



**N-1690**

**REV. B**

**ENGLISH**

**03 / 2003**

**CONTEC**

Comissão de Normalização  
Técnica

**SC-04**

Civil Construction

## **Design of Expansion Joints for Reinforced Concrete Dike**

Revalidation

**Revalidated in 05/2010.**

## DESIGN OF EXPANSION JOINTS FOR REINFORCED CONCRETE DIKE

### Procedure

This Standard replaces and cancels the previous revision.

The Responsible CONTEC Subcommittee provides guidance on the interpretation of this Standard when questions arise regarding its contents. The Department of PETROBRAS that uses this Standard is fully responsible for adopting and applying the clauses thereof.

**Technical Requirement:** a provision established as being the most adequate and which shall be used strictly in accordance with this Standard. If a decision is taken not to follow the requirement ("nonconformity" to this Standard) it shall be based on well-founded economic and management reasons, and be approved and registered by the Department of PETROBRAS that uses this Standard. It is characterized by the verb forms "shall," "it is necessary...", "is required to...", "it is required that...", "is to...", "has to...", "only ... is permitted," and other equivalent expressions having an imperative nature.

**Recommended Practice:** a provision that may be adopted under the conditions of this Standard, but which admits (and draws attention to) the possibility of there being a more adequate alternative (not written in this Standard) to the particular application. The alternative adopted shall be approved and registered by the Department of PETROBRAS that uses this Standard. It is characterized by the verbal form "should" and equivalent expressions such as "it is recommended that..." and "ought to..." (verbs of a nonmandatory nature). It is indicated by the expression: **[Recommended Practice]**.

Copies of the registered "nonconformities" to this Standard that may contribute to the improvement thereof shall be submitted to the Responsible CONTEC Subcommittee.

Proposed revisions to this Standard shall be submitted to the Responsible CONTEC Subcommittee, indicating the alphanumeric identification and revision of the Standard, the clause(s) to be revised the proposed text, and technical/economic justification for revision. The proposals are evaluated during the work for alteration of this Standard.

***"The present Standard is the exclusive property of PETRÓLEO BRASILEIRO S.A. - PETROBRAS, for internal use in the company, and any reproduction for external use or disclosure, without previous express authorization, will imply an unlawful act pursuant to the relevant legislation through which the applicable responsibilities shall be imputed. External circulation shall be regulated by a specific clause of Secrecy and Confidentiality pursuant to the terms of intellectual and industrial property law."***

### CONTEC

Comissão de Normas  
Técnicas

### SC - 04

Civil Construction

### Foreword

*PETROBRAS Technical Standards are prepared by Working Groups - GTs (consisting of PETROBRAS specialists and specialists from PETROBRAS Subsidiaries), are commented by PETROBRAS Units and PETROBRAS Subsidiaries, are approved by the Responsible Subcommittees - SCs (consisting of specialists belonging to the same specialty, representing the various PETROBRAS Units and PETROBRAS Subsidiaries), and ratified by the CONTEC Assembly (consisting of representatives of the PETROBRAS Units and PETROBRAS Subsidiaries). A PETROBRAS Technical Standard may be submitted to revision at any time by the responsible specialized Subcommittee and shall be reviewed every 5 years to be revalidated, revised or cancelled. PETROBRAS Technical Standards are prepared in accordance with PETROBRAS Technical Standard N - 1. For complete information about PETROBRAS Technical Standards see PETROBRAS Technical Standards Catalog.*

## **FOREWORD**

This Standard is the English version (issued in MAR/2003) of Standard PETROBRAS N-1690 REV. B MAR/2003. This Standard is the Revalidation of Standard PETROBRAS N-1690 REV. A APR/98, the contents thereof not altered.

## **1 SCOPE**

1.1 This Standard establishes the conditions to be fulfilled for design of expansion joints for reinforced concrete dike in storage tank basins.

1.2 This Standard is applied to procedures of its issue date.

1.3 This Standard only contains Technical Requirements.

## **2 SUPPLEMENTARY DOCUMENTS**

The document listed below is mentioned in the text and contain valid requirements for the present Standard.

ABNT [NBR 6118](#) - Projeto e Execução de Obras de Concreto Armado.

Note: For documents for which only the Portuguese version is available, the PETROBRAS department that uses this Standard should be consulted for any information required for the specific application.

## **3 GENERAL CONDITIONS**

3.1 For development of the design of expansion joints for reinforced concrete dike, the details in ANNEX A shall be followed.

3.2 The expansion joint shall consist of a partial opening on the wall of the reinforced concrete dike, as indicated in FIGURE A-1.2 of the ANNEX A.

3.3 The plate of the expansion joint shall be smooth and of annealed copper, in the shape and dimensions indicated in FIGURES A-1.1 and A-1.2 of the ANNEX A.

3.4 The iron bars of the dike wall structure shall not touch the copper plate, as indicated in FIGURE A-1.3 of the ANNEX A.

3.5 The wall opening shall extend at least 20 cm below the ground level, as indicated in FIGURE A-1.2 of the ANNEX A.

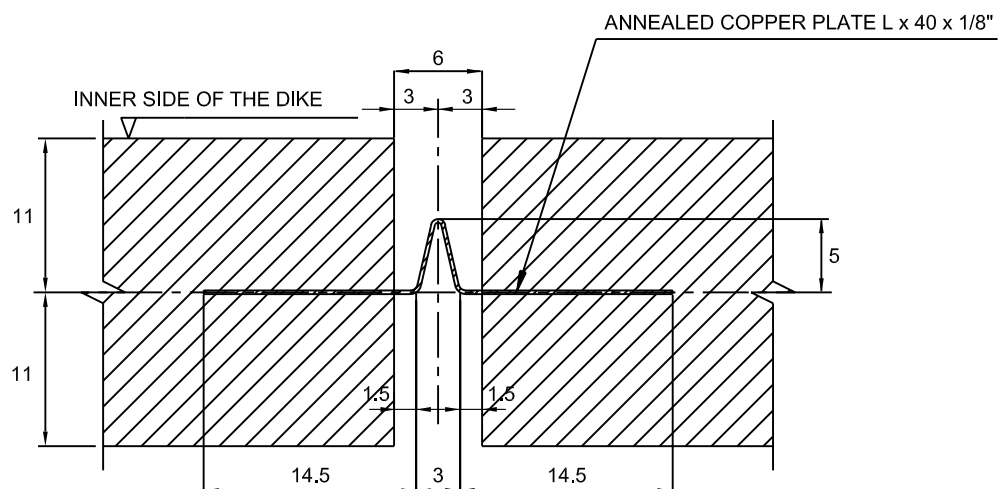
3.6 The copper plate of the joint shall extend at least 10 cm beyond the wall opening, as indicated in FIGURE A-1.2 of the ANNEX A.

3.7 The number of expansion joints to be designed for a reinforced concrete dike shall be specified in the design, in accordance with the recommendations of standard ABNT [NBR 6118](#).

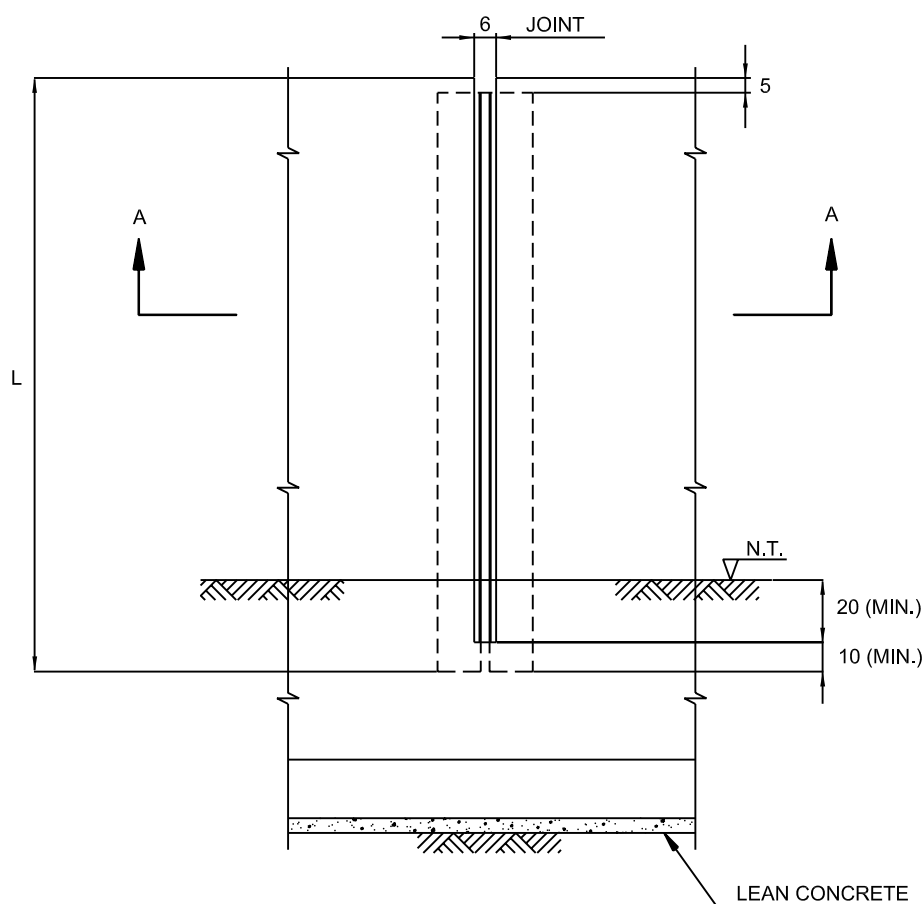
---

**/ANNEX A**

**ANNEX A - FIGURES**



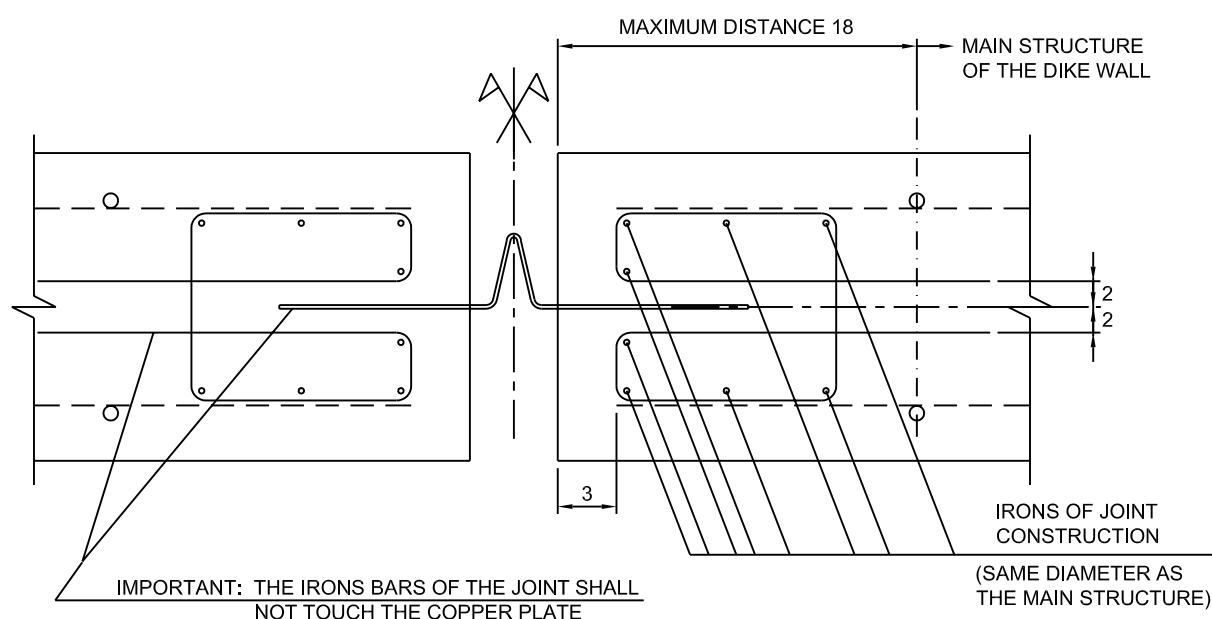
**FIGURE A-1.1 - Section A-A**



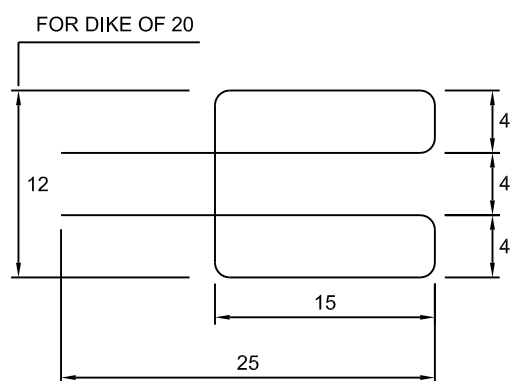
NOTE: DIMENSIONS IN CENTIMETERS.

**FIGURE A-1.2 - Elevation**

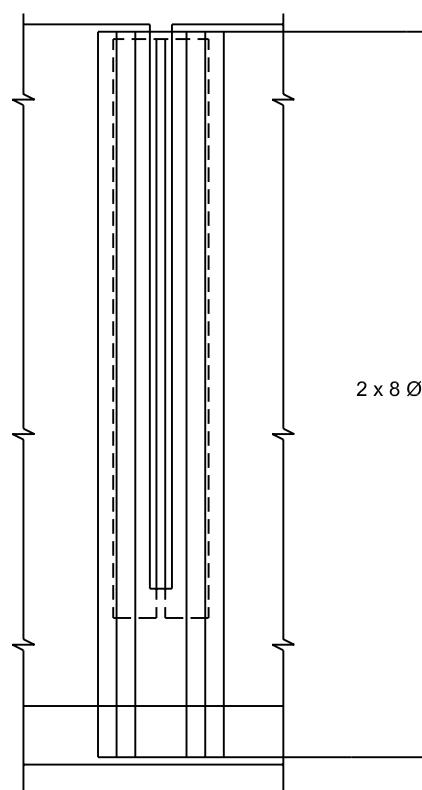
**FIGURE A-1 - EXPANSION JOINT - DETAILS**



**FIGURE A-1.3 - Detail of Joint Structure**



**FIGURE A-1.4 - Clamp Detail Ø6,3 mm c10**



**FIGURE A-1.5 - Elevation**

NOTE: DIMENSIONS IN CENTIMETERS.

**FIGURE A-1 - EXPANSION JOINT - DETAILS**

## INDEX OF REVISIONS

**REV. A**

There is no index of revisions.

**REV. B**

[illegible]