

# Reinforced concrete pressure pipes and distributed reinforcement concrete pressure pipes (non-cylinder type), including joints and fittings

The European Standard EN 640:1994 has the status of a  
British Standard

NO COPYING WITHOUT BSI PERMISSION EXCEPT AS PERMITTED BY COPYRIGHT LAW



Document Sharing Hub

# Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee B/504, Water supply, upon which the following bodies were represented:

- Association of Consulting Engineers
- Association of Manufacturers of Domestic Unvented Supply Systems Equipment (MODUSSE)
- British Bathroom Council
- British Foundry Association
- British Non-Ferrous Metals Federation
- British Plastics Federation
- British Plumbing Manufacturers' Association
- Department of the Environment
- Department of the Environment (Drinking Water Inspectorate)
- Fibre Cement Manufacturers' Association Limited
- Institute of Plumbing
- Institution of Water and Environmental Management
- Local Authority Organizations
- Scottish Association of Directors of Water and Sewerage Services
- Water Companies Association
- Water Research Centre
- Water Services Association of England and Wales

The following bodies were also represented in the drafting of this standard, through subcommittees and panels:

- Association of Metropolitan Authorities
- British Precast Concrete Federation Ltd.
- Concrete Pipe Association
- Concrete Society
- Department of Transport
- Federation of Civil Engineering Contractors
- Institution of Civil Engineers
- Institution of Highways and Transportation

This British Standard, having been prepared under the direction of the Sector Board for Building and Civil Engineering, was published under the authority of the Standards Board and comes into effect on 15 May 1995

© BSI 07-1999

The following BSI references relate to the work on this standard:  
Committee reference B/504  
Draft for comment 92/12537 DC

ISBN 0 580 24112 2

## Amendments issued since publication

| Amd. No. | Date | Comments |
|----------|------|----------|
|          |      |          |
|          |      |          |
|          |      |          |
|          |      |          |
|          |      |          |

# Contents

|                        | Page               |
|------------------------|--------------------|
| Committees responsible | Inside front cover |
| National foreword      | ii                 |
| Foreword               | 2                  |
| Text of EN 640         | 3                  |

## National foreword

This British Standard has been prepared by Technical Committee B/504 and is the English language version of EN 640:1994 *Reinforced concrete pressure pipes and distributed reinforcement concrete pressure pipes (non-cylinder type), including joints and fittings*, published by the European Committee for Standardization (CEN).

EN 640 was published as a result of international discussion in which the UK took an active part.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

**Compliance with a British Standard does not of itself confer immunity from legal obligations.**

### Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN title page, pages 2 to 12 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

---

ICS 23.040.10;23.040.40

Descriptors: Water pipelines, pressure pipes, potable water, water pipes, concrete tubes, reinforced concrete, armatures, specifications, design, equipment specifications, dimensions, tests

English version

## Reinforced concrete pressure pipes and distributed reinforcement concrete pressure pipes (non-cylinder type), including joints and fittings

Tuyaux pression en béton armé et tuyaux pression à armature diffuse (sans âme en tôle), y compris joints et pièces spéciales

Stahlbetondruckrohre und Betondruckrohre mit verteilter Bewehrung (ohne Blechmantel) einschliesslich Rohrverbindungen und Formstücken

This European Standard was approved by CEN on 1994-10-26. CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

# CEN

European Committee for Standardization  
Comité Européen de Normalisation  
Europäisches Komitee für Normung

**Central Secretariat: rue de Stassart 36, B-1050 Brussels**

---

© 1994 Copyright reserved to CEN members

## Foreword

This European Standard for concrete pipes is a standard which was prepared by WG 5, Concrete pipes, of the Technical Committee CEN/TC 164, Water supply, the Secretariat of which is held by AFNOR.

During preparation of this standard the provisional results already available of CEN/TC 164/WG 1, General requirements for external systems and components, and of CEN/TC 164/165/JWG 1, Structural design, were considered.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 1995, and conflicting national standards shall be withdrawn at the latest by April 1995.

In accordance with the common CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

## Contents

|                                                                                   | Page |
|-----------------------------------------------------------------------------------|------|
| Foreword                                                                          | 2    |
| 0 Introduction                                                                    | 3    |
| 1 Scope                                                                           | 3    |
| 2 Materials                                                                       | 3    |
| 2.1 Aggregates                                                                    | 3    |
| 2.2 Steel wire for distributed reinforcement pipes                                | 3    |
| 3 Design and fabrication of pipe                                                  | 3    |
| 3.1 General requirements                                                          | 3    |
| 3.1.1 Wall thickness                                                              | 3    |
| 3.2 Design of pipe                                                                | 3    |
| 3.2.1 General                                                                     | 3    |
| 3.2.2 Combined load design criteria                                               | 4    |
| 3.3 Reinforcement                                                                 | 4    |
| 3.3.1 Circumferential reinforcement for reinforced concrete pipe                  | 4    |
| 3.3.2 Circumferential reinforcement for distributed reinforcement pipe            | 4    |
| 3.3.3 Longitudinal reinforcement for reinforced concrete pipe                     | 5    |
| 3.3.4 Longitudinal reinforcement for distributed reinforcement pipe               | 5    |
| 3.3.5 Longitudinal prestressing reinforcement                                     | 5    |
| 3.3.6 Placement and cover to steel                                                | 5    |
| 3.4 Concrete and mortar                                                           | 5    |
| 3.4.1 Mix design                                                                  | 5    |
| 3.4.2 Concrete strength                                                           | 5    |
| 4 Factory testing                                                                 | 5    |
| 4.1 Concrete tests                                                                | 5    |
| 4.2 Pipe tests                                                                    | 5    |
| 4.2.1 Hydrostatic pressure tests                                                  | 5    |
| 4.2.2 Crushing test for reinforced concrete pipe                                  | 5    |
| 4.2.3 Combined crushing and pressure test for distributed reinforcement pipe      | 6    |
| 4.2.4 Combined bending and pressure test for distributed reinforcement pipes      | 6    |
| Annex A (informative) Typical design procedure                                    | 11   |
| Figure 1 — Crushing test                                                          | 7    |
| Figure 2 — Combined crushing and pressure test for distributed reinforcement pipe | 9    |
| Figure 3 — Combined bending and pressure test for distributed reinforcement pipe  | 10   |
| Figure A.1 — Coefficient $F_p$                                                    | 12   |
| Table 1 — Minimum wall thickness                                                  | 4    |
| Table 2 — Reduction factors for V shaped support                                  | 6    |