

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

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**BUREAU OF INDIAN STANDARDS**  
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NEW DELHI 110002

## 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 practices 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 ( <i>fourth revision</i> )
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.

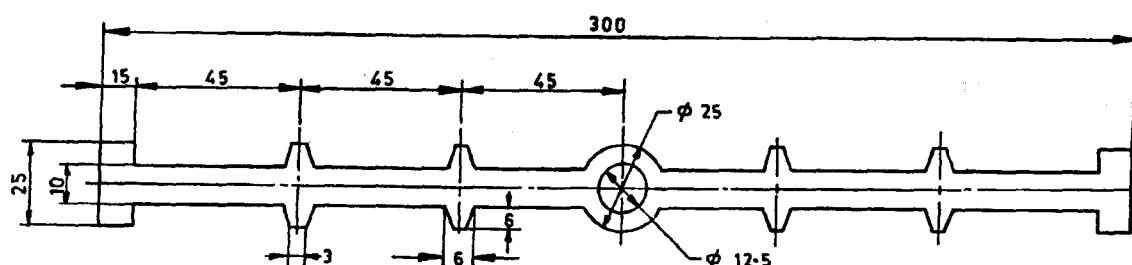
### 4 INSTALLATION OF WATER-STOPS

**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).

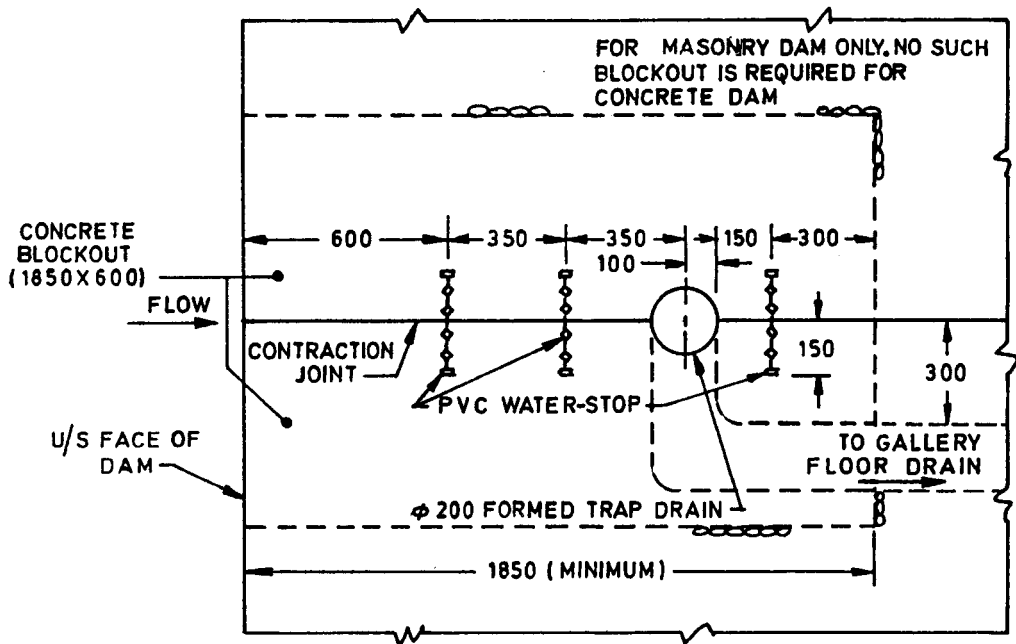
**4.3** The blockout of one block may be concreted first and the joint face given a coat of coaltar black paint conforming to IS 290 and then only the blockout of the second block should be concreted so as to have a clear contraction joint.

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



All dimensions in millimetres.

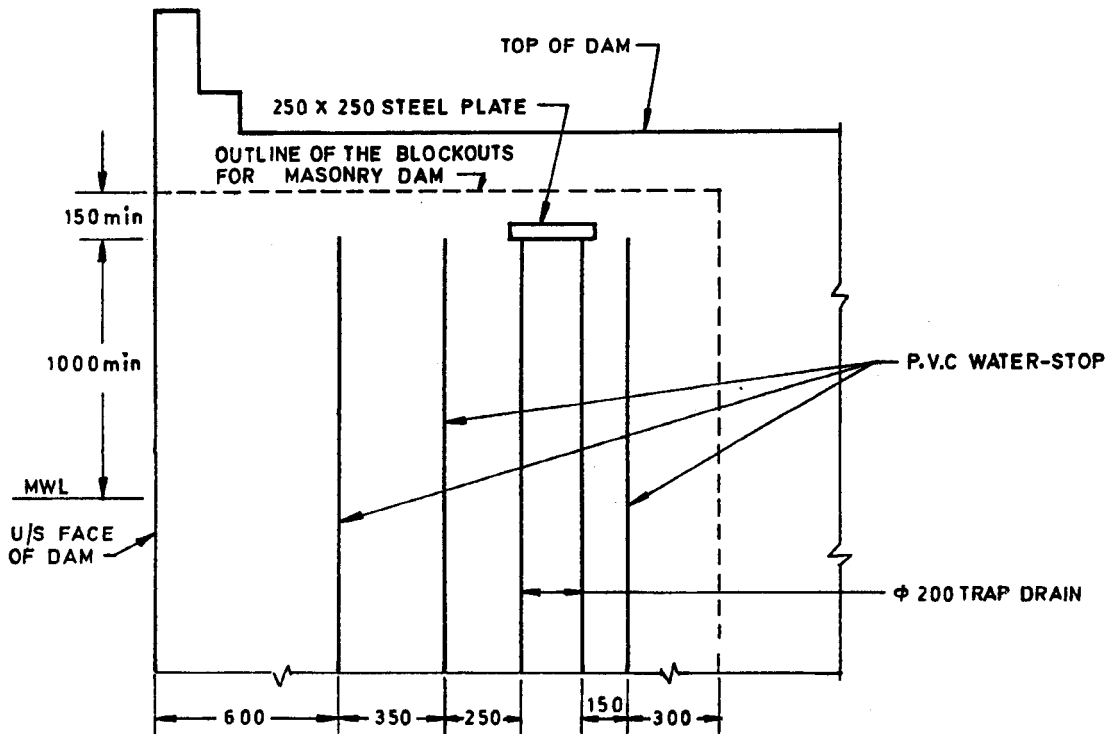
FIG. 1 TYPICAL CROSS-SECTION OF PVC WATER-STOP



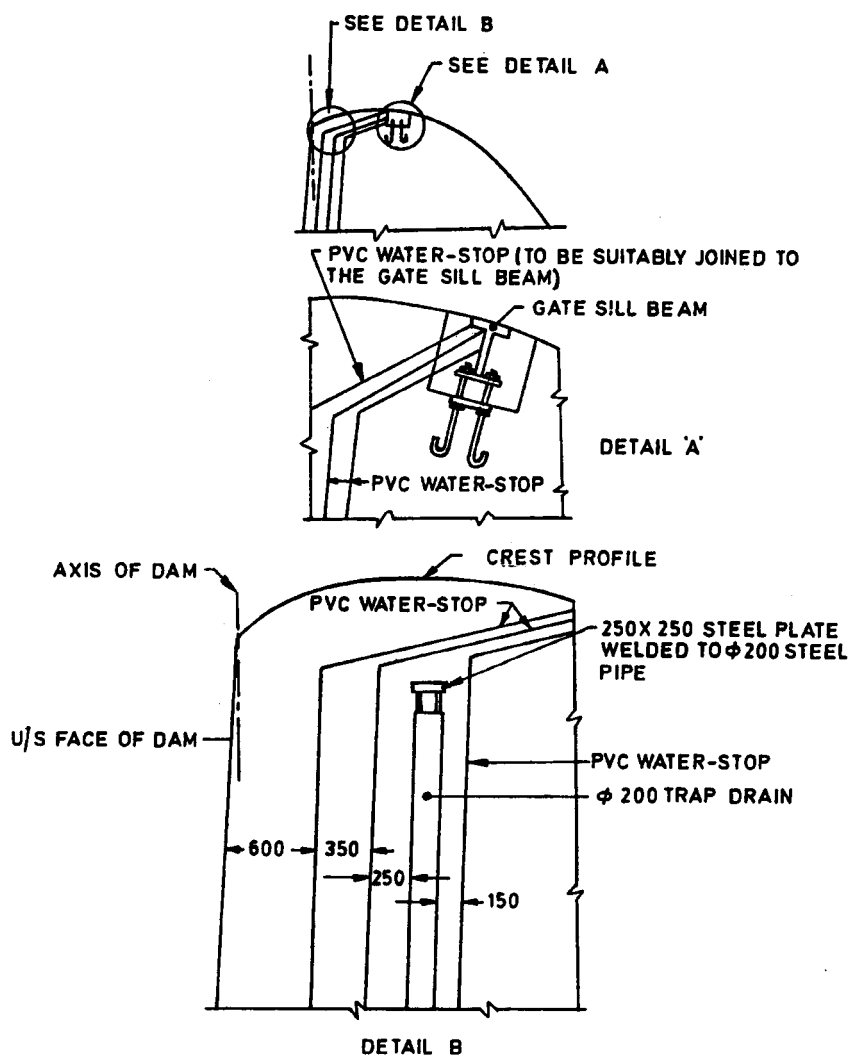
All dimensions in millimetres.  
FIG. 2 SECTIONAL PLAN AT CONTRACTION JOINTS

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.

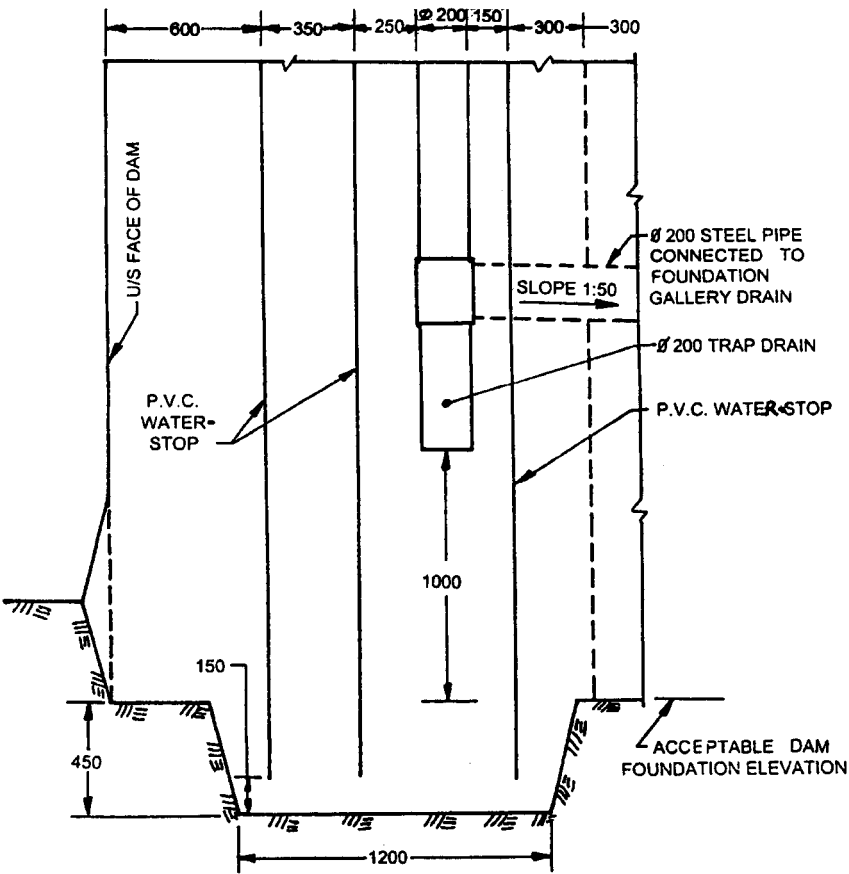
FIG. 4 TYPICAL WATER-STOP DETAILS NEAR THE CREST OF GATED OVERFLOW SECTION

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

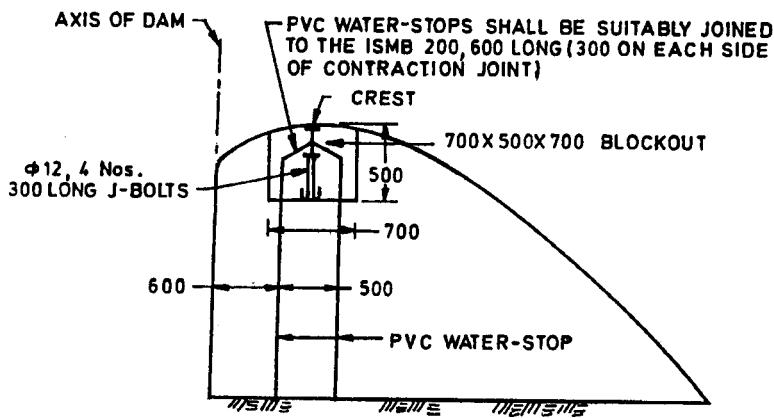
4.7 During installation, the exposed portion of water-stops should be protected against adverse weather conditions.

## 5 JOINTING

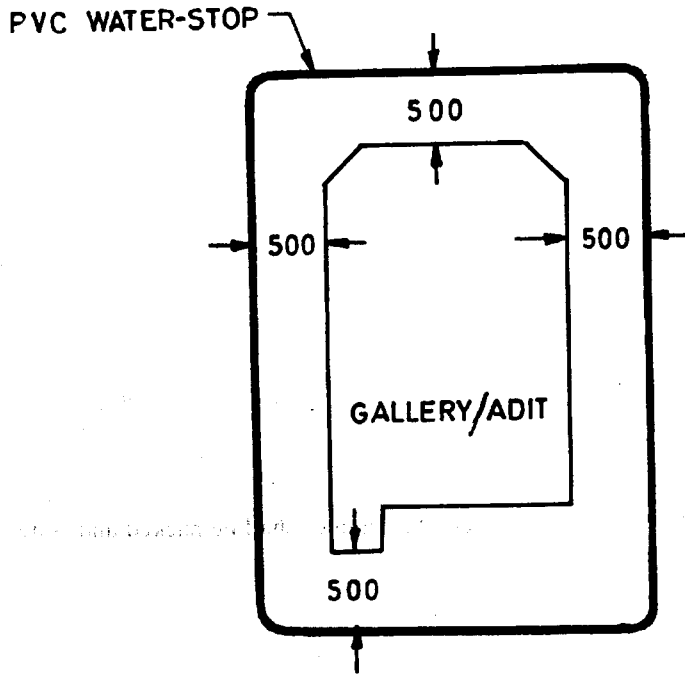
PVC water-stops shall be jointed in straight reaches only by an experienced trained personnel using a suitable device in consultation with the engineer-in-charge and the manufacturer.



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

Central Water Commission, New Delhi  
Bhakra Beas Management Board, Chandigarh

Central Board of Irrigation & Power, New Delhi

Central Soil & Material Research Station, New Delhi

Central Water & Power Research Station, Pune

Central Water Commission, New Delhi

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Gammon India, Mumbai

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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 latest issue of 'BIS Catalogue' and 'Standards: Monthly Additions'.

This Indian Standard has been developed from Doc : No. WRD 9 (283).

### Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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