

Plastics pipework (thermoplastics materials) —

**Part 8: Specification for the installation
of thermoplastics pipes and associated
fittings for use in domestic hot and cold
water services and heating systems**

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- British Board of Agrément
- British Gas plc
- British Plastics Federation
- British Plumbing Fittings Manufacturers' Association
- British Valve and Actuator Manufacturers' Association
- Department of the Environment (Property Services Agency)
- Department of the Environment (Building Research Establishment)
- Department of the Environment (Construction Industries Directorate)
- Department of Transport
- Electricity Supply Industry in England and Wales
- Engineering Equipment and Materials' Users' Association
- Health and Safety Executive
- Institute of Building Control
- Institution of Civil Engineers
- Institution of Gas Engineers
- Institution of Production Engineers
- Institution of Water and Environmental Management
- 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
- Society of British Gas Industries
- Society of British Water Industries
- Water Companies' Association
- Water Research Centre
- Water Services Association of England and Wales

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

- Heating and Ventilating Contractors' Association
- Institute of Domestic Heating and Environmental Engineers

Amendments issued since publication

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Foreword

This British Standard has been prepared under the direction of the Plastics Standards Policy Committee. It specifies methods and gives guidance for the installation of polybutylene (PB), crosslinked polyethylene (PE-X), and chlorinated polyvinyl chloride (PVC-C) pipes and associated fittings compatible with the scope of BS 7291. It is intended for the use of engineers, architects, surveyors, contractors, installers and inspection authorities for purposes of use of hot and cold water, including central heating, in buildings. To further assist end-users, guidance has also been given on the jointing systems which may be used with these components, together with recommended methods of storage, handling and transport.

NOTE In the preparation of this standard the opportunity has been taken to present it in the form of a practice specification in accordance with the guidance given in PD 6501. This format allows the requirements of the specification to be supported by recommendations. To comply with this specification, the user has to comply with all its requirements. He may depart from recommendations, but this would be on his own responsibility and he would be expected to have good reasons for doing so.

Attention is drawn to BS 5449-1 for guidance on the general planning and design of heating systems including those falling within the scope of this standard.

Attention is drawn to BS 6700 for guidance on the general planning, design, installation, alteration, testing and maintenance of systems for the domestic use, other than central heating, of hot and cold water. BS 6700 also includes less extensive requirements, commentaries and recommendations on matters within the scope of this Part of BS 5955 or BS 7291.

Attention is drawn to BS 1710 for guidance on identification and marking of service pipework to discriminate between different applications and/or pipework for other purposes. This is not intended to imply that the recommendations given in BS 1710 for the marking of pipework are either necessary or desirable for installations in situations used only for domestic purposes.

Attention is drawn to the fact that installations covered by this Part of BS 5955 fall within the scope of the Water Byelaws and persons using this standard should therefore be conversant with the applicable byelaws and water regulations, for which listing and general guidance is provided in Appendix A of BS 6700:1987.

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 water industry requirements for materials in contact with potable water.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 14, 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.

Section 1. General

1 Scope

This Part of this British Standard specifies the practices to be followed in the application and installation of thermoplastics pipes and associated fittings which fall within the scope of BS 7291 and are used for the distribution of domestic hot and cold water, including potable water, and central heating within buildings.

The duties for which the installations are suitable are classified as capable of carrying water at 12 bar¹⁾ when at 20 °C and one of three sets of combinations of lower pressures (3 bar, 3½ bar or 6 bar) and higher maximum system temperatures of which the highest temperature is 105 °C (see clauses 3 and 4).

Guidance is also given on acceptable methods of jointing polybutylene (PB), crosslinked polyethylene (PE-X) and chlorinated polyvinyl chloride (PVC-C) pipes and associated fittings, together with recommendations on their storage, handling and transportation.

Whilst it is recognized that in the majority of installations there will be combination of plastics and metallic components, guidance is only given for those parts of the installation where thermoplastics pipes and/or associated fittings are utilized, except where a transition occurs between plastics and metallic components.

NOTE The titles of the publications referred to in this Part of BS 5955 are listed on the inside back cover.

2 Definitions

For the purposes of this British Standard, the definitions given in BS 1755-1, BS 4118 and BS 7291-1 apply, together with the following.

2.1 boiler

an appliance designed for heating hot water either for space heating or for space heating and hot water supply

2.2 circulator

an appliance with a rated heat input not exceeding 8 kW designed primarily for the supply of domestic hot water in conjunction with a separate storage vessel and for operation by gravity circulation

2.3 component

a part of an installation which can be either plastics or metallic, e.g. boiler, radiator

2.4 installation

a complete assembly for the provision of domestic hot and cold water and/or central heating

2.5 pipework system

those parts of an installation which comprise thermoplastics pipes and associated fittings

3 Classification

The pipework system shall be classified in accordance with the classifications for thermoplastics pipes and associated fittings specified in BS 7291-1, i.e. class W, H or S.

COMMENTARY AND RECOMMENDATION ON CLAUSE 3.
Systems of pipe and fittings complying with BS 7291 are classified into one of three classes according to their suitability for use in domestic hot and cold water applications as follows:

- a) *class W systems, which are intended for use in domestic direct and indirect cold water supply, including potable water, and domestic vented subsurface heating installations;*
- b) *class H systems, which are intended for use in domestic vented or unvented hot water supply, and domestic vented central heating installations, in addition to the uses for which class W systems are intended;*
- c) *class S systems, which are intended for use in unvented central heating installations, in addition to the uses for which class W and class H systems are intended.*

The pipework class is selected to be suitable for the most stringent of the service conditions (see clause 4) to which the pipework will be exposed.

¹⁾ 1 bar = 10⁵ N/M² = 10⁵ Pa. References are to gauge pressure unless otherwise stated.

Section 2. Design considerations

4 Service conditions

The installed pipework system shall be capable of operation at the service conditions appropriate to the application(s) in accordance with Table 2 of BS 7291-1:1990.

COMMENTARY AND RECOMMENDATIONS ON CLAUSE 4.

The working pressure for which a plastics component is suitable generally reduces relative to an increase in the temperature and/or the duration of use at elevated temperature to which the component is subjected. Hence plastics pipes designed to convey cold water at 20 °C and 12 bar working pressure will not usually be capable of carrying that pressure for 50 years at temperatures of 60 °C or higher. On the other hand, the service conditions specified in BS 7192-1 have been based on service requirements and other codes of practice and do not imply that the thermoplastics pipes and associated fittings that comply with BS 7192 are not capable of operating under more stringent conditions. Information on the change of pressure rating with temperature for pipes of specific materials may be found in the applicable product standard. For the purposes of this specification, the minimum performance range for the thermoplastics pipes and associated fittings may be summarized as follows. Class W systems are required to be capable of operation at a system maximum working pressure of 12 bar for a nominal system flow temperature T_f of 20 °C and at a system maximum working pressure of 3½ bar for a T_f of 60 °C for underfloor heating, subject to a maximum system service temperature T_s of 83 °C and a system malfunction temperature T_m of 100 °C. Class H systems are required to be capable of operation at a system maximum working pressure of 12 bar for a T_f of 20 °C and at either a system maximum working pressure of 6 bar at a T_f of 65 °C with T_s of 95 °C and a T_m of 100 °C or a system maximum working pressure of 3½ bar at a T_f of 82 °C with a T_s of 95 °C and a T_m of 100 °C.

Class S systems are required to be capable of operating at a system maximum working pressure of 12 bar for a T_f of 20 °C and a system maximum working pressure of 3 bar for a T_f of 92 °C with a T_s of 105 °C and a T_m of 114 °C, in addition to all the limits applicable to class H systems.

5 Materials

All components used shall be suitable for the maximum system temperatures and pressures as specified in BS 7291-1 for their intended application. Components of PVC-C, PE-X and PB shall comply with the requirements appropriate to their class as given in the relevant following British Standard(s):

PB

Pipe	BS 7291-2
Fittings	BS 7291-2

PE-X

Pipe	BS 7291-3
Fittings	BS 7291-3

PVC-C

Pipe	BS 7291-4
Fittings	BS 7291-4

COMMENTARY AND RECOMMENDATIONS ON CLAUSE 5.

The class letter (see clause 3) will be marked on thermoplastics pipes and associated plastics fittings. Thermoplastics pipes are sometimes marked with the nominal system working pressure (pressure rating), usually for performance at 20 °C. Thermoplastics pipes and associated plastics fittings are marked with both class letter and material identification in accordance with the appropriate Part of BS 7291.

The requirements of byelaws and statutory regulations should always be ascertained before a final decision is made as to the pipe and type of joint to be used.

6 Water quality

6.1 Effect of materials on the quality of potable water

When used under the conditions for which they are designated, non-metallic products in contact with or likely to come into contact with potable water shall comply with the requirements of BS 6920-1:1988.

NOTE 1 Non-metallic products for installation and use in the United Kingdom which are verified and listed under the UK Water Fittings Byelaws Scheme are deemed to satisfy the requirements of this subclause. Details of the Scheme are obtainable from the Water Research Centre Byelaws Advisory Service, 660 Ajax Avenue, Slough SL1 4BG.

Non-metallic products approved by the Department of the Environment Committee on Chemicals and Materials of Construction for use in Public Water Supply and Swimming Pools are considered free from adverse health effects for the purpose of compliance with this subclause.