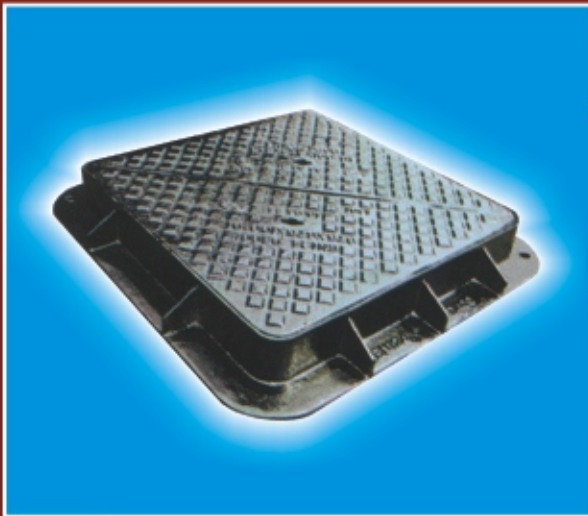




DUCTILE IRON

Manhole Covers, Gratings & Surface Box

BS-EN-124 • IS:1726



Kejrival
CASTINGS LIMITED

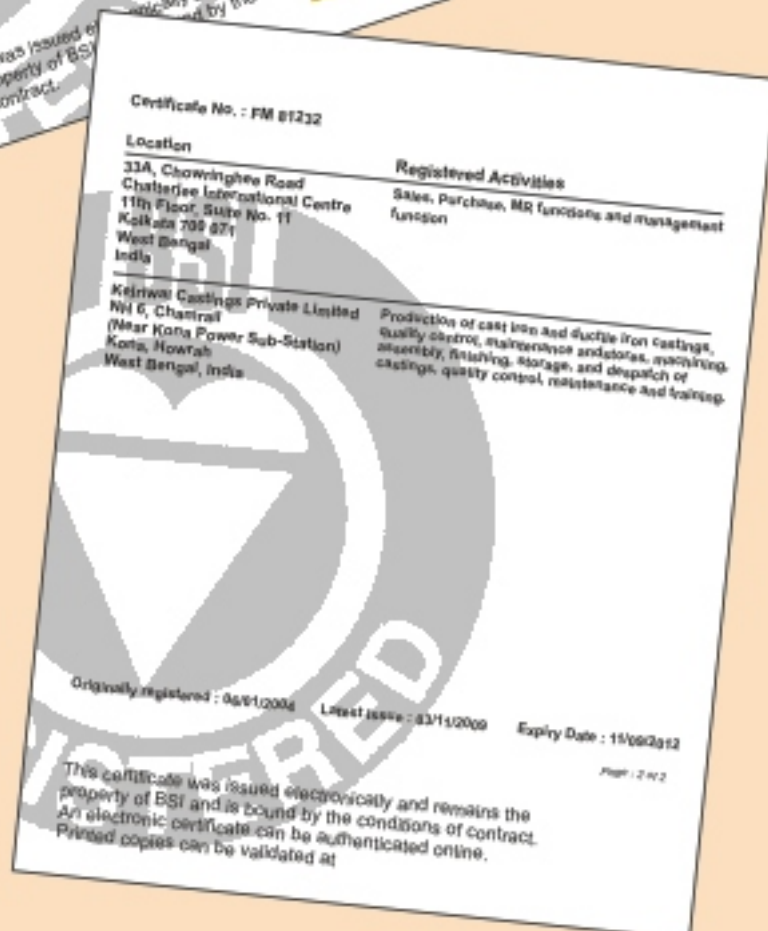


Quality Policy

We are committed to produce
quality Products
**(C.I., D.I., C.S. Valves, Pipes, Fittings,
Manhole Covers, Surface box etc.)**
consistently on schedule to the best
satisfaction of all our customers.

We shall also strive for improvement in
Quality Management System
by establishing and achieving
Quality Objectives
aimed at overall improvement
in our activities for enhanced
customer satisfaction.



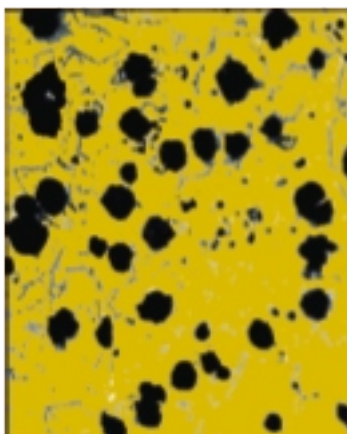




Advancement of Ductile Iron



Photomicrograph of Gray Cast Iron (1000x) showing carbon in the form of graphite flakes.



Photomicrograph of Ductile Cast Iron (1000x) showing carbon in the form of graphite nodules.



Cast Iron has long been the standard material for conveying water and sewage in municipal, utility and industrial piping systems.

The real life expectancy of cast iron pipe is unknown, but is usually estimated at 100 years or more. The oldest operating cast iron main is that at Versailles, France, installed in 1664. In several countries there are members of the Cast Iron Pipe Century Club, a unique organization composed of cities or utilities who have cast iron pipe still in service after 100 years.

Ductile Iron Pipe, a product of advanced metallurgy, offers unique properties for conveying water under pressure, and other piping uses. It combines the physical strength of mild steel with the long life of gray cast iron.

Ductile iron offers the greatest possible margin of safety against service failures due to ground movement and beam stresses. Virtually unbreakable in ordinary service, it also provides increased resistance to breakage caused by rough handling in shipping and installation.

The corrosion resistance of ductile iron pipe has been proved in a wide variety of accelerated tests to be at least the equal of gray cast iron. Ductile iron is produced by adding a closely controlled amount of magnesium alloy to a molten iron of low phosphorous and low sulfur content. The magnesium alloy addition produces a remarkable change in the microstructure by causing the carbon in the iron to assume a spheroidal or nodular shape, (as contrasted to the flake form of graphite in gray cast iron), and at the same time producing a finer grained iron matrix in the surrounding ferrite structure. As a result of this remarkable change, a far stronger, tougher, and ductile material is obtained.

In addition to the benefits of long life, corrosion resistance, high structural strength, and tight joints, ductile iron is also readily machinable, an important requirement in any pipe that must be drilled, tapped or cut.



Introduction

Kejriwal Castings Limited, is the manufacturer with the widest range of products in India, and we have an overriding aim: to be your first choice.

Living through our core values of being customer focused, competitive, and innovative through constant development in manufacturing process, services and our people, we aim to achieve it.

From the very beginning, quality has been the bedrock, on which the *Kejriwal* foundation has stood, and British Standards Institution has certified the quality systems in our factory as confirming to ISO-9001 :2000 standards for manufacture of Ductile Iron and Grey Iron castings for Industrial, general, municipal and sanitary applications.

At *Kejriwal*, traditional moulding skills with indigenous technology has been combined to enable manufacturing of even non standard items and keeping the costs in check as well.

Located at Howrah, a throbbing Industrial Area and twin city of Calcutta, we have easy access to all means of transport, be it rail, road, air or sea. With presence all over India, and in gulf countries, we ensure that we are very near to customer, wherever he may be.

We acknowledge that, it is you, whose support and encouragement has been the single most valuable factor in the success of *Kejriwal* Castings Ltd.



All castings manufactured by *Kejriwal* will comply to the contents of this brochure which itself has been designed to meet the requirements of BS EN 124 and IS-1726.

The journey towards excellence never ends at *Kejriwal*.



Extracts from EN 124:1994

National foreword

EN 124:1994 is a revision of EN 124:1986

This British Standard supersedes BS 497 : Part 1 : 1976, which will be withdrawn in due course.

Classification

Gully tops and manhole tops are divided into the following classes :

A 15, B 125, C 250, D 400, E 600 and F 900.

Place of installation

The appropriate class of manhole top or gully top to be used depends upon the place of installation. The various places of installation have been divided into groups numbered 1 to 6, as listed below.

The figure shows the location of some of these groups in a highway environment. A guide as to which class of manhole top or gully should be used is shown in parentheses for each group. The selection of the appropriate class is the responsibility of the designer. Where there is any doubt, the stronger class should be selected.

Group 1 (min. class A15)

Areas which can only be used by pedestrians and pedal cyclists.

Group 2 (min. class B 125)

Footways, pedestrian areas and comparable areas, car parks or car parking decks.

Group 3 (min. class C250)

For gully tops installed in the area of kerbside channels of roads (as per figure) which when measured from the kerb edge, extend a maximum of 0.5 m into the carriageway and a maximum of 0.2 m into the footway.

Group 4 (min. class D 400)

Carriageways of roads (including pedestrian streets), hard shoulders and parking areas, for all types of road vehicles.

Group 5 (min. class E 600)

Areas imposing high wheel loads, e.g. docks, aircraft pavements.

Group 6 (class F900)

Areas imposing particularly high wheel loads, e.g. aircraft pavements.

Materials

Manhole tops and gully tops

Manhole tops and gully tops with the exception of gratings shall be made from either :

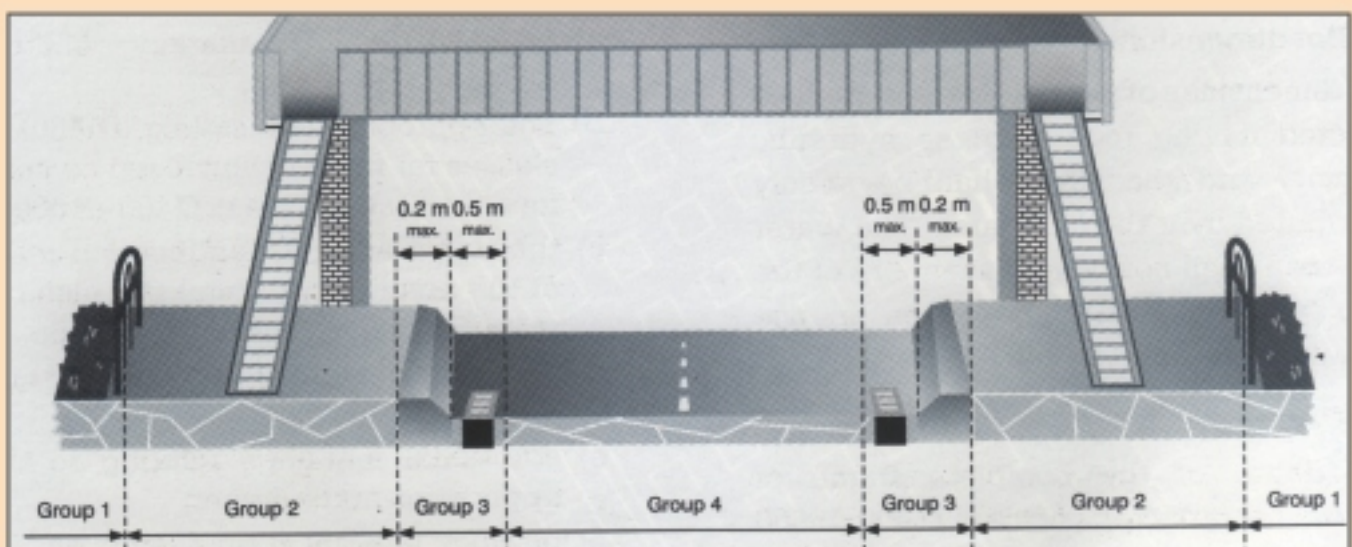
- flake graphite cast iron;
- spheroidal graphite cast iron.

Production, quality and testing

The production, quality and testing of the materials designated below shall comply with the following ISO standards or Euronorms :

Flake graphite cast iron ISO 185 - 1988

Spheroidal graphite cast iron ISO 1083 1987



Typical highway cross-section showing the location of some installation groups



Extracts from EN 124:1994

Design requirement

General

Gully tops and manhole tops shall be free of defects which might impair their fitness for use.

Where there is no detailed specification shown in this standard for any particular requirement, the manufacturer shall state such specification in his documentation.

Clear openings of manhole tops for man entry

The opening of manhole tops designed for man entry shall comply with the safety requirements in force at the place of installation. Generally this is considered to be at least 600 mm diameter.

Depth of insertion

Gully tops and manhole tops of classes D400, E600 and F900 shall have a depth of insertion A (see clause 3, no. 12) of at least 50 mm.

This requirement does not apply if the covers or gratings are made secure in their position against displacement by traffic by a locking device but such device are not included in this standard.

Seatings

The manufacture of gully tops and manhole tops shall be such as to ensure the compatibility of their seatings. For classes D400 to F 900 these seatings shall be manufactured in such a way as to ensure stability and quietness in use. This may be achieved by machining of the contact surfaces, use of cushioning inserts, three-point suspension design or any other appropriate method.

Slot dimensions

The dimensions of slots in gratings shall be selected having regard to the hydraulic capacity and the slots shall be evenly distributed over the clear area. The water way area shall not be less than 30% of the clear area and shall be given in the manufacturer's catalogue.

Frame depth

The depth of the complete frame of manhole or gully tops of class D 400, E 600 and F 900 shall be at least 100 mm.

Testing

Gully tops and manhole tops shall be tested as complete units in their condition of service.

Compliance with the loading requirements for the appropriate class shall be determined by a loading test.

Test Loads

For gully tops and manhole tops with a clear opening equal to or greater than 250 mm, the test load is shown in table 6 for each class. Where the clear opening is less than 250 mm, the test load shall be that shown in table, multiplied by CO/250.

Test Loads	
Class	Test Load kN
A 15	15
B 125	125
C 250	250
D 400	400
E 600	600
F 900	900

Type Testing

Three test specimens shall be tested, to prove that they meet the appropriate requirements.

Testing Procedure

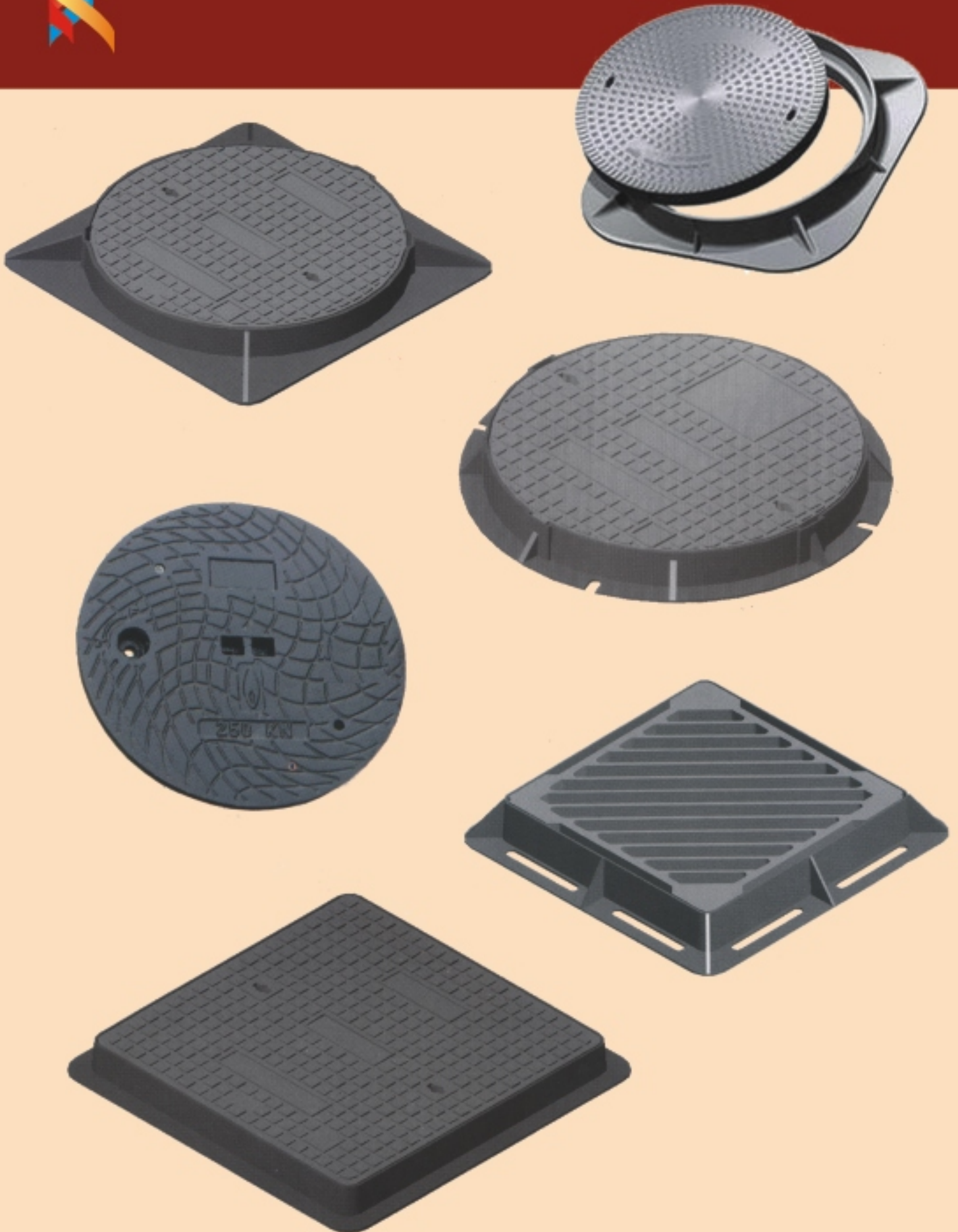
All gully tops and manhole tops shall be submitted to the following tests :

measurement of the permanent set of the cover or grating after the application of 2/3 of the test load.

Marking

All covers, gratings and frames shall bear :

- EN 124 (as the marking of this European Standard);
- The appropriate class (e.g. D 400) or classes for frames which can be used for several classes (e.g. D 400 - E 600);
- the name and/or identification mark of the manufacturer and the place of manufacture which may be in code;
- the mark of a certification body; and may bear;
- additional markings relating to the application or the owner;
- product identification (name and/or catalogue number).





Manhole Covers & Frames EN 124

Class E600 Double Triangular Manhole Covers & Frame

Description	Clear Opening (mm)	Base Size (mm)	Depth (mm)	Weight (kg)
Double Triangular	600 x 600	750 x 750	150	95
Double, Double Triangular	1220 x 675	1370 x 825	150	296

Class D400 Double Triangular Manhole Covers & Frame

Description	Clear Opening (mm)	Base Size (mm)	Depth (mm)	Weight (kg)
Double Triangular	600 x 600	750 x 750	100	75
Double Triangular	600 x 600	750 x 750	150	90
Double Triangular	675 x 675	825 x 825	100	104
Double Triangular	675 x 675	825 x 825	150	119
Double Triangular	750 x 600	900 x 750	100	120
Double Triangular	900 x 600	1050 x 750	100	154
Double, Double Triangular	1220 x 675	1370 x 825	100	210
Double, Double Triangular	1220 x 675	1370 x 825	150	216

Class D400 Single Seal, Solid Top, Manhole Covers & Frame

Description	Clear Opening (mm)	Base Size (mm)	Depth (mm)	Weight (kg)
Single Seal, Soled Top	400 x 400	500 x 500	100	38
Single Seal, Soled Top	500 x 500	600 x 600	100	55
Single Seal, Soled Top	500 x 700	600 x 800	100	80
Single Seal, Soled Top	600 x 600	700 x 700	100	77
Single Seal, Soled Top	800 x 800	900 x 900	100	129
Single Seal, Soled Top	900 x 900	1000 x 1000	100	175
Single Seal, Soled Top	1000 x 1000	1100 x 1100	100	202

Class C250 Single Seal, Solid Top, Manhole Covers & Frame

Description	Clear Opening (mm)	Base Size (mm)	Depth (mm)	Weight (kg)
Single Seal, Soled Top	450 x 450	550 x 550	75	36
Single Seal, Soled Top	600 x 450	690 x 540	75	46
Single Seal, Soled Top	600 x 600	700 x 700	75	58

Class B125 single Seal, Circular Top, Manhole Covers & Frame

Description	Clear Opening (mm)	Base Size (mm)	Depth (mm)	Weight (kg)
Single Seal, Circular Top & Frame	450 Dia	540 Dia	40	18
Circular Top & Square Frame	600 Dia	690 x 690	75	44



Manhole Covers & Frames EN 124

Class B125 Single Seal, Solid Top, Manhole Covers & Frame

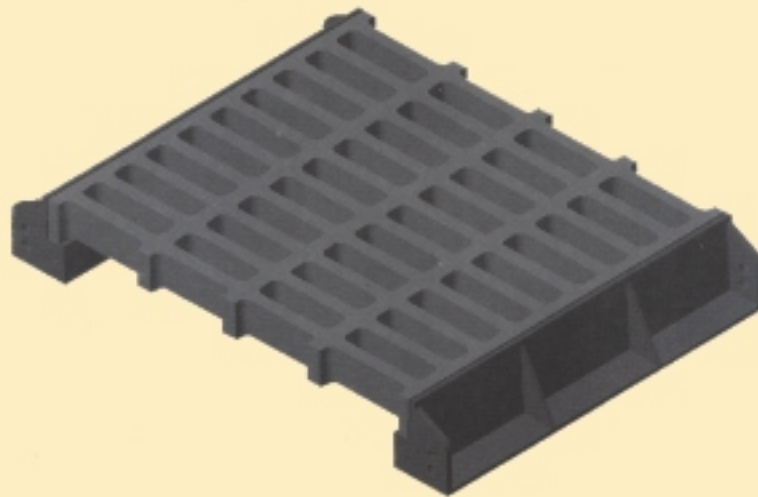
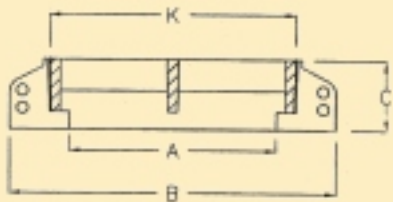
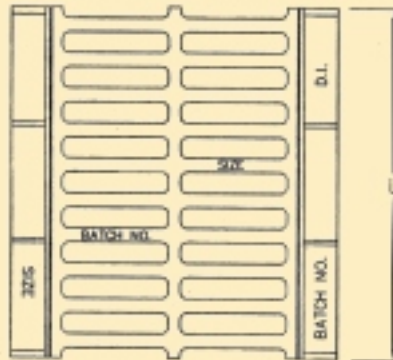
Description	Clear Opening (mm)	Base Size (mm)	Depth (mm)	Weight (kg)
Single Seal, Soled Top	450 x 450	540 x 540	40	20
Single Seal, Soled Top	450 x 450	550 x 550	75	30
Single Seal, Soled Top	600 x 450	690 x 540	40	22
Single Seal, Soled Top	600 x 600	700 x 550	75	32
Single Seal, Soled Top	600 x 600	690 x 690	40	35
Single Seal, Soled Top	600 x 600	700 x 700	75	40
Single Seal, Soled Top	900 x 600	1000 x 700	75	54

Gully Gratings & Frames : EN124

Description	Clear Opening (mm)	Base Size (mm)	Depth (mm)	Weight (kg)
Class D400 Double Triangular Gully Grating & Frame				
Double Triangular Grating	420 x 420	570 x 05	100	38
Double Triangular Grating	420 x 420	570 x 0	150	45
Double Triangular Grating	435 x 435	585 x 525	100	50
Class D400 Hinged Grating & Frame				
Straight bar, Hinged Gully Gate	420 x 420	542 x 495	100	39
Straight bar, Hinged Gully Gate	420 x 420	542 x 495	150	48
Class C250 Double Triangular Gully Grating & Frame				
Double Triangular Grating	445 x 445	530 x 490	75	34
Class C250 Hinged Grating & Frame				
Straight Bar, Hinged Gully Gate	380 x 310	470 x 370	75	19
Straight Bar, Hinged Gully Gate	420 x 420	545 x 520	75	24
Straight Bar, Hinged Gully Gate	450 x 450	545 x 510	75	28
Class C250 Concave Gully Grating & Frame (European)				
Concave Gate	480 x 840	580 x 960	75	70



Gratings EN 124



Options available

- Ductile Iron
- Grey Iron
- Customised markings
- Ventilated covers
- Epoxy powder coating

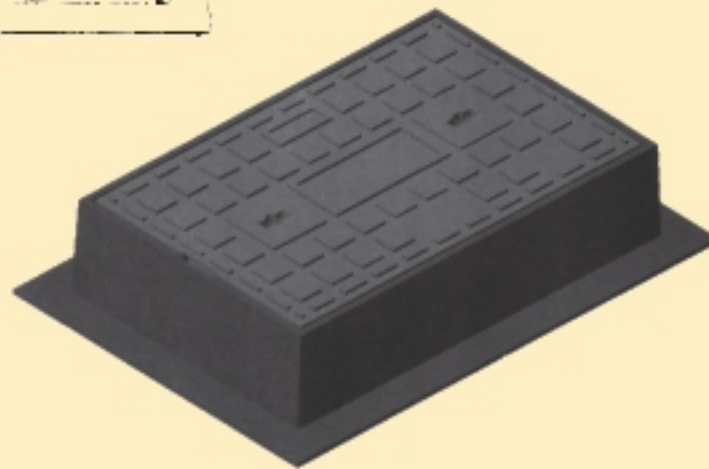
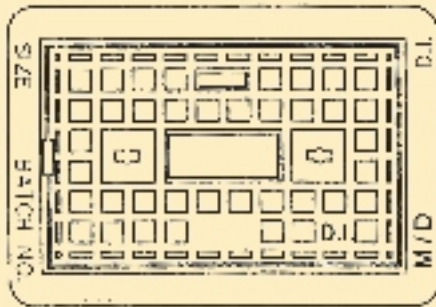
Features

- Non-rock seating
- Black bitumen coated
- Extra heavy duty traffic loading for airports & docks
- Convenient length for ease of use
- Large water way area

Clear Opening (A)	Over Base (B)	Depth (C)	Grating Width (K)	Grating Length (L)	Water Way (cm ²)
300 mm	476 mm	100 mm	338 mm	700 mm	1440
450 mm	650 mm	125 mm	510 mm	700 mm	1990
610 mm	600 mm	125 mm	672 mm	700 mm	2210



Surface Box EN 124



Options available

- Ductile Iron
- Grey Iron
- Customised markings
- Epoxy powder coating

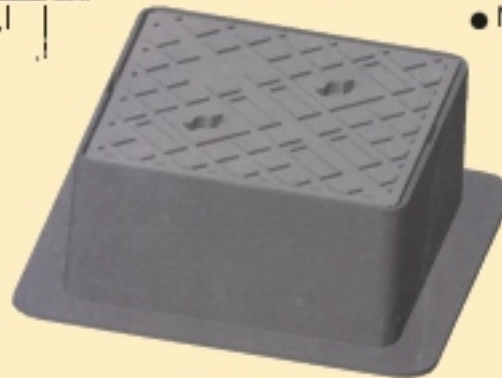
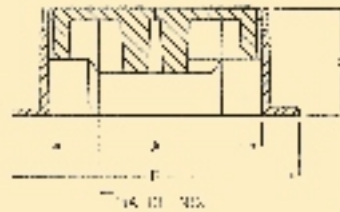
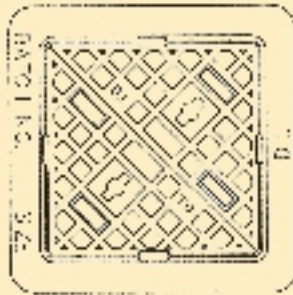
Features

- Non-rock seating
- Black bitumen coated
- Prising slots
- Closed keyholes
- Medium duty for traffic loading
- Non-skid checker design

Clear Opening (A)	Over Base (B)	Depth (C)
380 x 230 mm	530 x 380 mm	75 mm
380 x 230 mm	530 x 380 mm	100 mm
380 x 230 mm	530 x 380 mm	125 mm
430 x 280 mm	550 x 400 mm	75 mm



Surface Box EN 124



Options available

- Ductile Iron
- Grey Iron
- Customised markings
- Security requirements
- Epoxy powder coating

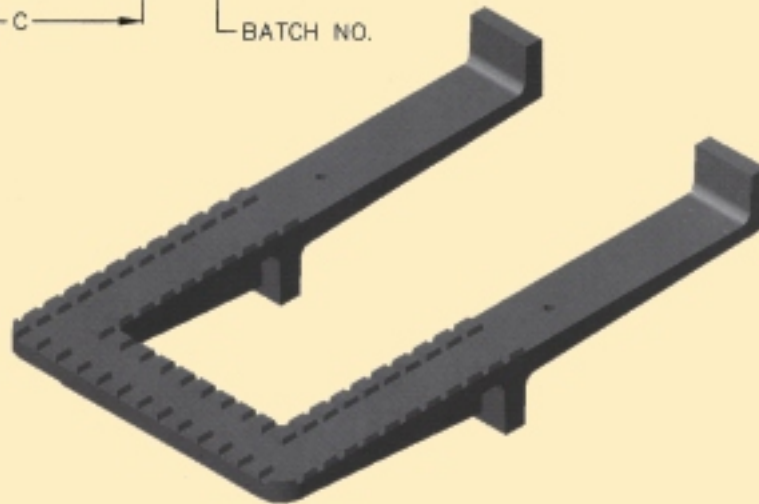
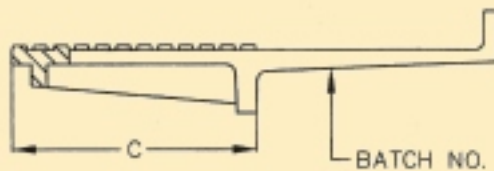
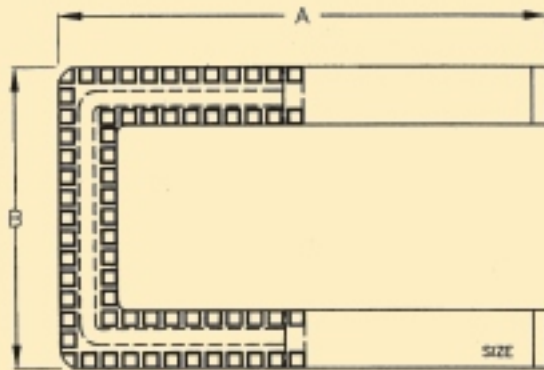
Features

- Non-rock seating
- Black bitumen coated
- Prising slots
- Closed keyholes
- Heavy duty for traffic loading
- Non-skid checker design

Clear Opening (A)	Over Base (B)	Depth (C)
100 x 100 mm	190 x 190 mm	100 mm
150 x 150 mm	225 x 225 mm	100 mm
150 x 150 mm	225 x 225 mm	150 mm
225 x 225 mm	330 x 330 mm	100 mm
300 x 300 mm	405 x 405 mm	75 mm
300 X 300 mm	405 X 405 mm	100 mm
380 x 230 mm	538 x 380 mm	100 mm
380 x 230 mm	538 x 380 mm	125 mm
430 x 280 mm	550 x 450 mm	100 mm



Manhole Steps EN 124



Options available

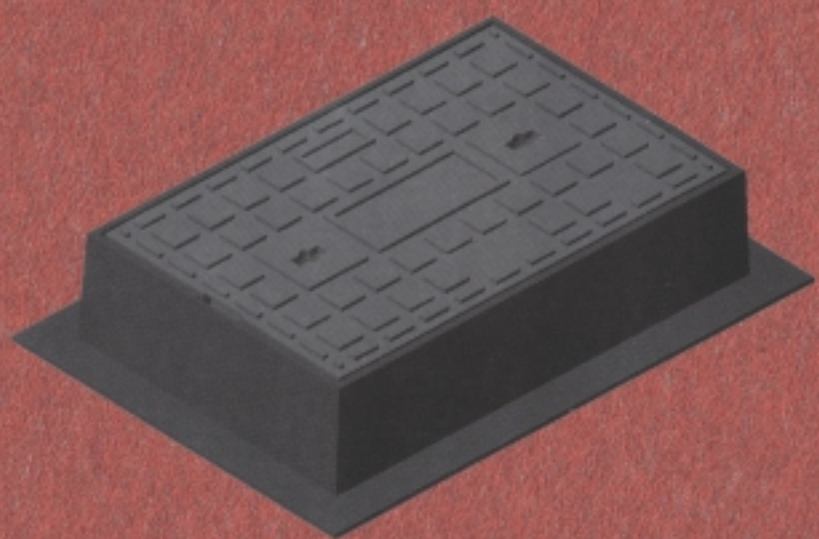
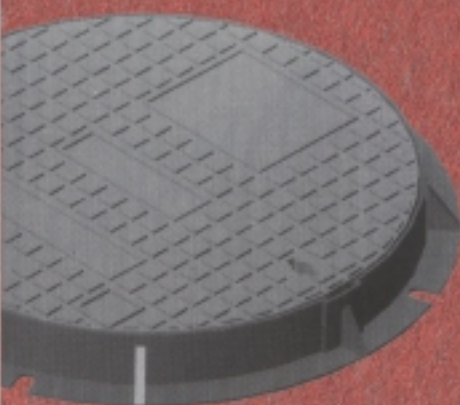
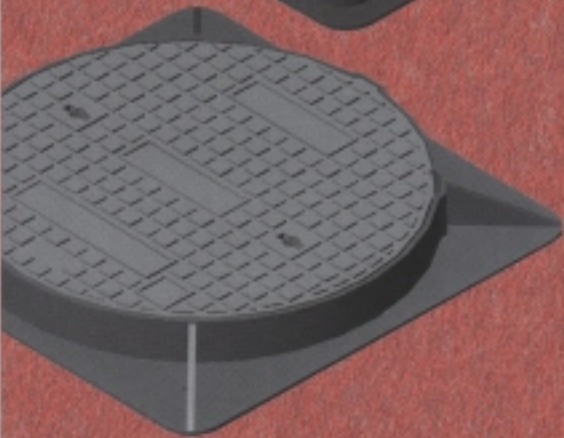
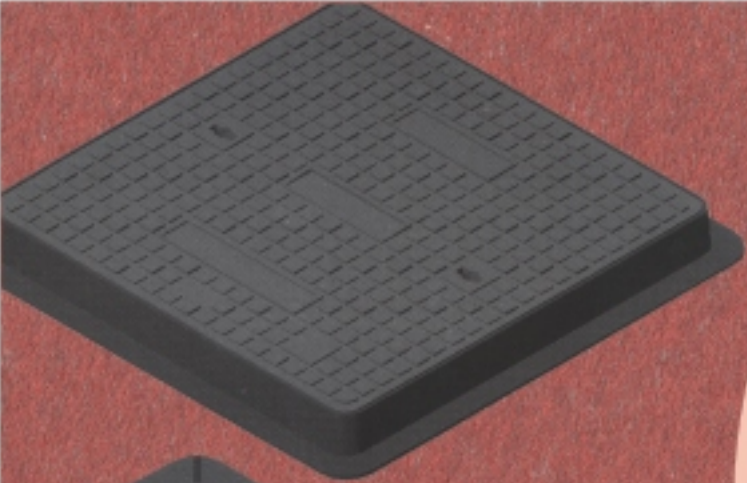
- Ductile Iron
- Grey Iron
- Customised markings
- Epoxy powder coating

Features

- Black bitumen coated
- Non-skid checker design
- Hot dip galvanized

Clear Opening (A)	Overall Width (B)	Terad Length (C)
175 mm	145 mm	125 mm
185 mm	145 mm	125 mm
250 mm	145 mm	125 mm
370 mm	145 mm	125 mm





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