

BS 5834-4:2011



BSI Standards Publication

# Surface boxes, guards and underground chambers for the purposes of utilities

Part 4: Specification for utility chambers

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### Summary of pages

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## Foreword

### Publishing information

This part of BS 5834 was published by BSI and came into effect on 31 May 2011. It was prepared by Technical Committee B/504, *Water supply*. A list of organizations represented on this committee can be obtained on request to its secretary.

### Supersession

This part of BS 5834 supersedes BS 5834-4:1989, which is withdrawn.

### Relationship with other publications

BS 5834, *Surface boxes, guards and underground chambers for the purposes of utilities*, is published in three parts:

- Part 1: *Specification for guards and plinths*;
- Part 2: *Specification for surface boxes*;
- Part 4: *Specification for utility chambers*.

### Information about this document

This is a full revision of the standard and incorporates the following principal changes:

- a) the exclusion of glass fibre reinforced polyester (GRP) units made by either hand lay-up or spray-up manufacture;  
*NOTE These are no longer manufactured in the United Kingdom.*
- b) the incorporation of chamber units made from recycled polymers;
- c) the update of requirements for cementitious content and concrete mix;
- d) the extension of product evaluation requirements.

**Product certification.** Users of this part of BS 5834 are advised to consider the desirability of third party certification of product conformity with this British Standard. Users seeking assistance in identifying appropriate conformity assessment bodies or schemes may ask BSI to forward their enquiries to the relevant association.

### Presentational conventions

The provisions of this standard are presented in roman (i.e. upright) type. Its requirements are expressed in sentences in which the principal auxiliary verb is "shall".

*Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.*

### Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

**Compliance with a British Standard cannot confer immunity from legal obligations.**

## 1 Scope

This part of BS 5834 specifies requirements and test methods for precast reinforced concrete and recycled polymer units for utility chambers of rectangular shape (including utility chambers of square shape), for use with surface boxes conforming to BS 5834-2 or covers and frames with a maximum designated clear opening of 900 mm × 600 mm and conforming to BS EN 124.

*NOTE In BS 5834-4:1989 "utility chambers" were termed "preformed chambers".*

## 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS 4027, *Specification for sulfate-resisting Portland cement*

BS 4035, *Specification for linear measuring instruments for use on building and civil engineering constructional works – Steel measuring tapes, steel bands and retractable steel pocket rules*

BS 4449, *Steel for the reinforcement of concrete – Weldable reinforcing steel – Bar, coil and decoiled product – Specification*

BS 4482, *Steel wire for the reinforcement of concrete products – Specification*

BS 4483, *Steel fabric for the reinforcement of concrete – Specification*

BS 4484-1, *Specification for measuring instruments for constructional works – Part 1: Metric graduation and figuring of instruments for linear measurement*

BS EN 197-1, *Cement – Part 1: Composition, specifications and conformity criteria for common cements*

BS EN 197-4, *Cement – Composition, specifications and conformity criteria for low early strength blastfurnace elements*

BS EN 450-1, *Fly ash for concrete – Part 1: Definition, specifications and conformity criteria*

BS EN 934-2, *Admixtures for concrete, mortar and grout – Part 2: Concrete admixtures – Definitions, requirements, conformity, marking and labelling*

BS EN 1008, *Mixing water for concrete – Specification for sampling, testing and assessing the suitability of water, including water recovered from processes in the concrete industry, as mixing water for concrete*<sup>1)</sup>

BS EN 12390-2, *Testing hardened concrete – Part 2: Making and curing specimens for strength tests*

BS EN 12390-3, *Testing hardened concrete – Part 3: Compressive strength of test specimens*

BS EN 12390-4:2000, *Testing hardened concrete – Part 4: Compressive strength – Specification for testing machines*

<sup>1)</sup> This standard also gives an informative reference to BS EN 1008:2002.

BS EN 12620, *Aggregates for concrete*<sup>2)</sup>

BS EN 15167-1, *Ground granulated blastfurnace slag for use in concrete, mortar and grout – Part 1: Definitions, specifications and conformity criteria*

BS EN 15167-2, *Ground granulated blastfurnace slag for use in concrete, mortar and grout – Part 2: Conformity evaluation*

## 3 Terms, definitions and symbols

### 3.1 Terms and definitions

For the purposes of this part of BS 5834, the following terms and definitions apply.

#### 3.1.1 adaptor slab

reinforced concrete or recycled polymer component incorporating an access opening, used at the top of a utility chamber to provide support for a surface box

#### 3.1.2 base wall unit

lowest placed wall unit, incorporating slots for entry and exit of utility apparatus

#### 3.1.3 bearing slab

reinforced concrete or recycled polymer component, with or without an aperture for the entry and exit of utility apparatus, used at the base of a utility chamber to provide support for the structure

#### 3.1.4 cementitious content

quantity of cement plus any pozzolanic or latent hydraulic addition in the concrete mix

*NOTE This is measured in kg/m<sup>3</sup>.*

#### 3.1.5 clear opening

access opening in an adaptor slab through which a horizontal plate of the specified chamber dimensions passes unimpeded without deviation

*NOTE The corners of the horizontal plate are removed.*

#### 3.1.6 concrete cover

thickness of concrete over any reinforcement

#### 3.1.7 intermediate wall unit

wall unit for extending the structure upwards from the base wall unit

#### 3.1.8 nominal size

numerical designation of the size of a utility chamber, which is an integer approximately equal to the internal length/width (LN/WN)

*NOTE This is measured in millimetres.*

#### 3.1.9 recycled polymer

polymer made up predominantly of recycled thermoplastics materials

<sup>2)</sup> This standard also gives an informative reference to BS EN 12620:2002.

**3.1.10 routine inspection**

inspection by sampling at prescribed intervals

*NOTE This is used to indicate the number of units of the same nominal size and type, manufactured from a specific process that can be evaluated to have attained, and continue to be in, a state of control, and adhere to the relevant acceptance criteria.*

**3.1.11 sample**

one or more units selected at random

**3.1.12 switching rules**

rules that govern the decision to increase or decrease the inspection requirements

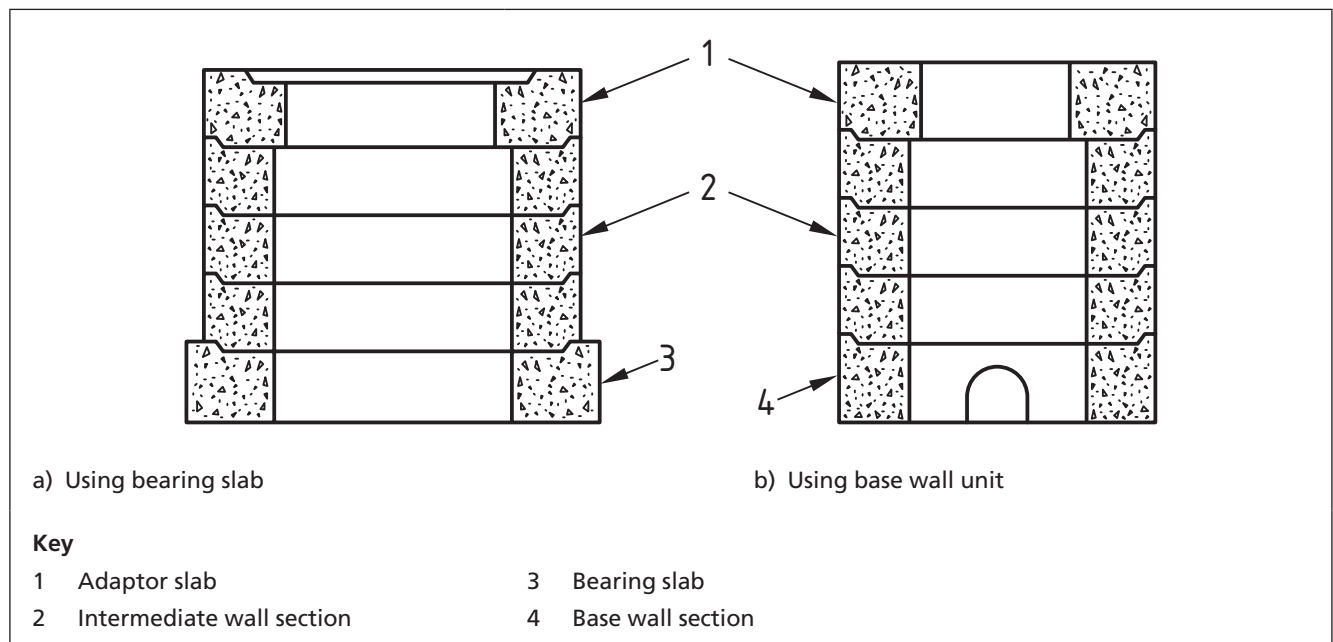
*NOTE See H.2 for more information regarding switching rules.*

**3.1.13 unit**

component of an utility chamber

*NOTE This can be made from precast reinforced concrete or recycled polymer. See Figure 1.A for typical components of a utility chamber.*

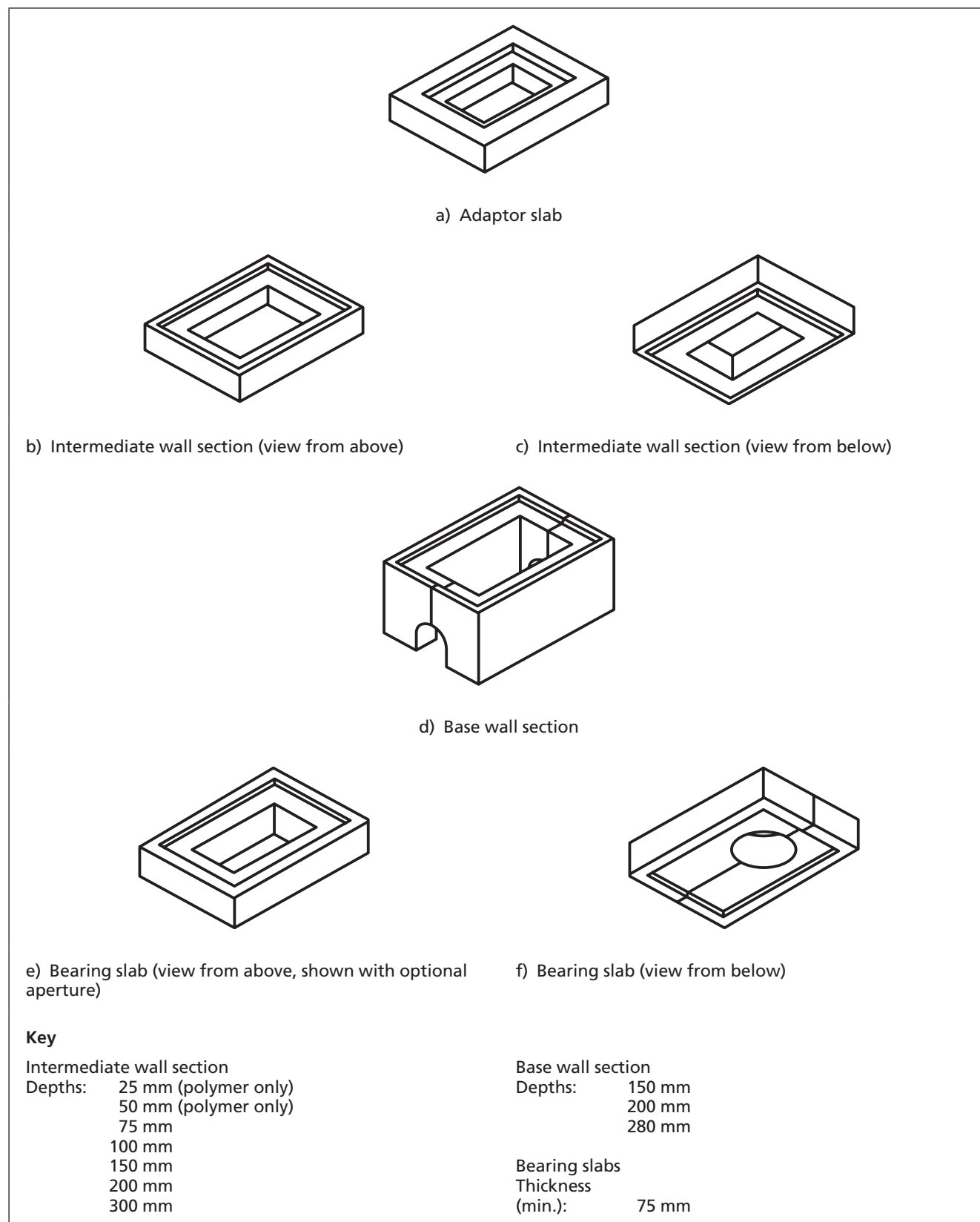
Figure 1.A Typical components of an utility chamber: sectional elevation

**3.1.14 utility chamber**

vertical structure used to house utility apparatus and to permit access for personnel and/or equipment for inspection and maintenance

*NOTE See Figure 1.A and Figure 1.B.*

Figure 1.B Typical components of a utility chamber: isometric views



**3.1.15 wall unit**

vertical hollow reinforced concrete or recycled polymer component of uniform rectangular cross-section, except at the joint profile

**3.2 Symbols**

For the purposes of this British Standard the symbols in Table 1 apply.

Table 1 Symbols

| Symbol   | Meaning                                                                                           | Unit | Reference |
|----------|---------------------------------------------------------------------------------------------------|------|-----------|
| <i>A</i> | maximum length/width of female joint in adaptor slab                                              | mm   | 5.6       |
| <i>B</i> | minimum length/width of female joint in adaptor slab                                              | mm   | 5.6       |
| <i>C</i> | maximum length/width of male joint in adaptor slab                                                | mm   | 5.6       |
| <i>D</i> | minimum length/width of male joint in adaptor slab                                                | mm   | 5.6       |
| <i>d</i> | loaded depth of intermediate wall unit                                                            | m    | F.2.2     |
| <i>L</i> | internal length of intermediate wall unit                                                         | m    | F.2.2     |
| <i>N</i> | test per nominal size                                                                             | —    | Annex G   |
| <i>P</i> | calculated test load                                                                              | kN   | F.2.2     |
| <i>R</i> | routine inspection test                                                                           | —    | Clause 6  |
| <i>S</i> | test per type, nominal size and grade                                                             | —    | Annex G   |
| <i>T</i> | initial type test                                                                                 | —    | Clause 6  |
| <i>t</i> | wall thickness of intermediate wall unit                                                          | m    | F.2.2     |
| <i>Y</i> | test per type, nominal size and grade produced per 1 000, with a minimum of one per type and year | —    | Annex G   |

**4 Grading**

Units shall be graded as one of the following.

- Grade A (heavy)*. Utility chambers for use with surface boxes suitable for use in carriageways capable of supporting fast-moving commercial vehicles with wheel loads<sup>3)</sup> of up to 5 t.
- Grade B (medium)*. Utility chambers for use with surface boxes capable of supporting wheel loads<sup>3)</sup> of up to 5 t, for use in areas to which vehicles would only have occasional access.
- Grade C (light)*. Utility chambers for use with surface boxes for use in areas not intended for use by vehicles.

**NOTE** Installation techniques (e.g. surrounding in concrete) can significantly contribute to the load-bearing qualities of the installed unit. Reference should be made to the appropriate manufacturer's instructions.

<sup>3)</sup> The magnitude of the stated wheel load is as exerted by a stationary vehicle.

## 5 General requirements

### 5.1 Materials

#### 5.1.1 Cements

Cements shall conform to 5.2.4.

#### 5.1.2 Aggregates

Aggregates shall conform to BS EN 12620.

*NOTE BS EN 12620:2002, 4.3.7, permits special aggregate gradings where these are needed to suit the manufacturing process, provided the special grading envelopes are defined using the R20 series of sieves specified in ISO 565:1990 and incorporating the appropriate sieves from a specified range of sizes.*

#### 5.1.3 Admixtures

Admixtures shall conform to BS EN 934-2.

#### 5.1.4 Additions

Additions shall be in the form of ground granulated blastfurnace slag (ggbs) or pulverized-fuel ash (pfa), conforming to BS EN 15167-1, BS EN 15167-2 and BS EN 450-1, Category A or B, respectively.

#### 5.1.5 Mixing water

Mixing water for concrete shall conform to BS EN 1008.

*NOTE BS EN 1008:2002, 3.1, specifies that potable water does not need testing.*

#### 5.1.6 Reinforcing steel

Reinforcing steel shall conform to BS 4449, BS 4482 or BS 4483.

### 5.2 Concrete

#### 5.2.1 Concrete materials

Only materials specified in 5.1 shall be used.

#### 5.2.2 Concrete strength

With the exception of:

- a) adaptor slabs with 150 mm × 150 mm and 600 mm × 450 mm clear openings;
- b) LN 430/WN 280 and LN 915/WN 610 utility chambers; and
- c) intermediate wall units for utility chambers with a nominal length exceeding LN 400 (see 5.7.2);

units without structural requirements specified in this part of BS 5834, shall have a characteristic compressive strength of not less than 30 MPa (N/mm<sup>2</sup>).