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BRITISH STANDARD 497 : 1945

Cast Manhole Covers Road Gully Gratings and Frames

BRITISH STANDARDS INSTITUTION

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BRITISH STANDARD SPECIFICATION

CAST MANHOLE COVERS ROAD GULLY GRATINGS AND FRAMES

B.S. 497 : 1945

Price 3s. 6d., post free

BRITISH STANDARDS INSTITUTION
Incorporated by Royal Charter
28 VICTORIA STREET, LONDON, S.W.1
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THIS BRITISH STANDARD, having been approved by the Ironmongery and Sanitary Fittings Industry Committee, and endorsed by the chairman of the Building Divisional Council, was published under the authority of the General Council on 17th December, 1945.

The Institution desires to call attention to the fact that this British Standard does not purport to include all the necessary provisions of a contract.

In order to keep abreast of progress in the industries concerned, British Standards are subject to periodical review. Suggestions for improvement will be recorded and in due course brought to the notice of the committees charged with the revision of the standards to which they refer.

This British Standard requires reference to the following :

B.S. 51. Wrought iron for general engineering purposes.
B.S. 592. Carbon steel castings for general engineering purposes.

A complete list of British Standards, numbering over one thousand, indexed and cross-indexed for reference, together with an abstract of each standard, will be found in the Institution's Yearbook, price 2*s*. 0*d*. post free.

British Standards are revised, when necessary, either by the issue of amendment slips or revised editions. It is important that users of British Standards should ascertain that they are in possession of the latest amendments or edition.

Users wishing to be kept informed of any alteration to this standard should notify Publications Sales Department of the Institution, giving the number and title of the standard.

HIB/16

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CO-OPERATING ORGANISATIONS

The Ironmongery and Sanitary Fittings Industry Committee, under whose supervision this British Standard was prepared, consists of representatives of the following government departments and scientific and industrial organisations :

Ministry of Health
*Ministry of Works
*Department of Scientific and Industrial Research
*British Ironfounders' Association
British Plastic Hardware Association
British Plastics Federation
Cast Butt Hinge Manufacturers' Association
*Distributors of Builders' Supplies Joint Council
*Institution of Municipal and County Engineers
*London County Council
Midland Lock and Latch Manufacturers' Association
National Brassfoundry Association
National Federation of Building Trades Employers
National Federation of Ironmongers

The government departments and scientific and industrial organisations marked with an asterisk in the above list, together with the following, were directly represented on the committee entrusted with the preparation of this standard :

Crown Agents for the Colonies
Ministry of War Transport
Post Office Engineering Department
British Cast Concrete Federation
British Valve Manufacturers' Association
British Waterworks Association
Incorporated Association of Electric Power Companies
Incorporated Municipal Electrical Association
Institution of Gas Engineers
Institution of Sanitary Engineers
Institution of Water Engineers
Midland Ironfounders' Association
Society of British Gas Industries
Manufacturers of Cast Manhole Covers, Road Gully Gratings and Frames

BRITISH STANDARD SPECIFICATION FOR

CAST MANHOLE COVERS
ROAD GULLY GRATINGS AND FRAMES
FOR DRAINAGE PURPOSES.

FOREWORD

This revised and enlarged specification was prepared primarily for use in connection with the programme of post-war building. In deciding upon the patterns to be included the committee was, therefore, guided by the need to facilitate mass production. At the same time, it was felt that the quality of the articles covered should be controlled by means of an adequate testing procedure in view of the importance of protecting against accidents to vehicular traffic, and other road users. Attention was also directed to the need to limit, as far as possible, the troubles experienced in the past due to rocking.

With the co-operation of the manufacturers represented it has been possible to include a range of non-rock covers for heavy duty applications, and similar covers for medium duty. In doing this the '3-point' system of support has been adopted and the circular type of cover has been omitted so far as heavy duty applications are concerned. It is appreciated that initially the circular cover may provide non-rock features but, as the result of wear, it cannot be guaranteed that this condition will apply for any length of time. Nevertheless, the circular type of cover has been included in the medium duty section as it is felt that the conditions are such as to render its use less open to the introduction of difficulty in such situations. It is pointed out that although the circular cover and frame has been omitted from the heavy duty section the double triangular patterns included are provided with a circular opening under a square cover.

The testing procedure requires a proving test on every cover and grating : this course has been adopted, rather than the inclusion of a type test, because of the unavoidable variations in castings which would not necessarily be revealed by such a test. It is considered that once the arrangements for carrying out the proving tests are made, there will be very little increase in production time.

PART ONE : GENERAL REQUIREMENTS

SCOPE

1. This British Standard provides for manhole covers and frames of the grades and types given in Part Two and for road gully gratings, covers and frames of the grades and types given in Part Three, all of which shall comply in every respect with the requirements laid down herein.

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MATERIALS

2. Manhole covers and frames shall be cast from a mixture of cast iron scrap and a suitable grade of pig iron. The composition of the resultant metal shall be such as to provide a strong grey structure free from chill.

Grade A (heavy duty) gully gratings shall be manufactured from cast iron of the same quality, or of cast steel of a quality as defined in Grade (i) of clause 1 of B.S. 592, as may be specified by the purchaser. All other gully gratings and covers and all gully frames shall be manufactured from cast iron as already defined. The grid used in Grade C kerb type covers shall be of wrought iron complying with the requirements of B.S. 51, Grade C.

MANUFACTURE AND WORKMANSHIP

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

DIMENSIONS

4. The dimensions of the various types of covers, gratings and frames shall be as indicated on the appropriate drawings and as scheduled in the appropriate tables.

The drawings indicate non-ventilating types of covers : when ventilating covers are ordered, the dimensions of the ribs shall be increased sufficiently to ensure that the covers shall be capable of withstanding the requirements of the appropriate loading test.*

WEIGHTS

5. The weights stated in the tables are approximate and are given for information purposes only.

PROTECTIVE COATING

6. Manhole covers and frames shall be supplied coated with a black bituminous composition unless otherwise ordered. Road gully gratings and frames shall be supplied uncoated unless otherwise ordered. The quality of the coating shall be such that it is smooth and tenacious and shall not flow when exposed to a temperature of 145°F. (62·8°C.) and shall not be so brittle at a temperature of 32°F. (0°C.) as to chip off.

If covers and frames of Grade C are required to be galvanised, this shall be specially stated in the enquiry and order. The process shall consist of thoroughly cleaning the articles of all scale, rust and dirt by pickling in a bath of dilute acid. Each part shall then be thoroughly washed, dipped in a bath of molten virgin spelter containing not more than 2½ per cent of impurities and shall remain therein until all the surfaces are completely and

* It is hoped to publish an addendum to the specification covering standard designs of ventilating cover as soon as practicable.

evenly coated with firmly adherent spelter. The coating shall be free from acid spots and unsightly blemishes or other defects.

LOADING TEST

7. Prior to delivery all covers and gratings shall be subjected to a loading test in the following manner :

The cover or grating shall be supported in a frame which may be a standard product or a specially made fitting simulating normal conditions of use. The specified load shall be applied without shock through the medium of a bearing block faced with hard rubber or other resilient material. The bearing block shall be of the size specified in the appropriate table and shall bear centrally on the cover or grating. The block shall be of sufficient rigidity to ensure that the load on the cover or grating shall be equally distributed over the full area of the block. When so tested the cover or grating shall sustain the specified load for a minimum period of 30 seconds without fracture.

See Amdt. No. 3.

INSPECTION

8. 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 clause 7, 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 be enabled to carry out inspection, if required, on covers, gratings and frames prior to the application of any coating.

REJECTION

9. Covers, gratings and frames which fail as a set, or as individual components, to comply with any of the requirements of this specification shall be liable to rejection.

MARKING*

10. All covers, gratings and frames purporting to conform to the requirements of this British Standard shall have clearly cast thereon the British Standard number and Grade, viz. : B.S. 497 Grade A, and such other markings as may be agreed.

MANUFACTURER'S CERTIFICATE

11. The purchaser, on request, shall be supplied with a certificate covering each delivery and testifying that the articles covered thereby comply with the requirements of this specification and that they have been subjected to the loading test laid down in clause 7.

* Attention is directed to the fact that the following combinations of letters, amongst others, have been registered in South Africa as standardisation marks :

B.S.I.
B.S.S.
B.E.S.

These marks may not be used on goods for sale in South Africa except under the authority of the South African Standards Institution.

Information regarding the conditions under which the use of these marks will be authorised by the South African Standards Institution may be obtained on application to the Director of the British Standards Institution, 28, Victoria Street, London, S.W.1.

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PART TWO : MANHOLE COVERS AND FRAMES

GRADES

12. British Standard manhole covers and frames shall be graded as follows :

Grade A. Heavy duty solid or ventilating manhole and lamp hole covers for use in carriageways.

Grade B. Medium duty solid or ventilating manhole covers for use in footpaths, verges, carriage drives or cycle tracks.

Grade C. Light duty inspection covers for use in domestic premises or other places where they will not be required to carry wheeled traffic.

TYPES

13. British Standard covers and frames shall comprise the following types :

Grade A. *a.* A double triangular manhole cover and frame as shown in fig. 1.
b. A single triangular manhole cover and frame as shown in fig. 2.
c. A double triangular lamp-hole cover and frame as shown in fig. 3.

Grade B. *a.* A circular cover and frame as shown in fig. 4.
b. A rectangular cover and frame as shown in fig. 5.

Grade C. Rectangular covers and frames as shown in figs. 6 to 9.

TEST LOADINGS

14. The loads and the diameters of the blocks for the purpose of the test specified in clause 7 shall be as follows :

Grade and type of cover	Load in tons	Diameter of block
		in.
A *a* and *b*	35	12
A *c*	18	5
B *a* and *b*	5	4
C	1	12

PART THREE : ROAD GULLY GRATINGS, COVERS AND FRAMES

GRADES

15. British Standard road gully gratings, covers and frames shall be graded as follows :

Grade A. Heavy duty gully gratings and frames for use in main roads.

Grade B. Medium duty gully gratings and frames for use in roads in which there is no expectation of heavy vehicles or fast traffic.

Grade C. Kerb type covers and frames for setting into footpaths and verges.

TYPES

16. British Standard gully gratings, covers and frames shall comprise the following types :

Grade A. Straight-bar double triangular gratings as illustrated in figs. 11 and 12.

Grade B. *a.* Straight-bar gratings for level roads and for gradients under 1-50 as illustrated in fig. 13.
b. Curved-bar gratings for roads having gradients 1-50 and steeper as illustrated in fig. 14.

Grade C. Kerb type gully covers and frames as illustrated in fig. 15.

NOTE. If a battered type is required the purchaser shall provide the manufacturer with all necessary details.

TEST LOADINGS

17. The loads and the diameters of the blocks for the purpose of the test specified in clause 7 shall be as follows :

Grade of grating or cover	Load in tons	Diameter of block
		in.
A	35	8
B	15	8
C	5	4

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TABLE OF SIZES FOR FIG. 1

GRADE A (HEAVY DUTY) DOUBLE TRIANGULAR COVER AND FRAME

Key letter	Dimension		Key letter	Dimension	
	in.	in.		in.	in.
A	20	22	U	5 approx.	6 approx.
C	21	23	V	1⅛	1⅛
E	30	32	W	*1⅛ to 1 11/16	*1⅛ to 1 11/16
G	6	6	X	3/16	3/16
H	⅝	⅝	Y	⅝ min.	⅝ min.
J	⅞	⅞		¾ max.	¾ max.
K	⅛	⅛	Z	2	2
L	1⅛	1¼	a	2	2
M	4	4	b	1¾	1¾
N	4⅜	4⅜	c	1	1
O	¾	¾	d	½	½
P	1¼	1¼	f	¾	¾
Q	1	1	g	2¾	2¾
R	¾	¾	h	11⅝	12⅝
S	1¼	1¼	k	12	13
T	1⅜	1⅜			

NOTE. Similar dimensions on all drawings are given similar reference letters so far as they apply.

APPROXIMATE WEIGHTS

Clear opening	Cover			Frame			Total		
in.	cwt.	qtr.	lb.	cwt.	qtr.	lb.	cwt.	qtr.	lb.
20	2	1	7	2	0	21	4	2	0
22	2	3	0	2	1	0	5	0	0

* i.e. 1 to 1½ V.

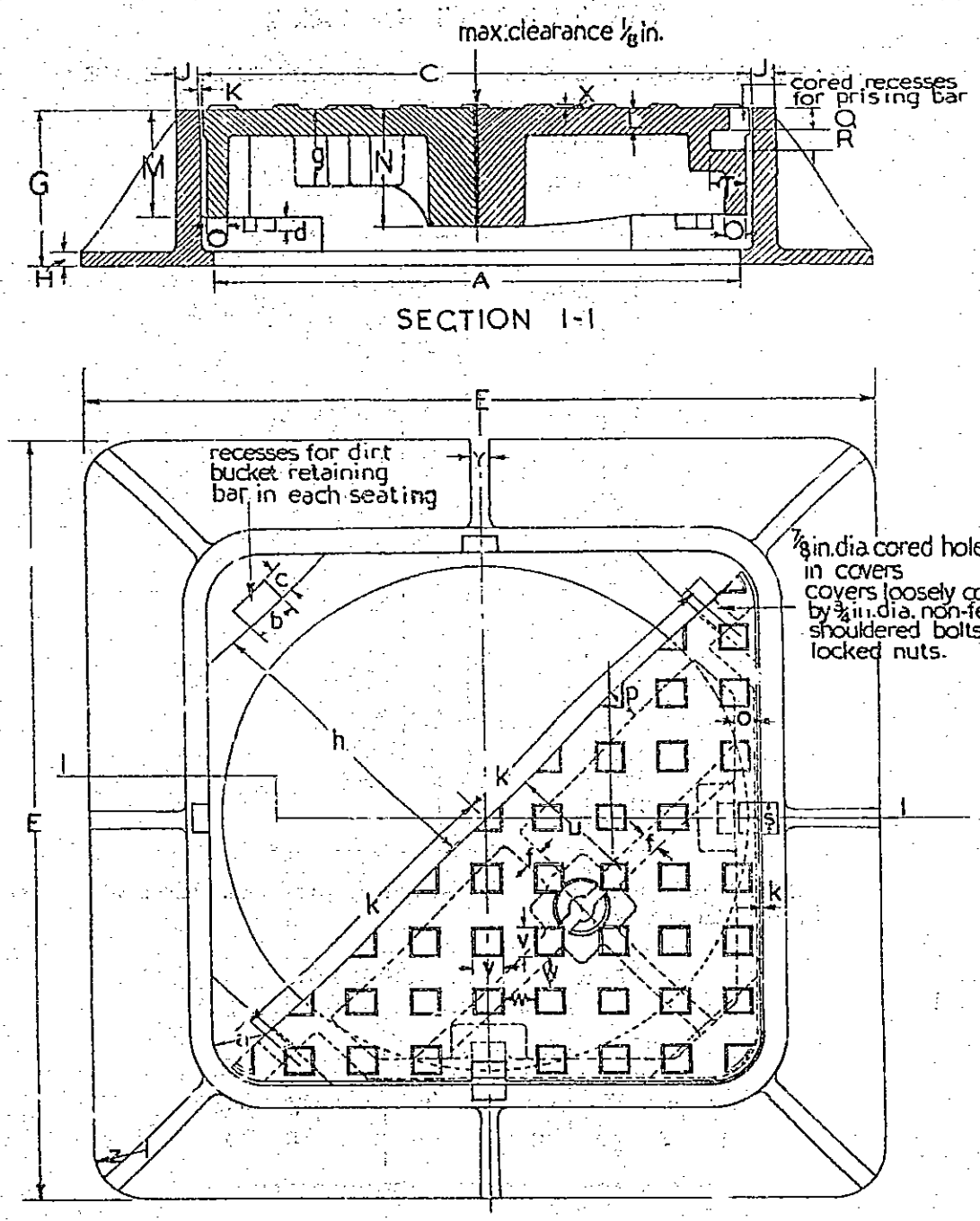

Fig. 1. Grade A (heavy duty) double triangular cover and frame

(For detail of keyhole, see fig. 10)

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TABLE OF SIZES FOR FIG. 2

GRADE A (HEAVY DUTY) SINGLE TRIANGULAR COVER AND FRAME

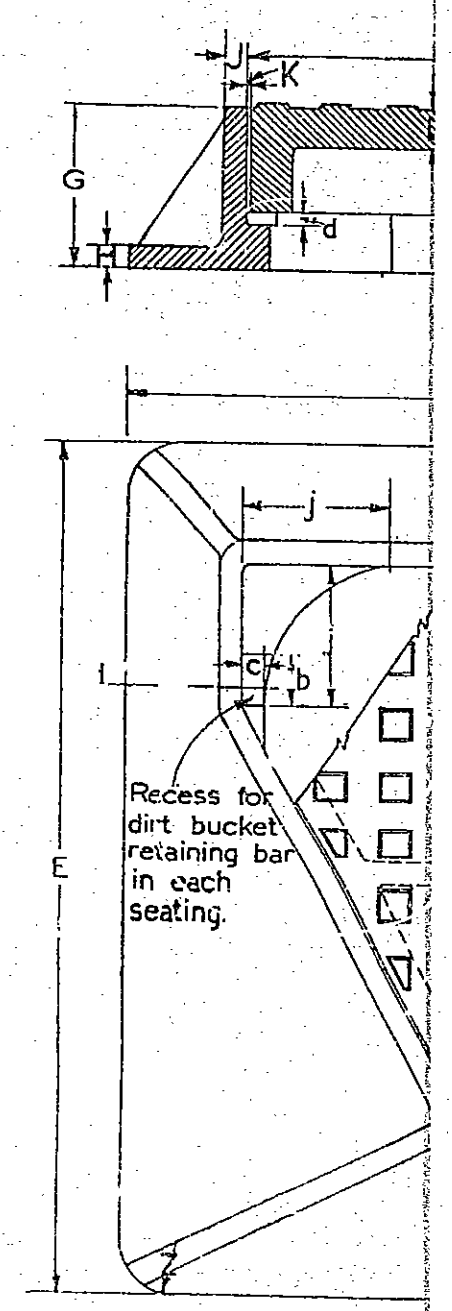
Key letter	Dimension	Key letter	Dimension
	in.		in.
B	19½	T	1⅓
C	22	U	4⅛ approx.
D	22	V	1⅛
E	30	W	*1⅛ to 1 11/16
G	6	X	3/16
H	¾	Y	¾ min. ⅞ max.
J	¾		
K	⅛	Z	2
L	1⅜	b	1¾
		c	¾
M	4		
O	1	d	⅛
P	1⅜	e	1⅜
		f	⅞
Q	1		
R	¾	g	2¾
S	1¼	j	5

NOTE. Similar dimensions on all drawings are given similar reference letters so far as they apply.

APPROXIMATE WEIGHTS

Cover			Frame			Total		
cwt.	qtr.	lb.	cwt.	qtr.	lb.	cwt.	qtr.	lb.
1	3	0	2	1	0	4	0	0

* i.e. 1 to 1½ V.



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