

Concrete pipes and ancillary concrete products —

Part 6: Specification for road gullies and gully cover slabs

ICS 93.080.30

Committees responsible for this British Standard

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British Plastics Federation
British Water
CMF — Cast Metals Federation
Chartered Institution of Water and Environmental Management
Clay Pipe Development Association Ltd
CPSA — Concrete Pipeline Systems Association
Institute of Cast Metal Engineers
Institution of Civil Engineers
Institute of Plumbing
LOTAG — London Technical Advisors Group
ODPM (represented by Waterman Burrow Crock)
Society of British Water Industries
Water UK

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Contents

	Page
Committees responsible	Inside front cover
Foreword	ii
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Symbols	3
5 General requirements	3
6 Test requirements for finished products	11
7 Conformity evaluation	11
8 Marking	12
Annex A (informative) Information to be supplied in an enquiry or order	13
Annex B (normative) Water absorption test	13
Annex C (normative) Dimensional tests	14
Annex D (normative) Watertightness test	15
Annex E (normative) Manufacturer's quality assurance system	15
Annex F (normative) Sampling procedures for inspection of finished products	20
Annex G (normative) Sampling procedures for continuous inspection of watertightness	21
Annex H (normative) Tasks for a product certification body	23
Bibliography	24
Figure 1 — Typical trapped gully with spigot outlet	8
Figure 2 — Typical untrapped gully with spigot outlet	9
Figure 3 — Typical trapped gully with socket outlet	10
Figure 4 — Typical untrapped rectangular gully with socket outlet	11
Table 1 — Symbols	3
Table 2 — Limiting values of composition and properties for concrete where a DC-class is specified	4
Table 3 — General purpose cements and combinations	5
Table 4 — Nominal sizes dimensions for gullies	7
Table 5 — Summary of test requirements	11
Table E.1 — Control for all materials	18
Table E.2 — Control for certain materials	18
Table E.3 — Equipment control	19
Table E.4 — Control of concrete mix	19
Table E.5 — Control of factory production	19
Table E.6 — Control of marking and storage	20
Table E.7 — Control of delivery	20
Table E.8 — Control of laboratory equipment	20
Table F.1 — Sampling procedures	20

Foreword

The several parts of BS 5911 specify requirements for various types of concrete pipe and ancillary concrete products such as manholes, inspection chambers and road gullies.

BS 5911-6 has been prepared under the direction of Technical Committee B/505. BS 5911-6:2004+A1:2010 supersedes BS 5911-6:2004, which is withdrawn.

The start and finish of text introduced or altered by Amendment No. 1 is indicated in the text by tags **A1** **A1**. Minor editorial changes are not tagged.

Amendment A1 introduces the following principal changes:

- all references to other standards have been updated;
- Table 2 and Table 3 have been replaced to align with BS 8500.

BS EN 1916:2002 covers unreinforced, steel fibre and reinforced concrete pipes and fittings with flexible joints and BS EN 1917:2002 covers manholes and inspection chambers manufactured from the same types of precast concrete. Neither contains all the requirements of the existing national specifications of CEN members because complete agreement could not be achieved. Therefore, BS 5911-1, -3 and -4 contain requirements from former national British Standards that could not be agreed upon for inclusion in EN 1916 and EN 1917.

Precast concrete road gullies and gully cover slabs are two of the ancillary products often made by manufacturers of concrete pipes and so for over 50 years they have been specified within the same British Standard. Accordingly, for consistency and convenience, it was appropriate for this revision of BS 5911-230 to be aligned with BS EN 1916, BS EN 1917 and BS 5911-1, -3 and -4 wherever practicable.

The requirements for cementitious content and cement groupings have been aligned with the provisions of BS 8500-1:2006 and BRE Special Digest 1 [1] insofar as they relate to precast concrete pipeline systems.

For an enquiry or order to be fully understood it is essential that the manufacturer be given the information set out in Annex A of this part of BS 5911.

Product certification. Users of this part of BS 5911 are advised to consider the desirability of third party certification of product conformity with this British Standard, based on the conformity attestation arrangements described herein. Users seeking assistance in identifying appropriate conformity assessment bodies or schemes may ask BSI to forward their enquiries to the relevant association.

BSI Committee B/505, whose constitution is shown in this British Standard, takes collective responsibility for its preparation under the authority of the Standards Policy and Strategy Committee. The committee wishes to acknowledge the contribution of the following organizations:

- The British Precast Concrete Federation;
- The Concrete Society;
- The County Surveyors' Society;
- The Highways Agency.

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.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 25 and a back cover.

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1 Scope

This part of BS 5911 specifies requirements and describes test methods for precast concrete road gullies manufactured from monolithic concrete or prefabricated sections of concrete. A gully outlet may incorporate a permanent former, with or without a jointing profile, for the connection of a pipeline. Requirements are also specified for gully cover slabs. The intended use for gullies is the interception of silt and debris from surface water being discharged into drainage systems.

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.

[A1] *Text deleted.* **[A1]**

[A1] *Text deleted.* **[A1]**

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

BS 5204-2, *Specification for straightedges — Part 2: Steel or granite straightedges of rectangular section.*

[A1] *Text deleted.* **[A1]**

[A1] BS 7979, *Specification for limestone fines for use with Portland cement.* **[A1]**

[A1] BS 8500-2:2006, *Concrete — Complementary British Standard to BS EN 206-1 — Part 2: Specification for constituent materials and concrete.* **[A1]**

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

[A1] BS EN 197-4, *Cement — Part 4: Composition, specifications and conformity criteria for low early strength blastfurnace cements.* **[A1]**

[A1] BS EN 450-1, *Fly ash for concrete — Part 1: Definition, specifications and conformity criteria.* **[A1]**

BS EN 934-2, *Admixtures for concrete, mortar and grout — Part 2: 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.*

BS EN 12620, *Aggregates for concrete.*

[A1] BS EN 14216, *Cement — Composition, specifications and conformity criteria for very low heat special cements.* **[A1]**

[A1] BS EN 15167-1, *Ground granulated blast furnace slag for use in concrete, mortar and grout — Part 1: Definitions, specifications and conformity criteria.* **[A1]**

3 Terms and definitions

For the purposes of this part of BS 5911, the following terms and definitions apply.

3.1

unit

gully (whether trapped or untrapped) or a gully cover slab

NOTE Although unreinforced, the concrete in units conforming to this part of BS 5911 may be strengthened for handling purposes.

3.2

type

units of the same manufacturing process and design

3.3

gully

device for the interception of silt and debris from surface water being discharged into a drainage system

3.4

untrapped gully

hollow cylinder, with base, manufactured from concrete with an outlet to facilitate the connection of a pipeline, which acts as a rodding eye

NOTE It is permissible for the outlet to incorporate a permanent former, with or without a jointing profile, for the connection of pipelines.

3.5

trapped gully

gully as described in 3.4 but with the outlet designed to form a water seal, and provided with a rodding eye

NOTE It is permissible for the outlet to incorporate a permanent former, with or without a jointing profile, for the connection of pipelines.

3.6

gully cover slab

frame or surround manufactured from concrete, with or without a drainage slot, to accommodate a road gully grating and frame

3.7

nominal size

for a gully, the expression of nominal section and nominal depth separated by solidus (e.g. “450/900” or “300/385/900”); for a gully cover slab, the nominal section of the gully with which it is designed to fit

3.8

nominal section

numerical designation of the plan shape of a gully which for circular sections is a convenient integer approximately equal to the internal diameter in millimetres and for rectangular sections is convenient integers approximately equal to the internal length and width in millimetres

3.9

nominal depth

numerical designation of the depth of a gully, or gully outlet, which is a convenient integer approximately equal to the internal depth in millimetres

3.10

manufacturing dimension

dimension(s) of section, diameter or depth which a manufacturer seeks to achieve

3.11

actual dimension

dimension(s) of section, diameter or depth as measured

3.12

cementitious content

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

3.13

inspection

process of measuring, examining, testing, gauging or otherwise comparing a unit with the applicable requirements

3.14

routine inspection

inspection by sampling at prescribed intervals in order to determine the acceptability of the items represented by the samples

3.15

continuous inspection

routine inspection according to a sampling plan which indicates the number of units from a specific process evaluated to have attained, and continue to be in, a state of control, and the associated acceptance criteria

3.16**sample**

one or more units selected at random without regard to their quality

3.17**specific process**

manufacture of units of the same nominal size and type, essentially under the same conditions over any period of time

3.18**switching rules**

rules that govern the decision to increase or decrease the severity of inspection

4 Symbols

The meanings of symbols used in this part of BS 5911 shall be as given in Table 1.

Table 1 — Symbols

Symbol	Meaning	Unit	Reference
A_w	absorption of water by immersion	%	B.5
m_1	constant mass of immersed sample	kg	B.4.1, B.5
m_2	constant mass of dry sample	kg	B.4.2, B.5
N	test per nominal size	—	Annex F
R	routine inspection test	—	Clause 6
T	initial type test	—	Clause 6
Y	test per type and nominal size produced, per 1000, with a minimum of one per type and year	—	Annex F

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 (ggbfs) or pulverized-fuel ash (pfa), conforming to **EN** BS EN 15167-1 and BS EN 450-1 **EN** 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.

5.2 Concrete

5.2.1 Concrete materials

NOTE Although unreinforced, the concrete in units conforming to this part of BS 5911 may be strengthened for handling purposes. Only materials described in 5.1 shall be used.

5.2.2 Concrete quality

The concrete in any unit shall be dense, homogeneous and conform to the requirements of 5.2.3, 5.2.4 and 5.2.5.

5.2.3 Water content of concrete

Concrete shall have such a composition that the ratio of water to cementitious content in the fully compacted state is not greater than 0.45 and is consistent with the serviceability conditions in 5.3.6.

5.2.4 Types of cement

A1 The cement used shall conform to Table 2. **A1**

5.2.5 Cementitious content

The fully compacted concrete shall have a minimum cementitious content of not less than the relevant amount shown in Table 2. The composition/specification of cement groups shall be as shown in Table 3.

A1 Table 2 — Limiting values of composition and properties for concrete where a DC-class is specified

DC-class (design chemical class)	Max. water content ratio	Min. cement or combination content in kg/m ³ for max. aggregate sizes (mm) of:				Cement and combination types ^a	Grouping used in BRE SD1:2005
		≥40	20	14	10		
DC-1 ^b	—	—	—	—	—	All in Table 3	A to G
DC-2	0.55	300	320	340	360	IIB-V+SR, IIIA+SR, IIIB+SR, IVB-V	D, E, F
	0.50	320	340	360	380	CEM I, SRPC, IIA-D, IIA-S, IIA-V, IIB-S, IIB-V, IIIA, IIIB	A, G
	0.45	340	360	380	380	IIA-L or LL ≥ class 42,5	B
	0.40	360	380	380	380	IIA-L or LL class 32,5	C
DC-2z	0.55	300	320	340	360	All in Table 3	A to G
DC-3	0.50	320	340	360	380	IIIB+SR	F
	0.45	340	360	380	380	IVB-V	E
	0.40	360	380	380	380	IIB-V+SR, IIIA+SR, SRPC	D, G
DC-3z	0.50	320	340	360	380	All in Table 3	A to G
DC-4	0.45	340	360	380	380	IIIB+SR	F
	0.40	360	380	380	380	IVB-V	E
	0.35	380	380	380	380	IIB-V+SR, IIIA+SR, SRPC	D, G
DC-4z	0.45	340	360	380	380	All in Table 3	A to G
DC-4m	0.45	340	360	380	380	IIIB+SR	F

^a For the sulfate-resisting characteristics of other cements and combinations, see BRE SD1 [1] and IP 17/05 [2].

^b If the concrete is reinforced or contains embedded metal, the minimum concrete quality for 20 mm maximum aggregate size is C25/30, 0.65, 260 or designated concrete RC25/30.

A1

Table 3 — General purpose cements and combinations

Type	Notation	British Standard	Broad designation	Grouping used in BRE SD1:2005
Portland cement	CEM I	BS EN 197-1	CEM I	A
Portland silica fume cement ^a	CEM II/A-D	BS EN 197-1	IIA	A
Portland limestone cement	CEM II/A-L CEM II/A-LL	BS EN 197-1 BS EN 197-1	IIA IIA	B ^b or C ^b B ^b or C ^b
Portland slag cements	CEM II/A-S CEM II/B-S	BS EN 197-1 BS EN 197-1	IIA IIB-S	A A
Portland fly ash cements	CEM II/A-V CEM II/B-V CEM II/B-V+SR ^c	BS EN 197-1 BS EN 197-1 BS EN 197-1	IIA IIB-V IIB+SR	A A D
Blastfurnace cements	CEM III/A CEM III/A+SR ^d CEM III/B CEM III/B+SR ^d	BS EN 197-1 or BS EN 197-4 BS EN 197-1 or BS EN 197-4	IIIA IIIA+SR IIIB IIIB+SR	A D A F
Pozzolanic cement	CEM IV/B(V)	BS EN 197-1 or BS EN 14216	IVB-V	E
Sulfate-resisting Portland cement	SRPC	BS 4027	SRPC	G
Combinations conforming to BS 8500-2:2006, Annex A, manufactured in the concrete mixture from Portland cement and fly ash, ground granulated blast furnace slag (ggbs) or limestone fines:				
CEM I cement conforming to BS EN 197-1 with a mass fraction of 6% to 20% of combination of fly ash conforming to BS EN 450-1	CIIA-V	BS 8500-2:2006, Annex A	IIA	A
CEM I cement conforming to BS EN 197-1 with a mass fraction of 21% to 35% of combination of fly ash conforming to BS EN 450-1	CIIB-V CIIB-V+SR ^c	BS 8500-2:2006, Annex A	IIB-V IIB+SR	A D
CEM I cement conforming to BS EN 197-1 with a mass fraction of 36% to 55% of combination of fly ash conforming to BS EN 450-1	CIVB-V	BS 8500-2:2006, Annex A	IVB-V	E
CEM I cement conforming to BS EN 197-1 with a mass fraction of 6% to 20% of combination of ggbs conforming to BS EN 15167-1	CIIA-S	BS 8500-2:2006, Annex A	IIA	A
CEM I cement conforming to BS EN 197-1 with a mass fraction of 21% to 35% of combination of ggbs conforming to BS EN 15167-1	CIIB-S	BS 8500-2:2006, Annex A	IIB-S	A
CEM I cement conforming to BS EN 197-1 with a mass fraction of 36% to 65% of combination of ggbs conforming to BS EN 15167-1	CIIA CIIA+SR ^d	BS 8500-2:2006, Annex A	IIIA IIIA+SR	A D
CEM I cement conforming to BS EN 197-1 with a mass fraction of 66% to 80% of combination of ggbs conforming to BS EN 15167-1	CIIB CIIB+SR ^d	BS 8500-2:2006, Annex A	IIIB IIIB+SR	A F
CEM I cement conforming to BS EN 197-1 with a mass fraction of 6% to 20% of combination of limestone fines conforming to BS 7979	CIIA-L CIIA-LL	BS 8500-2:2006, Annex A	IIA IIA	B ^b or C ^b B ^b or C ^b

^a When IIA or IIA-D is specified, CEM I and silica fume may be combined in the concrete mixer using the *k*-value concept; see BS EN 206-1:2000, 5.2.5.2.3.

^b The classification is B if the cement or combination strength is class 42,5 or higher and C if it is class 32,5.

^c With a minimum proportion of fly ash of 25%.

^d Where the alumina content of the slag exceeds 14%, the tricalcium aluminate content of the Portland cement fraction should not exceed 10%.