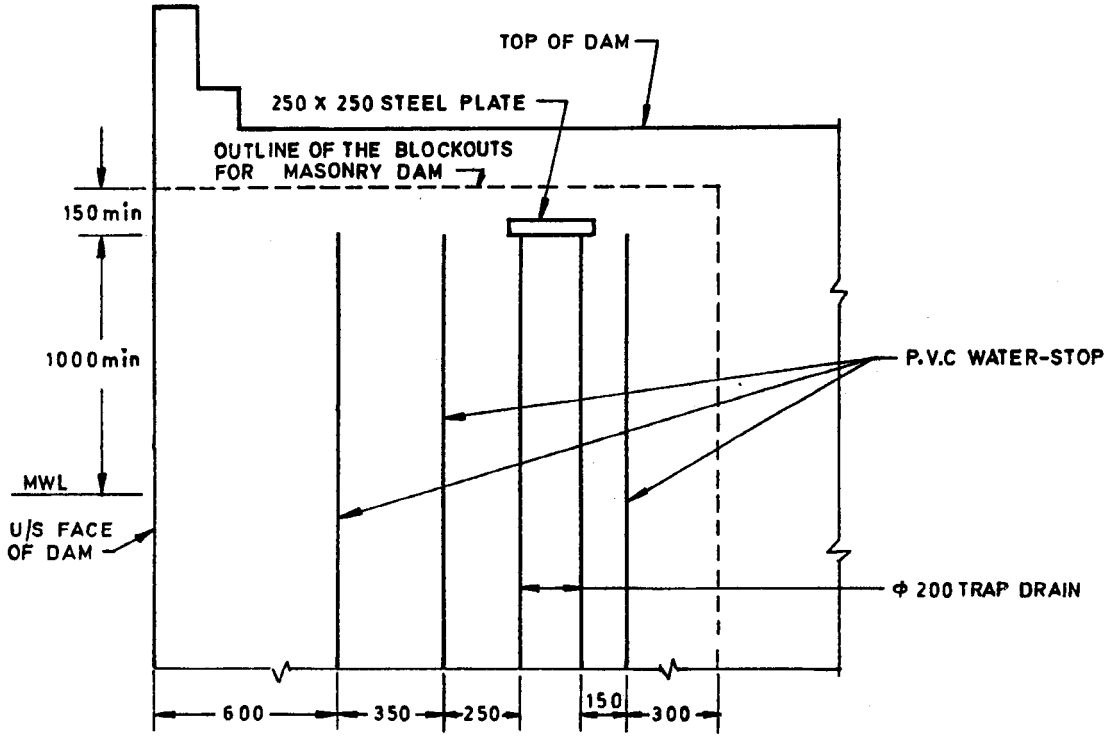


All dimensions in millimetres.

FIG. 2 SECTIONAL PLAN AT CONTRACTION JOINTS

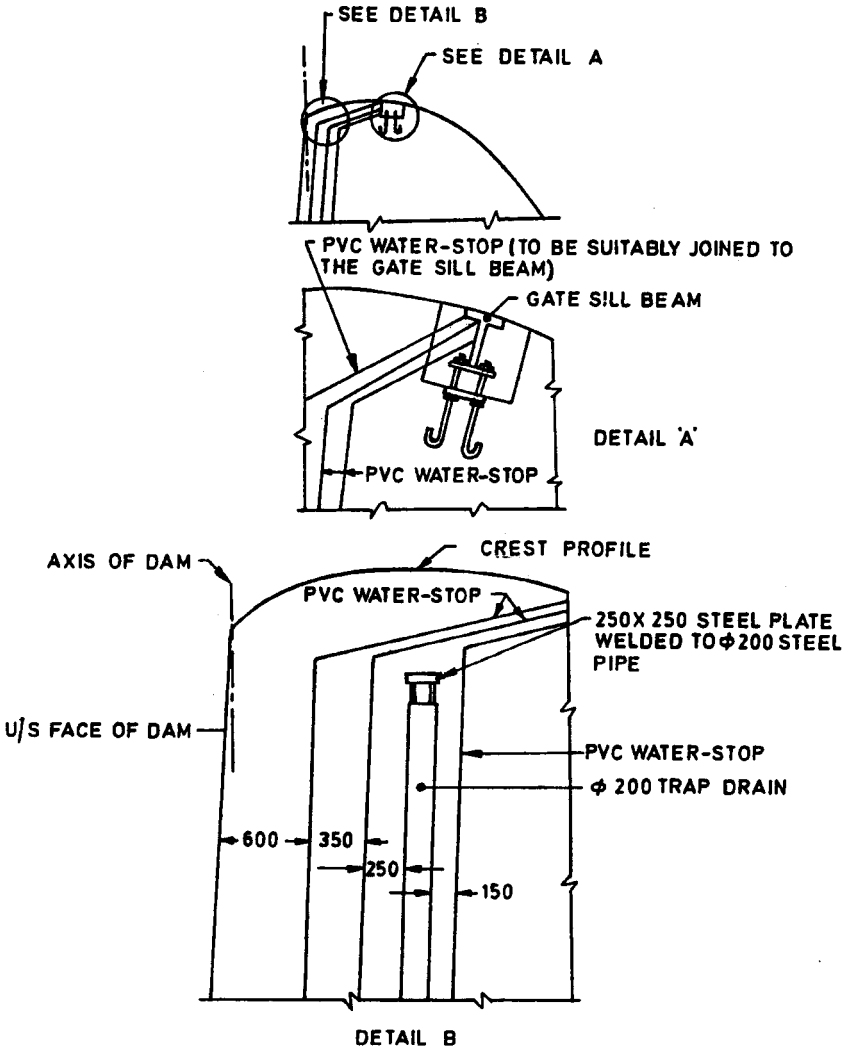
near the top of a non-overflow section are shown in Fig. 3, near the crest of a gated overflow section in Fig. 4, near the bottom of the dam in Fig. 5 and ungated overflow section in Fig. 6.

4.5 PVC water-stops shall be provided around galleries/adits at the contraction joint between two monoliths of a dam as shown in Fig. 7. In case of masonry dam, the thickness of concrete cover may be 400 mm.



All dimensions in millimetres.

FIG. 3 TYPICAL WATER-STOP DETAILS NEAR THE TOP OF NON-OVERFLOW SECTION OF DAM



All dimensions in millimetres.

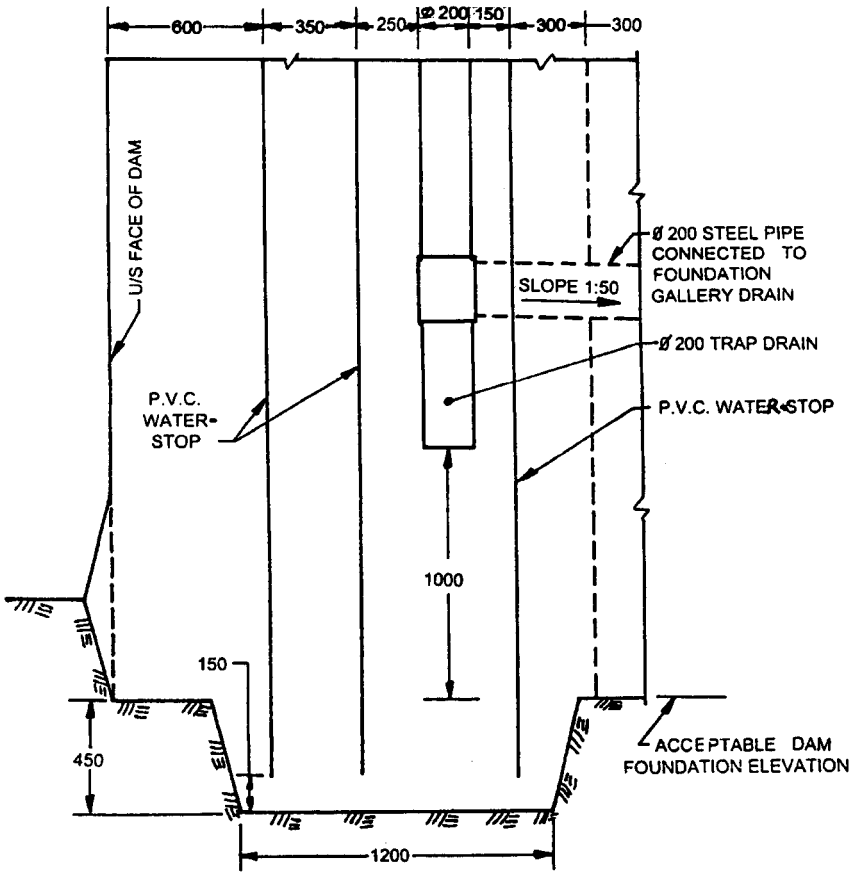
FIG. 4 TYPICAL WATER-STOP DETAILS NEAR THE CREST OF GATED OVERFLOW SECTION

4.6 Water-stops rolls should be stored in a suitable environment to avoid its damage due to adverse weather conditions.

4.7 During installation, the exposed portion of water-stops should be protected against adverse weather conditions.

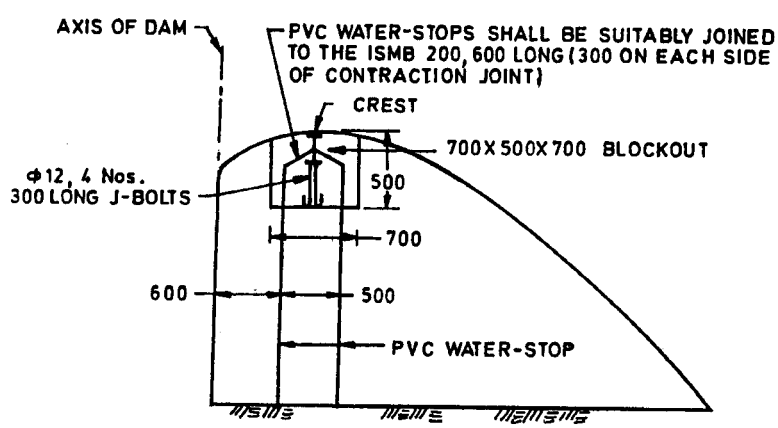
5 JOINTING

PVC water-stops shall be jointed in straight reaches only by an experienced trained personnel using a suitable device in consultation with the engineer-in-charge and the manufacturer.



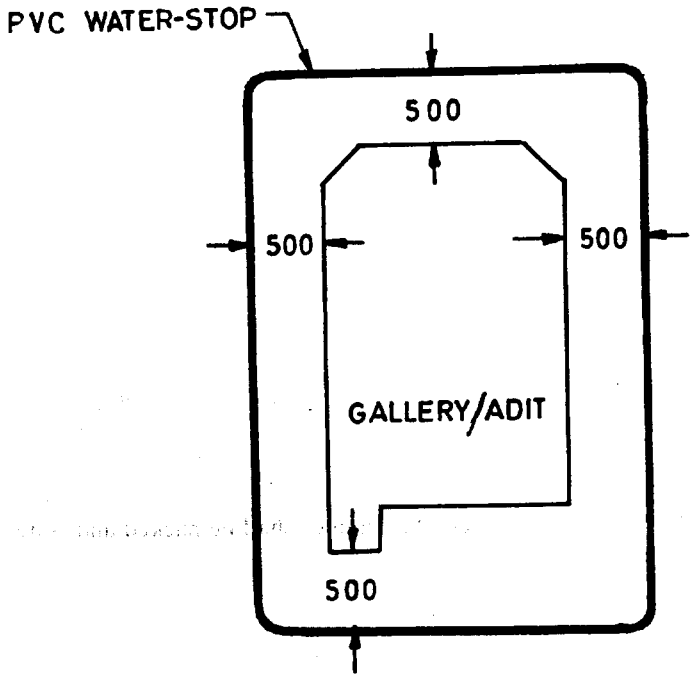
All dimensions in millimetres.

FIG. 5 TYPICAL WATER-STOP DETAILS NEAR BOTTOM OF DAM



All dimensions in millimetres.

FIG. 6 WATER-STOP DETAILS FOR UNGATED OVERFLOW SECTION



All dimensions in millimetres.

FIG. 7 PVC WATER-STOP AROUND GALLERY/ADIT AT CONTRACTION JOINT

ANNEX A

(Foreword)

COMMITTEE COMPOSITION

Dams and Reservoirs Sectional Committee, WRD 9

Organization	*Representative(s)*
Central Water Commission, New Delhi	DR B. K. MITTAL (***Chairman***)
Bhakra Beas Management Board, Chandigarh	CHIEF ENGINEER (BHAKRA DAM) DIRECTOR (DESIGN) B&B DESIGN DIRECTORATE (*Alternate*)
Central Board of Irrigation & Power, New Delhi	SHRI S. P. KAUSHISH SHRI T. S. MURTHY (*Alternate*)
Central Soil & Material Research Station, New Delhi	DIRECTOR SHRI A. K. DHAVAN (*Alternate*)
Central Water & Power Research Station, Pune	SHRI R. M. KHATSURIA SHRI P. B. DEOLALIKAR (*Alternate*)
Central Water Commission, New Delhi	DIRECTOR (CMDD-NW&S) DIRECTOR RESEERVOIR, OPERATION DIRECTORATE (*Alternate*)
Consulting Engineering Services (I) Pvt Ltd, New Delhi	SHRI M. K. NARASIMHAIYA SHRI S. S. NARANG (*Alternate*)
Geological Survey of India, Lucknow	SHRI G. K. KAISTHA SHRI R. N. SINGH (*Alternate*)
Narmada & Water Resources Department, Government of Gujarat, Gandhinagar	CHIEF ENGINEER (MEDIUM & MINOR) AND ADDL SECRETARY SUPERINTENDING ENGINEER (CDO) (*Alternate*)
Indian Institute of Technology, New Delhi	HEAD OF THE CIVIL ENGINEERING DEPARTMENT
Irrigation Department, Government of Andhra Pradesh, Hyderabad	CHIEF ENGINEER (I&CAD) SUPERINTENDING ENGINEER (DAMS) (*Alternate*)
Irrigation & Waterways Directorate, Government of West Bengal, Kolkata	SHRI A. DASGUPTA SHRI H. P. CHAKRABARTI (*Alternate*)
Irrigation Department, Government of Uttar Pradesh, Roorkee	CHIEF ENGINEER (DAM DESIGN) SUPERINTENDING ENGINEER (DAM DESIGN CIRCLE 1) (*Alternate*)
Irrigation Department, Government of Punjab, Chandigarh	CHIEF ENGINEER (RSDD) DIRECTOR DAMS (RSDD) (*Alternate*)
Irrigation Department, Government of Maharashtra, Nasik	SUPERINTENDING ENGINEER (MD) EXECUTIVE ENGINEER (MD-4) (*Alternate*)
Irrigation Department, Government of Haryana, Chandigarh	CHIEF ENGINEER (PROJECTS) DIRECTOR (ENGINEERING) (*Alternate*)
Water Resources Department, Government of Madhya Pradesh, Bhopal	SHRI A. K. RISHI DIRECTOR (DAMS) (*Alternate*)
Jaiprakash Industries Ltd, New Delhi	SHRI D. G. KADKADE SHRI NARENDRA SINGH (*Alternate*)
Karnataka Power Corporation Limited, Bangalore	SHRI P. R. MALTI KARJUNA SHRI S. M. CHEBBI (*Alternate*)
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North Eastern Electric Power Corporation Ltd, New Delhi	SHRI UTPAL BORA
National Institute of Hydrology, Roorkee	DR S. M. SETH DR P. K. MAHAPATRA (*Alternate*)
Public Works Department, Government of Tamil Nadu, Chennai	ENGINEER-IN-CHIEF CHIEF ENGINEER (*Alternate*)
Tehri Hydro Development Corporation, Noida	SHRI L. K. BANSAL
BIS Directorate General	SHRI S. S. SETHI, Director & Head (WRD) [Represending Director General (*Ex-officio*)]

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

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