

Specification for

Polyethylene pipes (type 50) in metric diameters for general purposes

UDC 621.643.2:678.742.2 – 462

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 by the Plastics Standards Committee (PLC/-) to Technical Committee PLC/9 upon which the following bodies were represented:

- British Chemical Distributors' and Traders' Association Ltd.
- British Gas Corporation
- British Plastics Federation
- British Steel Industry
- British Valve Manufacturers' Association Ltd.
- Copper Tube Fittings Manufacturers' Association
- Department of the Environment (Housing and Construction)
- Department of the Environment (PSA)
- Electricity Supply Industry in England and Wales
- Engineering Equipment and Materials Users' Association
- Institution of Civil Engineers
- Institution of Municipal Engineers
- Institution of Public Health Engineers
- Institution of Water Engineers and Scientists
- National Association of Plumbing, Heating and Mechanical Services Contractors
- Plastics and Rubber Institute
- Plastics Land Drainage Manufacturers' Association
- Royal Institute of Public Health and Hygiene
- STC Water Regulations and Fittings Scheme
- Water Companies Association
- Water Research Centre

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

- British Adhesive Manufacturers' Association
- British Board of Agrément
- Greater London Council
- Heating and Ventilating Contractors' Association
- Institute of Plumbing
- Ministry of Agriculture, Fisheries and Food
- Pitch Fibre Pipe Association of Great Britain

This British Standard, having been prepared under the direction of the Plastics Standards Committee, was published under the authority of the Board of BSI and comes into effect on 31 January 1984

© BSI 07-1999

The following BSI references relate to the work on this standard:
Committee reference PLC/9
Draft for comment 82/53980 DC

ISBN 0 580 13550 0

Amendments issued since publication

Amd. No.	Date of issue	Comments
5169	September 1986	Indicated by a sideline in the margin

Contents

	Page
Committees responsible	Inside front cover
Foreword	ii
1 Scope	1
2 Definition	1
3 Designation, category and class	1
4 Dimensions and tolerances	1
5 Compound composition	3
6 Pipe material	3
7 Hydrostatic properties	4
8 Physical and mechanical characteristics	4
9 Marking	4
Appendix A Method for the determination of ovality	5
Appendix B Method for the determination of a toluene extract of carbon black	5
Appendix C Method for the measurement of the extinction coefficient of the cyclohexane extract of carbon black at $\lambda = 386 \text{ nm}$	5
Appendix D Method for the determination of volatile matter from carbon black	6
Appendix E Method for the determination of the long term hydrostatic strength of pipe at 20°C	6
Appendix F Method of ageing for the resistance to weathering of unpigmented pipes	8
Appendix G Method for the determination of elongation at break	8
Figure 1 — Punched test piece	9
Figure 2 — Machined test piece	9
Table 1 — Pipe dimensions	2
Table 2 — Coil diameters	3
Table 3 — Melt flow rate tolerances	3
Table 4 — Carbon black characteristics	3
Table 5 — Hydrostatic pressure conditions	4
Table 6 — Elongation at break	4
Table 7 — Failure point distribution	6
Table 8 — Values of Student's t distribution (upper $2\frac{1}{2}\%$ points)	7
Table 9 — Dimensions of punched test piece	9
Table 10 — Number of strips for a given diameter of pipe	9
Table 11 — Dimensions of machined test piece	9
Publications referred to	Inside back cover

Foreword

This British Standard has been prepared under the direction of the Plastics Standards Committee.

The dimensions and pressure ratings of the pipes are in accordance with BS 5556, except that a 6 bar¹⁾ rating has been adopted instead of 6.3 bar. Pipes are classified into five classes, according to pressure rating at a temperature of 20 °C. Pipe sizes are designated by a nominal size up to a maximum of 500.

The type designation (50) indicates the recommended maximum working stress for material in pipe form, in bar at 20 °C, i.e. 50 bar at 20 °C. This stress has been used as the basis for calculating minimum wall thickness.

Polyethylenes are manufactured by different processes and contain a range of and varying quantities of co-monomers which can result in substantially different basic properties, e.g. melt flow rate, density, etc. Materials known to be suitable for the manufacture of pipes to this specification are characterized by pipe stress rupture performance at each of two temperatures.

Because of the differences in these basic properties, polyethylenes made by different processes may not be compatible with each other for fusion jointing and the guidance of the manufacturer should be sought before fusion jointing.

Attention is drawn to CP 312 which has been prepared to assist users in assessing the suitability of plastics pipes for particular purposes and to give guidance on proper application. If prolonged exposure to light is likely, i.e. use above ground, then carbon black pigmented pipes should be used.

This British Standard supersedes BS 3796:1970, which is withdrawn.

A standard is in course of preparation that specifies requirements for polyethylene joints and fittings (type 50), suitable for thermal fusion jointing to pipes complying with this standard.

Attention is drawn to the provisions of the Health and Safety at Work etc.

Act 1974 and the need to ensure that appropriate precautions are taken to ensure the safety of personnel carrying out the methods of test required by this standard.

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. In particular, attention is drawn to the General Provisions for Materials and Articles in Contact with Food Regulations and Amendments.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 10, 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⁾ 1 bar = 10⁵ N/m² = 100 kPa.

1 Scope

This British Standard specifies requirements for composition, dimensions, performance and marking for two categories of polyethylene pipes (PE 50 A and PE 50 B) in nominal sizes 16 to 500 for general purposes, including use in the chemical and food industries. Pipes in coils or straight lengths, unpigmented or pigmented with carbon black are included. Pipes are in five classes, according to nominal pressure rating.

NOTE The titles of the publications referred to in this standard are listed on the inside back cover.

2 Definition

For the purposes of this British Standard, the following definition applies.

ovality

the difference between the measured maximum outside diameter ($d_{y,max}$) and the measured minimum outside diameter ($d_{y,min}$) in the same cross section of pipe

3 Designation, category and class

3.1 Designation. Pipes are designated by their nominal sizes (see Table 1).

3.2 Category. Pipes are divided into categories by their hydrostatic properties, in accordance with 7.2. There are two categories, PE 50 A and PE 50 B.

3.3 Class. Pipes are classified by their nominal pressure ratings, in accordance with Table 1. The classes are as follows:

- a) class 2.5 : 2.5 bar^a (25 m head of water);
- b) class 3.2 : 3.2 bar (32 m head of water);
- c) class 4.0 : 4.0 bar (40 m head of water);
- d) class 6.0 : 6.0 bar (60 m head of water);
- e) class 10.0 : 10.0 bar (100 m head of water).

^a 1 bar = 10^5 N/m² = 100 kPa.

4 Dimensions and tolerances

4.1 Nominal size. The nominal size of the pipe shall be one of the sizes given in Table 1.

4.2 Mean outside diameter and wall thickness. When measured by the methods described in BS 2782: Method 1101A, the mean outside diameter and wall thickness of the pipe shall be in accordance with Table 1.

4.3 Ovality

4.3.1 Pipe in coils as manufactured. When determined by the method described in Appendix A, the ovality (see clause 2) of pipe from coils in the as manufactured condition, of nominal size, DN, up to and including 125, shall not exceed $0.06D_N$, where D_N (in mm) is numerically equal to the nominal size.

4.3.2 Pipe in coils after relaxation and straight pipe. When determined by the method described in Appendix A, the ovality of pipe from coils, subjected to relaxation, of nominal size up to and including 125 and of straight pipe of any nominal size, shall be as follows.

- a) For pipe up to and including nominal size 63, the ovality shall not exceed $1 + 0.008D_N$.
- b) For pipe of nominal size 90, up to and including nominal size 250, the ovality shall not exceed $0.02D_N$.
- c) For pipe of nominal size exceeding 250, the ovality shall not exceed $0.035D_N$.

4.4 Tolerance on length. No coil or straight length of pipe shall be shorter than its nominal length.

NOTE The preferred lengths of straight pipe are 6 m or 9 m and of coils 50 m, 100 m or 150 m.