
British Standard Specification for
**Plastics inspection chambers
for drains**

Regards d'égout en plastique — Spécifications
Schächte aus Kunststoff für Abflußleitungen

Foreword

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

It introduces a specification for inspection chambers made of specified plastics materials and intended for use in the construction of drains based on rigid pipes and/or flexible pipes in accordance with BS 8301. Its publication as an individual standard is intended to avoid duplication of specification and confusion of marking of plastics inspection chambers used in drainage systems otherwise made of different materials which may or may not be plastics.

It is applicable to chambers with or without raising pieces and having a nominal internal cross-sectional diameter or wall length of up to 600 mm. The chambers are classified into three grades as a function of stiffness (see 6.6) and strength (see 6.7), to suit different types of installation and location for exposure to surface loading (see appendix J). Attention is drawn to BS 497 : Part 1, which specifies manhole covers and frames for drainage purposes that are applicable to inspection chambers or raising pieces thereon.

Because the chambers may be designed for use with one or more different systems made in accordance with other standards, provision is made for marking integral connections on the chambers to indicate the system components and sizes in accordance with other standards with which the connection is dimensioned to allow direct connection as applicable. At least two of the systems with which such chambers are expected to be used, namely those specified in BS 65 and BS 4660, embody fundamentally different philosophies in respect of sampling requirements and inspection systems. Attention is drawn to appendices A and K and to the advice concerning certification.

Attention is drawn to BS 8301, which gives recommendations for the design, construction, testing and use of

drainage systems, including inspection chambers, under and around buildings and their connections to downstream systems.

Attention is drawn to BS 5955 : Part 6, which gives guidance on the installation, testing, cleaning and repair of unplasticized PVC pipework for gravity drains and sewers.

Attention is drawn to BS 4346 : Part 3 and to BS 6209, which include requirements for cements suitable for jointing thermoplastics pipes for non-pressure applications and are applicable to pipework systems in accordance with BS 4660.

It has been assumed in the preparation of this British Standard that the execution of its provisions is entrusted to appropriately qualified and experienced personnel.

Product certification. Users of this British Standard are advised to consider the desirability of third party certification of product conformity with this British Standard based on testing and continuing surveillance, which may be coupled with assessment of a supplier's quality systems against the appropriate Part of BS 5750.

Enquiries as to the availability of third party certification schemes will be forwarded by BSI to the Association of Certification Bodies. If a third party certification scheme does not already exist, users should consider approaching an appropriate body from the list of Association members.

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 when carrying out methods of test required by this standard.

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

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Specification

1 Scope

This British Standard specifies requirements for plastics inspection chambers for use in the construction of drainage systems.

It is applicable to chambers of circular cross-section with a maximum nominal internal diameter of up to 600 mm or of rectangular cross-section with maximum nominal dimensions of up to 600 mm x 450 mm.

Three grades of inspection chambers are specified as I, II and III. Their use on site is dependent upon position and installation procedures (see appendix J).

This standard specifies materials, dimensions and tolerances, physical and performance characteristics and marking for plastics inspection chambers for drains.

Some points to be borne in mind when ordering an inspection chamber for a particular application are given in appendix A. Methods of test are given in appendices B to H. Guidance on the use and installation of plastics inspection chambers is given in appendix J. Guidance on quality control for the manufacture of plastics inspection chambers is given in appendix K.

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

2 Definitions

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

2.1 C glass. An alkali calcium glass with an enhanced boron trioxide content and intended for applications requiring enhanced chemical resistance accordingly.

NOTE. This definition is consistent with ISO 2078 : 1985 and equivalent to DIN 1259 : Part 1 : 1986.

2.2 inspection chamber. Chamber, constructed on a drain or sewer and with a removable cover, that provides access for inspection, testing, maintenance, clearance of obstructions and removal of debris, all when operating from surface level.

NOTE. This is term 270 3213 of BS 6100 : Section 2.7 : 1988.

2.3 reprocessed material. Plastics material made from products of suitable type by suitable reprocessing.

NOTE. This is term A.1327 of BS 1755 : Part 1 : 1982.

2.4 reworked material. Plastics material, from a process, which has been reused within the process for production of material or product of the same type.

NOTE. This is term A.1326 of BS 1755 : Part 1 : 1982.

2.5 visible cracking. The presence of cracks apparent under close inspection by the naked eye without magnification.

3 Materials

3.1 General

The material from which the main body of the inspection chamber and/or the raising piece is produced shall comprise a thermoplastics material in accordance with 3.2 or a reinforced thermosetting resin in accordance with 3.3, based on the corresponding monomers or polymers as applicable and incorporating other ingredients or reinforcement as necessary for the manufacture of an inspection chamber and/or raising piece in accordance with the other requirements of this standard as applicable (e.g. pigments or dyes to satisfy the requirements of clause 5).

Elastomeric joint rings used in drainage connections to and from inspection chambers and for fabrication on site shall satisfy the requirements for rings of type D (drainage) given in BS 2494 : 1986.

3.2 Thermoplastics materials

The thermoplastics material shall be selected from one of the following.

(a) Polyethylene [PE] plastic (1.1.65*), to be specified in accordance with BS 3412 together with the designation applicable to the method of processing to be used for the manufacture of the inspection chamber or raising piece and otherwise as necessary to satisfy 3.1 of this standard.

(b) Polypropylene [PP] plastic (1.1.76*) or propylene plastic (1.1.95*), to be specified in accordance with BS 5139 as light- and weather-stabilized together with the designation applicable to the method of processing to be used for the manufacture of the inspection chamber or raising piece and otherwise as necessary to satisfy 3.1 of this standard.

(c) Unplasticized polyvinyl chloride (PVC-U) plastic (1.1.88*) which when tested in accordance with BS 2782 : Method 120B shall have a Vicat softening temperature of not less than 79 °C for test pieces taken from an inspection chamber or raising piece and shall otherwise be specified as that necessary to satisfy 3.1 of this standard.

(d) Reworked material (see 2.4). If reworked material is added or used it shall be clean, derived under the control of the manufacturer of the inspection chamber or raising piece and, if applicable, of the same type and compatible with the material in accordance with items (a), (b), (c) and/or (e) of 3.2 to which it is added.

(e) Reprocessed material (see 2.3). The use of reprocessed material shall be permissible providing the material is clean, free from inclusions and otherwise as specified in accordance with items (a), (b) or (c) of 3.2. The material shall be traceable to a single source of known origin. If blended with material in accordance with items (a), (b) or (c) of 3.2, it shall be of the same type and compatible therewith.

*Term defined in BS 1755 : Part 1 : 1982.

3.3 Thermosetting materials

The thermosetting materials shall comprise a reinforced plastic (1.5.27*) incorporating resin and reinforcement in accordance with items (a) and (b) of the following list and optionally materials in accordance with one or more of the remainder of the list.

- (a) Resin. The resin system used shall comply with BS 3532 for polyesters or shall be based on an epoxy resin (1.1.26*).
- (b) Reinforcement. Except for alternative surface tissues (see (c)) all reinforcement shall be derived from from continuously drawn filaments of E glass (1146†) (see note) and used in the following forms alone or in any combination subject to compatibility with the resin system used:

- (1) chopped strand mat in accordance with BS 3496;
- (2) woven fabric in accordance with BS 3396 : Part 1, BS 3396 : Part 2 or BS 3396 : Part 3 as applicable;
- (3) woven fabric in accordance with BS 3749;
- (4) rovings in accordance with BS 3691;
- (5) individual filaments and/or strands, chopped or continuous, having a minimum diameter of not less than 0.005 mm and having a surface treatment compatible with the resin used in accordance with item (a) of 3.3 of this standard.

NOTE. Such glass includes either aluminoborosilicate glass or aluminocalciumsilicate glass, in either case optionally containing other oxides, mainly aluminium trioxide, incorporated for enhanced corrosion resistance and then sometimes described as E.C.R. glass.

- (c) Surface tissues, comprising tissues optionally incorporated into the superficial layers of the internal and/or external surfaces of the reinforced plastics article, where such tissues shall be made from glass materials in accordance with item (b) of 3.3 or otherwise of C glass (see 2.1) or from woven or non-woven textiles based on polyester or acrylic fibres.
- (d) Aggregates. Aggregates in the particle size range 0.05 mm to 0.5 mm, such as graded silica sands, may be incorporated where they are a designed part of the composite structure.
- (e) Fillers. Fillers comprising fine material with a particle size below 0.05 mm may be incorporated either on their own or with aggregates.
- (f) Additives. Additives may be incorporated for modifying the properties of the resin, e.g. for viscosity control.

4 Dimensions

4.1 General

The general form of the inspection chamber and associated benching and channels shall be in accordance with the

recommendations given in 13.4.1, 13.4.2 plus table 8 in respect of inspection chambers having a depth to invert of either '0.6 m or less' or '1.0 m or less' and 13.4.4 of BS 8301 : 1985.

4.2 Horizontal cross sections

NOTE. Limitations on the minimum nominal dimensions of inspection chambers are given in table 8 of BS 8301 : 1985.

4.2.1 Circular chambers. The nominal internal diameter of the chamber shall not exceed 600 mm.

4.2.2 Rectangular chambers. The nominal internal dimensions shall not exceed 600 mm x 450 mm.

4.2.3 Tolerances. The permissible deviations from the manufacturer's nominated dimensions shall be $\pm 2\%$.

NOTE. These permissible deviations are set to accommodate variations in design and are not intended to ensure that riser sections from different designs or manufacturers are interchangeable.

4.3 Depth

The depth of the chamber, including any raising pieces, shall not exceed 1 m to invert.

NOTE. To enable installation such that the depth from ground level to invert does not exceed 1.0 m, in accordance with table 8 of BS 8301 : 1985, the chamber may have a smaller depth and/or may be designed to be trimmed to a suitable depth.

5 Appearance

The colour of the inspection chamber or raising piece shall be uniform and either brown in the range 06 D 45 to 06 D 43 of BS 4901 : 1976, or black.

For an inspection chamber or raising piece made of thermoplastics material, the surfaces shall be free from visible cracking and visible inclusions.

For an inspection chamber or raising piece made of glass reinforced plastics the interior shall have a continuous smooth internal surface. The exterior surface shall be free from sharp projections. Both inner and exterior surfaces shall be clean and free from protruding fibres and from voids, pits, bubbles, cracks, blisters or foreign matter that would prevent compliance with clause 6.

6 Performance requirements

6.1 General

Inspection chambers shall comply with 6.2 to 6.7 using components assembled in accordance with the manufacturer's instructions.

Where a manufacturer supplies chamber raising pieces, performance tests shall be carried out on a combination of the chamber and raising piece(s) to yield an invert depth representing the maximum depth nominated by the manufacturer.

*Term defined in BS 1755 : Part 1 : 1982.

†Term defined in BS 3447 : 1962.

6.2 Watertightness

When tested in accordance with appendix B for a period of 5 min there shall be no visible leakage from the joints or the body of the components.

6.3 Resistance to angular deflection

When tested in accordance with appendix C for a period of 5 min, the pipe connections shall not exhibit any visible leakage.

6.4 Diametric distortion or shear resistance

6.4.1 Applicability of test. Pipe or fitting connections shall comply with 6.4.2 or 6.4.3 as applicable depending upon whether the system to which connection is intended is classified as rigid or flexible in accordance with 5.6.2 or 5.6.3 of BS 8301 : 1985.

NOTE. For connection to a pipe or fittings in accordance with BS 4660, 6.4.2 would apply, or for connection to a pipe or fitting in accordance with BS 65, 6.4.3 would apply.

6.4.2 Diametric distortion. Pipe or fitting connections, intended for use with flexible pipes and fittings, shall show no visible signs of leakage when tested in accordance with appendix D for a period of 5 min.

6.4.3 Shear resistance. Pipe or fitting connections, intended for use with rigid pipes and fittings, shall show no visible signs of leakage or cracking (see 2.5) when tested in accordance with appendix E for a period of 5 min.

6.5 Resistance to elevated temperature cycling

When tested in accordance with appendix F the joints under test shall show no visible signs of leakage. On completion the inspection chamber shall not exhibit any visible cracking and shall withstand an internal water test in accordance with method A of appendix B for 5 min without visible leakage.

6.6 Specific tangential initial stiffness (STIS)

When tested in accordance with appendix G the test piece shall not exhibit any visible cracking (see 2.5) and the mean specific tangential initial stiffness shall be not less than the value given in table 1.

Table 1. Classification of specific tangential initial stiffness (STIS)	
Grade	Minimum specific tangential initial stiffness (STIS)
	Pa
I	50
II	700
III	1500

* Marking BS 7158 : 1989 on or in relation to a product represents a manufacturer's declaration of conformity, i.e. a claim by or on behalf of the manufacturer that the product meets the requirements of the standard. The accuracy of the claim is therefore solely the responsibility of the person making the claim. Such a declaration is not to be confused with third party certification of conformity, which may also be desirable.

6.7 Resistance to vertical loading

For inspection chambers where the frame of the cover is to be supported in service by the top of the chamber and not otherwise by, e.g. surrounding concrete, when tested in accordance with appendix H using the applicable test force given in table 2, the horizontal dimensions shall not change by more than 6 % and the inspection chamber shall not exhibit any visible cracking.

Table 2. Classification of test force	
Grade	Test force
	kN
II	10
III	35

7 Marking

Each chamber component shall be indelibly marked with the following.

- Manufacturer's identification.
- The number and date of this British Standard, e.g. BS 7158 : 1989*.
- The nominal horizontal dimensions (see 4.1).
- Duty classification grade of I, II or III as applicable.
- The applicable symbol for the type of plastics material as follows:

- PE for polyethylene;
- PP for polypropylene and polypropylene plastics;
- PVC-U for unplasticized polyvinyl chloride;
- GRP for glass-reinforced thermosetting plastics and/or a symbol to indicate the resin system as follows:

- EP for epoxy resin;
- UP for polyester resin.

(f) The pipe/fitting/joint system(s) for which the individual integral inspection chamber inlet and/or outlet connections are compatible. If all the connections are compatible with one or more specific system specification(s), one marking to identify the system(s) shall be considered sufficient, otherwise the individual connections shall each be marked. In either case, sufficient marking(s) shall be visible after installation.

NOTE. This can be achieved by markings inside the chamber. In addition, use of a marked stopper and a connection or installation can be helpful.