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Specification for

# Manhole covers, road gully gratings and frames for drainage purposes

## Part 1. Cast iron and cast steel

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Spécification concernant les cadres et tampons de voirie  
pour trous d'homme utilisés pour le drainage  
Partie 1. Fonte de fer et fonte d'acier

Schachtabdeckungen, Straßenabläufe-Roste und Rahmen  
(für Entwässerungszwecke)  
Teil 1. Gußeisen und Stahlguß

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## Foreword

This British Standard has been prepared under the authority of the Road Engineering Standards Policy Committee.

As part of the new approach to harmonization and standards in Europe, work on manhole covers is being undertaken by CEN/TC 165, Drainage, who are revising EN 124 : 1986, 'Gully tops and manhole tops for vehicular and pedestrian areas; design requirements, type testing, marking'. It is therefore envisaged that the next edition of this standard will be a dual British/European Standard.

Since the 1976 edition of this standard, traffic growth has significantly exceeded forecasts and it is likely that rapid growth will continue into the next century. In addition the maximum permitted weight of heavy goods vehicles has increased and will increase still further during the 1990s.

Concern has been expressed by various highway authorities about the durability of certain grade A products under high speed, heavily trafficked conditions such as on motorways and other primary routes. An increasing amount of maintenance is required on covers and frames to ensure their continued satisfactory performance. These maintenance works can be hazardous to motorists and operatives as well as causing congestion and serious delays. It was therefore agreed to supplement the existing range of grades in BS 497 to cater for these circumstances.

In view of the move towards product standard harmonization in Europe it was decided to introduce a new grade equivalent to Class D 400 of the draft revision of EN 124. The new BS grade (called D for consistency with draft EN 124) has a 400 kN design load and stipulates minimum frame dimensions to improve stiffness.

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

\* See reference in CP 301: 1971 (note at end of table 6).

British Standard Specification for

# Manhole covers, road gully gratings and frames for drainage purposes

Part 1. Cast iron and cast steel

## 1. Scope

This British Standard specifies requirements for:

- (a) cast iron manhole covers, inspection covers and frames;
- (b) cast iron and cast steel road gully gratings in cast iron frames;
- (c) cast iron kerb-type gully covers and frames.

The standard falls into four main parts as follows.

Clauses 2 to 11 specify general requirements applicable to the articles covered in clauses 12, 13 and 14.

Clause 12 deals with manhole covers, inspection covers and frames.

Clause 13 deals with road gully gratings and frames.

Clause 14 deals with kerb-type gully covers and frames.

## 2. References

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

## 3. Materials

**3.1 Cast iron units.** The metal used for the manufacture of castings included in this standard shall be suitable for the method of manufacture and shall be either

flake graphite iron (hereafter called grey iron) of a quality not less than that specified as grade 10 in BS 1452: 1961, or

spheroidal or nodular graphite iron (hereafter called ductile iron) complying with the requirements specified in BS 2789: 1973 for grade 500/7, 600/3 or 700/2, as selected by the manufacturer to suit the design and dimensions of the unit.

**3.2 Cast steel gully gratings.** The metal used for the manufacture of cast steel gratings shall comply with the requirements for BS 592 grade A given in BS 3100: 1967

**3.3 Bolts.** Bolts supplied for loosely coupling separate sections of covers and gratings shall be steel, hexagon headed, complying with the requirements of BS 4190: 1967 and not less than size M16, complete with hexagon nut; these shall be provided with means to prevent undue tightening of the unit sections. Alternative coupling devices, if used, shall be of steel, have a minimum cross-sectional area of 140 mm<sup>2</sup>, and be removable and incapable of undue tightening or loosening.

## 4. Manufacture and workmanship

All cast units shall be cleanly cast and shall be free from air holes, sand holes, cold shuts and chill. They shall be neatly dressed and carefully fettled. All castings shall be free from voids, whether due to shrinkage, gas inclusions or other causes.

## 5. Protective coating

Unless otherwise specified by the purchaser, all units shall be supplied coated by dipping, or other equivalent means, using a hot-applied coal-tar-based material complying with the requirements specified in BS 4164. Alternatively, at the option of the manufacturer, a cold-applied black bitumen material complying with the requirements specified in BS 3416 may be used. No coating shall be applied to any casting unless the surfaces of the casting are clean, dry and free from rust.

## 6. Design requirements

Products manufactured to the requirements of this standard shall be capable of supporting, without fracture, the following design loads:

Grade of cover or grating	Design load kN
D	400
A	350
B	150
C	10

Bearing blocks shall be of the same size as those used for the relevant quality control tests (see 12.3, 13.3 and 14.3) and the cover or grating shall be capable of supporting the specified design load with the bearing block placed at any position wholly within the perimeter of the cover or grating section(s).

The manufacturer shall verify the design of each type of unit by submitting a sufficient number of prototypes to the loading tests specified in this clause and in clause 7.

## 7. Quality control

**7.1 Quality control tests.** The manufacturer shall test sample units, by the method given in appendix A, for compliance with the requirements given in 7.2. Apart from the initial design proving tests that shall be carried out by the manufacturer, routine sampling tests will be at the discretion of the manufacturer, to suit his rate and method of production, in order to ensure continuing compliance with the requirements of this standard. Records of such quality control tests shall be available to the purchaser or his representative.

**7.2 Acceptance requirements.** Products shall be deemed to comply with the loading test requirements of this standard if, when tested in accordance with the procedures described in appendix A, the following requirements are satisfied.

- (a) Grey iron units sustain the loads specified in 12.3, 13.3 and 14.3 without fracture.

(b) Ductile iron and cast steel units sustain the loads specified in 12.3, 13.3 and 14.3 without fracture and any resultant permanent set, measured at the midpoint between any two selected supporting seatings after removal of the test load, is not greater than one five-hundredth (0.2 %) of the distance between these selected seatings.

**7.3 Testing of recessed covers.** Recessed covers shall be tested before they are filled with concrete.

## 8. Additional tests specified by the purchaser

If the purchaser requires additional tests to be carried out, this shall be stated in his enquiry and order. The manufacturer shall provide every facility for the purchaser to select such samples as he may require from a consignment prior to delivery and the tests shall be carried out in the presence of the manufacturer and the purchaser, or his representative, if he so desires.

The allocation of costs of additional tests should be agreed between the manufacturer and the purchaser.

## 9. Inspection

The manufacturer shall afford all reasonable facilities for carrying out inspection during the course of manufacture. Should the purchaser desire to witness the tests specified in 7.2 he shall inform the manufacturer accordingly and the latter shall give reasonable notice of the date or dates on which the tests will be carried out. The purchaser shall, if he so desires, be enabled to carry out inspection of covers, gratings and frames prior to the application of any coating.

## 10. Certificate of compliance

The purchaser shall, on request, be supplied with a certificate in respect of each delivery certifying that the articles comply with the requirements of this specification.

## 11. Marking

All covers, gratings and frames shall have clearly cast thereon the number of this British Standard and the appropriate grade, e.g. 'BS 497, Grade A', and such other markings as may be agreed between the manufacturer and the purchaser.

## 12. Manhole covers, inspection covers and frames

**12.1 Grades.** Manhole covers, inspection covers and frames complying with the requirements of this British Standard shall be graded as follows:

**Grade A** Manhole covers and frames, capable of bearing wheel loads up to 11.50 tonnes, for use in carriageways. These covers and frames shall incorporate a permanent non-rock design feature such as triangular point suspension or machined faces.

**Grade B class 1** Manhole covers and frames, capable of bearing wheel loads up to 5.00 tonnes, for use in carriageways carrying relatively slow-moving normal commercial vehicles (e.g. cul-de-sacs and minor residential roads; see table 1 in Road note 29\*). These covers and frames shall incorporate a permanent non-rock design feature such as triangular point suspension or machined faces.

**Grade B class 2** Sealed manhole covers and frames (see 12.4.8) capable of bearing wheel loads up to 5.00 tonnes, for use in areas to which vehicles would have only occasional access (e.g. pedestrian precincts).

**Grade C** Sealed inspection covers and frames (see 12.4.8) for use in situations inaccessible to motor vehicles.

**Grade D** Manhole covers and frames, capable of bearing wheel loads up to 11.50 tonnes, for use in carriageways carrying fast-moving heavy vehicles, such as motorways, trunk roads and other primary routes. These covers and frames shall incorporate a permanent non-rock design feature such as triangular point suspension or machined faces.

**12.2 Shape and size.** Only minimum clear-opening sizes and certain frame dimensions are stipulated (see 12.5), shape (e.g. square, rectangular, circular) and size being the product of the individual manufacturer's design. If a purchaser desires to specify a particular shape this shall be stated on the enquiry and/or order.

The minimum clear-opening dimensions that relate to rectangular designs in tables 3, 4 and 5 shall be deemed not to be contravened by projections at the corners, required for manufacturing purposes, provided that the resulting reduction of minimum clear-opening area does not exceed 15 cm<sup>2</sup> at each of the corners.

For grade D frames, slots within the 75 mm minimum bedding width are permissible in any side of the frame but there shall be an increase in width to give a corresponding increase in solid flange area for that side of the frame.

**12.3 Test loads for quality control purposes** (see also clause 7 and appendix A). The loads and sizes of the bearing blocks for the test specified in clause 7 shall be as follows:

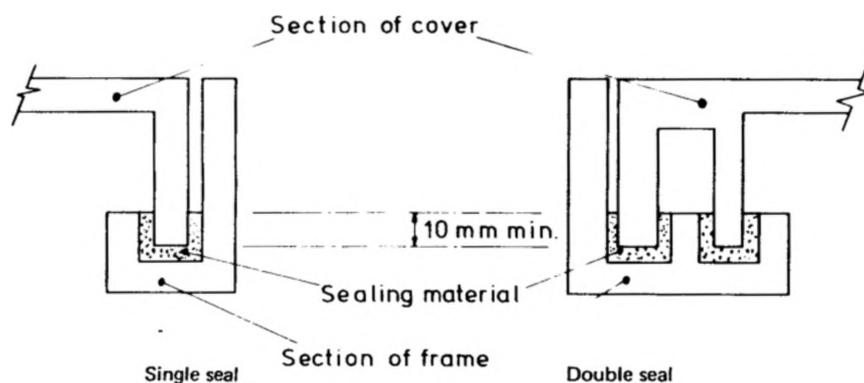
Grade of cover	Test load		Size of block
	Grey iron	Ductile iron	
	kN	kN	mm
Grade D manhole covers	400	267	250 dia.
Grade A manhole covers	350	235	300 dia.
Grade B classes 1 and 2 manhole covers	150	100	300 dia.
Grade C inspection covers	10	7	300 dia.

## 12.4 Design features

**12.4.1 Registers.** Where the directional installation of the cover relative to the frame is an essential feature of a non-rock design, a register shall be provided.

**12.4.2 Displacement by traffic.** The design of covers shall be such that they cannot be displaced by normal traffic. Grade A and grade B frames of less than 100 mm depth shall be provided with means of additional anchorage (e.g. openings and/or holes for anchor bolts in the flange).

\* Department of the Environment — Road Research Laboratory. Road note 29, third edition. 'A guide to the structural design of pavements for new roads'.



NOTE. The figure is diagrammatic only.

Figure 1. Sealed manhole covers

**12.4.3 Drainage and skid resistance.** Covers of solid-top type shall be self-draining and have a raised pattern, such as chequers, so as to provide a skid-resisting surface.

**12.4.4 Loosening.** A recess for a prising bar shall be incorporated in manhole covers unless other means of loosening the cover from the frame are provided.

**12.4.5 Grade C recessed covers.** Covers shall be recessed to a clear depth of not less than 28 mm. The recess shall extend, except for keyway housings and locking pads, to within 25 mm of the outside of the frame at surface level.

**12.4.6 Keyways.** At least two keyways as detailed in figure 4 shall be provided in each complete cover, one in each segment for a double triangular cover. Closed keyways shall always be provided on grade B class 2 and on grade C covers; open or closed keyways may be provided on grades D and A, on grade B class 1 and on kerb-type gully covers.

**12.4.7 Clearance.** The maximum clearance between cover section and frame, or between section and section, shall be 3 mm (as for gratings; see figure 3).

**12.4.8 Sealing.** When a manhole or inspection cover unit is described as sealed, unless an alternative method is agreed by the purchaser, the frame shall provide a continuous means of retaining a sealing material. This standard seal may be of either single or double pattern (see figure 1) and the minimum depth of penetration of the cover sealing flange(s) into the frame shall be 10 mm.

**12.4.9 Locking.** Where specified by the purchaser, menas shall be provided for locking sealed covers in their frames, without nullifying the seal. Where locking devices would be rendered ineffective by corrosion, they shall be suitably protected

**12.4.10 Ventilated covers.** The total area of ventilation shall be not less than 5% of the minimum clear-opening area. The width of slots shall not exceed 40 mm and their length shall not exceed 125 mm.

**12.5 Specified dimensions and details.** The dimensions of manhole covers and frames of specified grades and BS reference numbers shall be as given in tables 1 to 5.

Table 1. Grades D and A manhole covers and frames

(a). Grade D manhole covers and frames

BS reference	Minimum clear opening (see 12.2)	Minimum depth of frame	Minimum bedding width of frame*
MD-60	mm 600 dia.	mm 150	mm 75

\*See 12.2, paragraph 3.

(b). Grade A manhole covers and frames.

BS reference	Minimum clear opening (see 12.2)	Minimum depth of frame	Minimum bedding width of frame
MA-50	mm 500 dia.	mm 75	mm 75
MA-55	mm 550 dia.	mm 75	mm 75
MA-60	mm 600 dia.	mm 75	mm 75
MA-T	See silhouette in figure 2 for single triangular cover	mm 75	mm 75

Table 2. Grade B class 1 manhole covers and frames

BS reference	Minimum clear opening (see 12.2)	Minimum depth of frame	Minimum bedding width of frame
MB1-50	mm 500 dia.	mm 75	mm 75
MB1-55	mm 550 dia.	mm 75	mm 75
MB1-60	mm 600 dia.	mm 75	mm 75

**Table 3. Grade B class 2 single-seal manhole covers and frames**

BS reference	Minimum clear opening (see 12.2)	Minimum depth of frame	Minimum bedding width of frame
MB2-50	mm 500 dia.	mm 75	mm 75
MB2-55	550 dia.	75	75
MB2-60	600 dia.	75	75
MB2-60/45*	600 x 450	75	75
MB2-60/60*	600 x 600	75	75
MB2R-60/45†	600 x 450	75	75
MB2R-60/60†	600 x 600	75	75

\* Solid top.

† Recessed top.

**Table 4. Grade C single-seal inspection covers and frames**

BS reference	Minimum clear opening (see 12.2)	Minimum depth of frame	Minimum bedding width of frame
MC1-45/45*	mm 450 x 450	mm 40	mm 40
MC1-60/45*	600 x 450	40	40
MC1-60/60*	600 x 600	40	40
MC1R-45/45†	450 x 450	60	40
MC1R-60/45†	600 x 450	60	40
MC1R-60/60†	600 x 600	60	40
MC1-45*	450 dia.	40	40

\* Solid top

† Recessed top. See 12.4.5.

**Table 5. Grade C double-seal inspection covers and frames**

BS reference	Minimum clear opening (see 12.2)	Minimum depth of frame	Minimum bedding width of frame
MC2-45/45*	mm 450 x 450	mm 40	mm 65
MC2-60/45*	600 x 450	40	65
MC2-60/60*	600 x 600	40	65
MC2R-45/45†	450 x 450	60	65
MC2R-60/45†	600 x 450	60	65
MC2R-60/60†	600 x 600	60	65
MC2-45*	450 dia.	40	65

\* Solid top.

† Recessed top. See 12.4.5.

### 13. Road gully gratings and frames

**13.1 Grades.** Road gully gratings and frames complying with the requirements of this British Standard shall be graded as follows:

**Grade A** Gully gratings and frames, capable of bearing *class 1* wheel loads up to 11.50 tonnes, for use in carriageways. These gratings and frames shall incorporate a permanent non-rock design feature such as triangular point suspension or machined seating.

**Grade A** Gully gratings and frames, incorporating a hinged *class 2* grating and capable of bearing wheel loads up to 11.50 tonnes, for use in carriageways.

**Grade B** Gully gratings and frames, incorporating a hinged grating and capable of bearing wheel loads up to 5.00 tonnes, for use in carriageways carrying relatively slow-moving normal commercial vehicles (e.g. cul-de-sacs and minor residential roads; see table 1 in Road note 29\*).

**13.2 Shape and size.** Two minimum 'nominal' widths, 325 mm and 450 mm, with minimum waterway area are specified (see 13.5), shape and size being the product of the individual manufacturer's design (see figure 3 for definition of nominal width). If the purchaser desires to specify a particular shape (e.g. square, rectangular, triangular), this shall be stated on the enquiry and/or order.

**13.3 Test loads for quality control purposes** (see also clause 7 and appendix A). The loads and sizes of the bearing blocks for the purpose of the test specified in clause 7 shall be as follows:

Grade of grating	Test load			Size of block (see notes 1 and 2)
	Grey iron	Ductile iron	Cast steel	
A	kN	kN	kN	mm
B		235	235	300 x 235
		100	100	300 x 235

NOTE 1. If a non-flat upper surface is specified for a grating (see 13.4.4), the test block shall have a contoured bottom face to mate with the shape of the grating.

NOTE 2. The test block shall be used with the 300 mm side parallel to the kerb face of the gully.

#### 13.4 Design features

**13.4.1 Waterway area distribution.** Of the total waterway area, there shall be a minimum of 45 cm<sup>2</sup> between the kerb face of the frame and a parallel line 50 mm distant (line X-X in figure 3) and there shall also be a minimum of 65 cm<sup>2</sup> between the kerb face of the frame and a parallel line 90 mm distant (line Y-Y in figure 3).

**13.4.2 Slot width and direction.** The maximum width of a slot in a grating shall be limited to 40 mm, this figure to include the 3 mm clearance (see 13.4.3) when this forms an integral part of such a slot. The predominant direction of slots must be at an angle to the kerb face of between 40° and 90°.

**13.4.3 Clearance.** The maximum clearance between grating section and frame, or section and section, shall be 3 mm (see figure 3). The area of such clearance shall not count as part of the minimum waterway area specified in 13.5, nor shall it count as part of the areas specified in 13.4.1, except where such clearance forms an integral part of an adjacent drainage slot.

**13.4.4 Grating surface.** The upper surface of all gratings shall be flat unless otherwise agreed between purchaser and manufacturer.

**13.4.5 Grating length and width.** The actual length of the grating shall not be less than 325 mm.

**13.4.6 Displacement by traffic.** The design of gratings shall be such that they cannot be displaced by normal traffic. Frames of less than 100 mm depth shall be provided with means of additional anchorage (e.g. openings and/or holes for anchor bolts in the flange).

**13.4.7 Hinged gratings.** When designed to hinge open, gratings shall be self-supporting in the fully open position. They shall remain open when the frame is placed on a

test slope as indicated below, with the hinge side at the top of the slope.

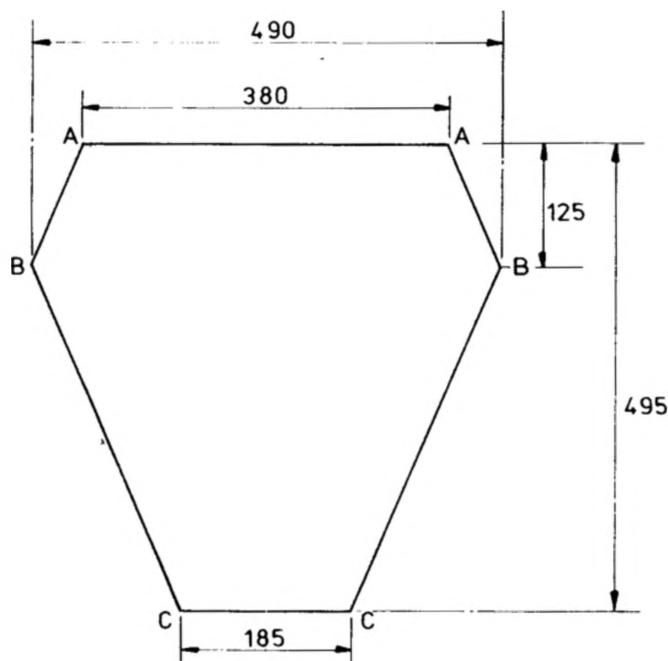
Type	Test slope
Hinged at kerb or road side	1 in 20
Hinged at end	1 in 10

**13.5 Specified dimensions and details.** The dimensions of road gully gratings and frames of specified grades and BS reference numbers shall be as given in tables 6 to 8.

**Table 6. Grade A class 1 gully gratings and frames**

BS reference	Minimum nominal width (see figure 3)	Minimum area of waterway	Minimum depth of frame	Minimum bedding width of frame*
GA1-325	325	650	75	75
GA1-450	450	900	75	75

\* On three sides of grating only; no frame flange on kerb face

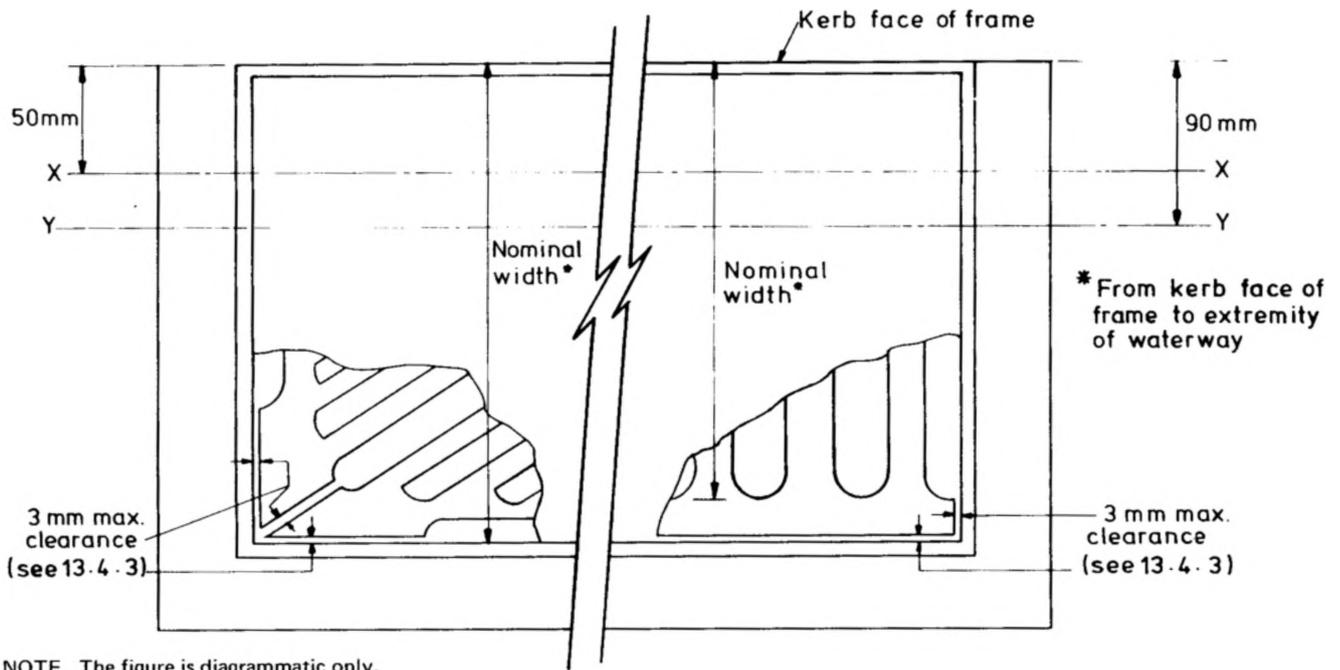


All dimensions are in millimetres.

**NOTE.** Minor intrusions in corners A, B and C, to accommodate seatings and the like, are permitted provided that

- their total area inside the minimum dimension lines does not exceed 15 cm<sup>2</sup>, and
- no individual intrusion shall have a projection of more than 20 mm inside the minimum clear opening.

**Figure 2. Minimum clear-opening dimensions of frame for BS reference MA-T manhole cover**



NOTE. The figure is diagrammatic only.  
Figure 3. Part plans of gully gratings and frames

Table 7. Grade A class 2 gully gratings and frames

BS reference	Minimum nominal width (see figure 3)	Minimum area of waterway	Minimum depth of frame	Minimum bedding width of frame*
GA2-325	mm	cm <sup>2</sup>	mm	mm
GA2-450	325	650	75	75
	450	900	75	75

\* On three sides of grating only; no frame flange on kerb face.

Table 8. Grade B gully gratings and frames

BS reference	Minimum nominal width (see figure 3)	Minimum area of waterway	Minimum depth of frame	Minimum bedding width of frame*
GB-325	mm	cm <sup>2</sup>	mm	mm
GB-450	325	650	75	75
	450	900	75	75

\* On three sides of grating only; no frame flange on kerb face.

### 14 Kerb-type gully covers and frames

**14.1 Duty.** These covers and frames are for use in the kerbs of carriageways.

**14.2 Types.** Units shall provide kerb inlet with access cover opening away from the carriageway. Weir depth (distance from top of cover to top of fixed weir, if any) shall be either 115 mm or 165 mm at customer's selection.

**14.3 Test load for quality control** (see also clause 7 and appendix A). A load of 150 kN for grey iron units, or 100 kN for ductile iron units, on a rectangular bearing block 300 mm x 235 mm (with the 300 mm dimension parallel to the kerb face) shall be used for the purpose of the test specified in clause 7.

### 14.4 Design features

**14.4.1 Weir length and waterway.** The weir length shall be at least 425 mm and a rectangular clearway at least 250 cm<sup>2</sup> in area shall be provided above the weir level (see 14.2), both excluding any debris trap as specified in 14.4.4.

**14.4.2 Road retaining bar.** Unless otherwise specified by the purchaser, a road retaining bar, minimum cross section 35 mm x 25 mm, shall be provided as a standard feature. It shall be supplied loose so as to provide adjustment to suit the required road level. Alternatively, a deflector plate may be provided by arrangement between the purchaser and the manufacturer.

**14.4.3 Cover.** The cover shall be provided with either a keyway(s) for the standard small key or a locking mechanism. Where the cover may be readily raised without the use of the key or other tool, a locking mechanism shall be provided. Where a hinge is provided, this shall be at the rear edge of the cover, as viewed from the road. The top shall be self-draining and have an adequate raised pattern, such as chequers, to provide a slip-resisting surface.

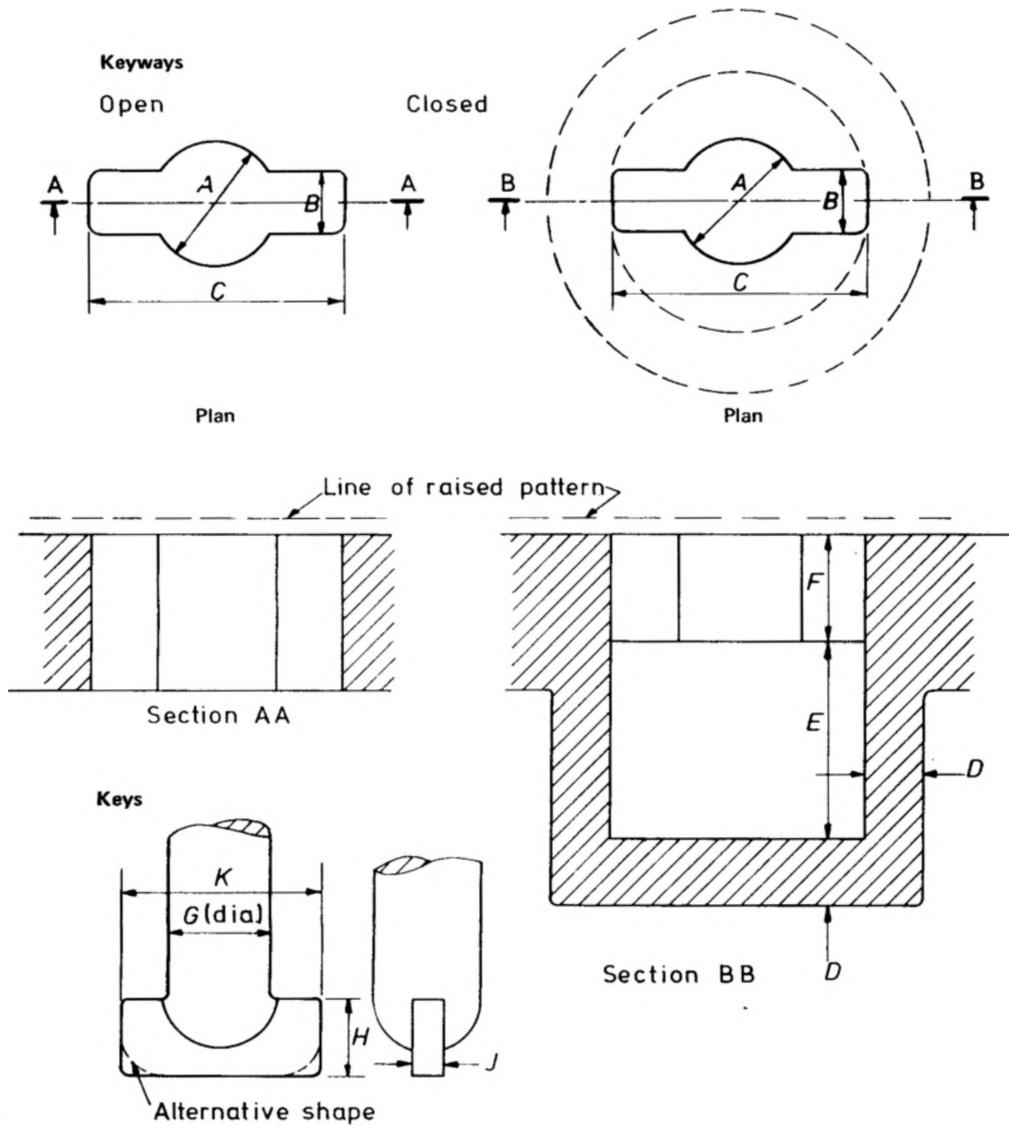
**14.4.4 Debris trap.** A robust grid with horizontal bar(s) or a minimum of two vertical fins shall be provided to act as a debris trap across the open mouth of the unit.

**14.4.5 Cleansing access.** The opened unit shall provide a minimum rectangular clear opening 400 mm x 250 mm.

**14.5 Specified dimensions.** The dimensions of kerb-type gully covers and frames of specified BS reference numbers shall be as given in table 9.

Table 9. Kerb-type gully covers and frames

BS reference	Weir depth	Minimum net weir length	Minimum rectangular clearway	Minimum rectangular clear opening (see 14.4.5)
GK-115	mm	mm	cm <sup>2</sup>	mm
GK-165	115	425	250	400 x 250
	165	425	250	400 x 250



Type	Keyway						Key			
	A	B	C	D	E	F	G	H	J	K
	min./max.	min./max.	min.	min.	min.	min.				
Small	14-16	9-11	29	6	17	6	12	12	6	25
Large	22-25	9-13	44	6	35	10	20	15	6	40

All dimensions are in millimetres.

NOTE. Small key for class C and kerb-type gully covers; large key for class A and class B covers.

Figure 4. Detail of keyways and keys

## Appendix A

### Loading test

**A.1 Apparatus.** The following apparatus is required.

**A.1.1 A standard frame** to be used as a supporting frame.

**A.1.2 A bearing block** of the shape and size specified in 12.3, 13.3 and 14.3 as appropriate, of hardwood faced with hard rubber or other resilient material, and sufficiently rigid to ensure that the load on the cover or grating is evenly distributed over the full area of the block.

**A.1.3 A device, preferably a hydraulic testing machine,** for applying the load. The device shall be capable of applying a load at least 25 % greater than the appropriate load specified in 12.3, 13.3 and 14.3. If a testing machine is used it shall comply with the accuracy requirements for grade A or grade B testing machines given in BS 1610: 1964. If any other load-measuring device is used it shall be accurate to within 2 % of the indicated load.

**A.1.4 A measuring device,** accurate to 0.1 mm, suitable for indicating deflection measurements on ductile iron units and cast steel gully gratings.

**A.2 Procedure.** Carry out the loading test by applying the appropriate load specified in 12.3, 13.3 and 14.3 through the bearing block of specified size placed centrally on the unit or section(s) being tested. For grey iron covers or gratings proceed as described in A.2.1, for ductile iron covers and gratings and cast steel gratings as described in A.2.2.

**A.2.1 Grey iron covers or gratings.** Support the cover or grating in the frame and, using the testing machine or other load-measuring device (A.1.3), apply the appropriate load without shock. Sustain the load for a minimum period of 30 s.

**A.2.2 Ductile iron covers and gratings and cast steel gratings.** Support the cover or grating in the frame and take two readings with the measuring device (A.1.4) as follows.

(a) Before the load is applied, take an initial reading at a point midway between the two selected supporting seatings to establish a datum point. Where it is not practicable to make this measurement exactly on the line drawn between the two supporting seatings it shall be taken on a line parallel to, and as near as possible to, this line.

(b) Apply the test load, without shock, five times, sustaining alternating maximum and zero loads for minimum periods of 20 s; then take a second reading at the datum point.

Record the difference between the two readings as the permanent set.

## Appendix B

### Summary of optional variations (see note)

Standard	Optional variations	Applicable to:		
		Manhole covers	Gully gratings	Kerb-type gully covers
Coated in accordance with clause 5	Not coated, or other finishes	Yes	Yes	Yes
Normal sampling and testing (see clause 7)	Additional sampling and testing (see clause 8)	Yes	Yes	Yes
BS marking as given in clause 11	Additional marking (see clause 11)	Yes	Yes	Yes
Manufacturer's choice of shape (see 12.2 and 13.2)	Particular shape (see 12.2 and 13.2)	Yes	Yes	Yes
Open or closed keyways in grades D and A, grade B class 1 and kerb-type gully covers at the manufacturer's option (see 12.4.6)	Open or closed keyways in grades D and A, grade B class 1 and kerb-type gully covers at the purchaser's option (see 12.4.6)	Yes	No	Yes
Standard sealing (see 12.4.8)	Agreed alternative sealing method (see 12.4.8)	Yes	No	No
Non-locking sealed covers	Locking device on sealed covers (see 12.4.9)	Yes	No	No
Solid cover top	Ventilated cover top (see 12.4.10)	Yes	No	No
Minimum clear openings as specified in 12.5, 13.5 and 14.5	Specific larger openings	Yes	Yes	Yes
Flat upper surface of gratings (see 13.4.4)	Shaped upper surface to gratings (see 13.4.4)	No	Yes	No

NOTE. Unless options are specifically requested, a standard unit shall be supplied. An example of a specific requirement might be: 12 no. manhole covers and frames to BS 497 : Part 1, reference MA-60 but having a clear opening of 700 mm diameter and round frame shape.

## Standards publications referred to

BS 1452 Grey iron castings

BS 1610 Methods for the load verification of testing machines

BS 2789 Iron castings with spheroidal or nodular graphite

BS 3100 Steel castings for general engineering purposes

BS 3416 Black bitumen coating solutions for cold application

BS 3763 The International System of units (SI)

BS 4164 Coal tar based hot applied coating materials for protecting iron and steel, including suitable primers where required

BS 4190 ISO metric black hexagon bolts, screws and nuts

PD 5686 The use of SI units

| EN 124\* Gully tops and manhole tops for vehicular and pedestrian areas; design requirements, type testing, marking

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The Hardware and Ironmongery Standards Committee, under whose supervision this British Standard was prepared, consists of representatives from the following Government departments and scientific and industrial organizations:

- Aluminium Window Association
- Association of Builders' Hardware Manufacturers
- British Hardware Federation
- British Lock Manufacturers' Association
- British Plastics Federation
- British Steel Industry
- Copper Development Association
- \* Department of the Environment
- Department of the Environment – Building Research Station
- \* Greater London Council
- Guild of Architectural Ironmongers
- \* Institution of Municipal Engineers
- Metropolitan Police
- Royal Institute of British Architects
- Royal Institution of Chartered Surveyors
- Steel Window Association
- Zinc Development Association

The Government department and organizations marked with an asterisk in the above list, together with the following, were directly

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- Agrement Board
- Association of London Borough Engineers and Surveyors
- British Gas Corporation
- British Ironfounders' Association
- British Malleable Tube Fittings Association
- County Surveyors' Society
- Department of the Environment – Transport and Road Research Laboratory
- Electricity Supply Industry in England and Wales
- Environmental Health Officers' Association
- Institute of Works and Highways Superintendents
- Institution of Civil Engineers
- Institution of Gas Engineers
- Institution of Public Health Engineers
- National and Midland Ironfounders' Association
- National Federation of Builders' and Plumbers' Merchants
- National Water Council
- Post Office
- Water Companies Association
- Individual manufacturers

## Amendments issued since publication

Amd. No.	Date of issue	Text affected
5034	December 1985	Indicated by a line in the margin
6643	December 1990	Indicated by a line in the margin