

Code of Practice for

Plastics pipework (thermoplastics material) —

Part 3: Polyethylene pipes for the conveyance of liquids under pressure

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Plastics pipe

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Foreword

The preparation of this Code of Practice has been authorized in order to present the details of comparative physical, chemical and mechanical properties of the various plastics pipes, to guide the selection for different applications and consequently, to define sound practice in the fabrication and installation of such pipes.

Part 1 deals with the selection of the most suitable pipework material.

Part 2 provides recommended practice in the installation of unplasticized PVC pipework for the conveyance of liquids under pressure and Part 3 provides similar information for polyethylene.

NOTE The name “polyethylene” is now preferred to “polythene” and is used in this Code of Practice except where the latter is included in the title of a published British Standard which has not yet been revised to take account of this preference.

It is proposed to issue further parts dealing with other materials, as follows:

- *Part 4: Unplasticized PVC soil pipes;*
- *Part 5: Plastics waste pipes;*
- *Part 6: Plastics drain pipes.*

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, pages 1 to 8, an inside back cover 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.

1 General

1.1 Scope

1.1.1 This part of the code gives guidance on the proper application and installation of polyethylene pipe for the conveyance of liquids under pressure. The choice of materials for particular applications is covered in Part 1 of this code. This part does not recommend the use of polyethylene pipe for any particular purpose.

1.1.2 The use of plastics pipes in services supplied from the mains of water undertakings is governed by the byelaws of the undertakings and these shall be strictly observed. They include requirements that pipes shall be located and protected so as to avoid damage by frost, and these are deemed to be satisfied if the recommendations of CP 99 are observed. Although pipes of polyethylene are not easily fractured by freezing, the flow of water may be stopped, and therefore precautions should be taken as for pipes of other materials.

Polyethylene pipes are slightly permeable to certain gases and are not recommended for use in ground that is, or might be, liable to severe gas contamination.

NOTE The titles of the British Standards referred to in this Code of Practice are listed on the inside back cover.

1.2 Classification of polyethylenes

Whilst polyethylenes are available in densities covering the range from 0.914 – 0.965 g/ml, a technical committee of BSI has adopted (for the purpose of preparing standards for polyethylene pipes) two general classes. The first covers polyethylene having a density not greater than 0.93 g/ml. This class of material has a recommended maximum working stress of 32 bar¹⁾ at 20 °C when in pipe form and used for water. This stress has been used as a basis for calculating the minimum wall thicknesses of pipes specified in BS 1972 and BS 1973. Similarly, the second classification is for polyethylene having a density greater than 0.93 g/ml, which has a recommended maximum working stress of 50 bar¹⁾ at 20 °C when in pipe form and used for water. This stress has been used as a basis for calculating the minimum wall thicknesses of pipes specified in BS 3284 and BS 3796.

These two stress values are the basis of the designations “Type 32” and “Type 50” respectively.

2 Working pressure and effects of temperature

2.1 The normal maximum working pressures for the various classes of polyethylene pipe for carrying liquids are given in BS 1972, BS 1973, BS 3284 and BS 3796, and these pressures are applicable where the working temperature is at 20 °C or below. The normal maximum working pressures given in these standards have been calculated from known data on the basis of a life of at least 50 years of operation continuously with water at these pressures. Where pipes are required to operate only for a limited duration of total life, it may be permissible to allow somewhat higher maximum working pressures to be used but the manufacturer’s advice should be sought in such cases.

2.2 Polyethylene pipes soften with heat and therefore lose strength as the temperature rises. Table 1 gives a guide to the reduction in working pressure that can be expected to result in an estimated 50 year life.

Table 1 — Reduction in working pressures for polyethylene pipes at elevated temperatures

Temperature	Working pressure (expressed as percentage of that recommended at 20 °C)	
	Type 32	Type 50
°C	%	%
20	100	100
30	80	65
40	60	40
50	45	25
60	25	15
70	—	10

2.3 Table 1 refers only to the conveyance of substances to which polyethylene is completely resistant. Chemicals that attack polyethylene slightly may be conveyed safely at low temperatures and pressures, but chemical attack is accelerated as the temperature rises. An additional margin of safety should be allowed in these circumstances.

3 Limitations

3.1 Type 32 pipe is not recommended for use at temperatures above 60 °C, except in installations involving no internal pressure or very low internal pressures, such as apply when conveying effluents. Similar observations apply to Type 50 pipe at temperatures above 70 °C.

¹⁾ 1 bar = 10⁵ N/m².