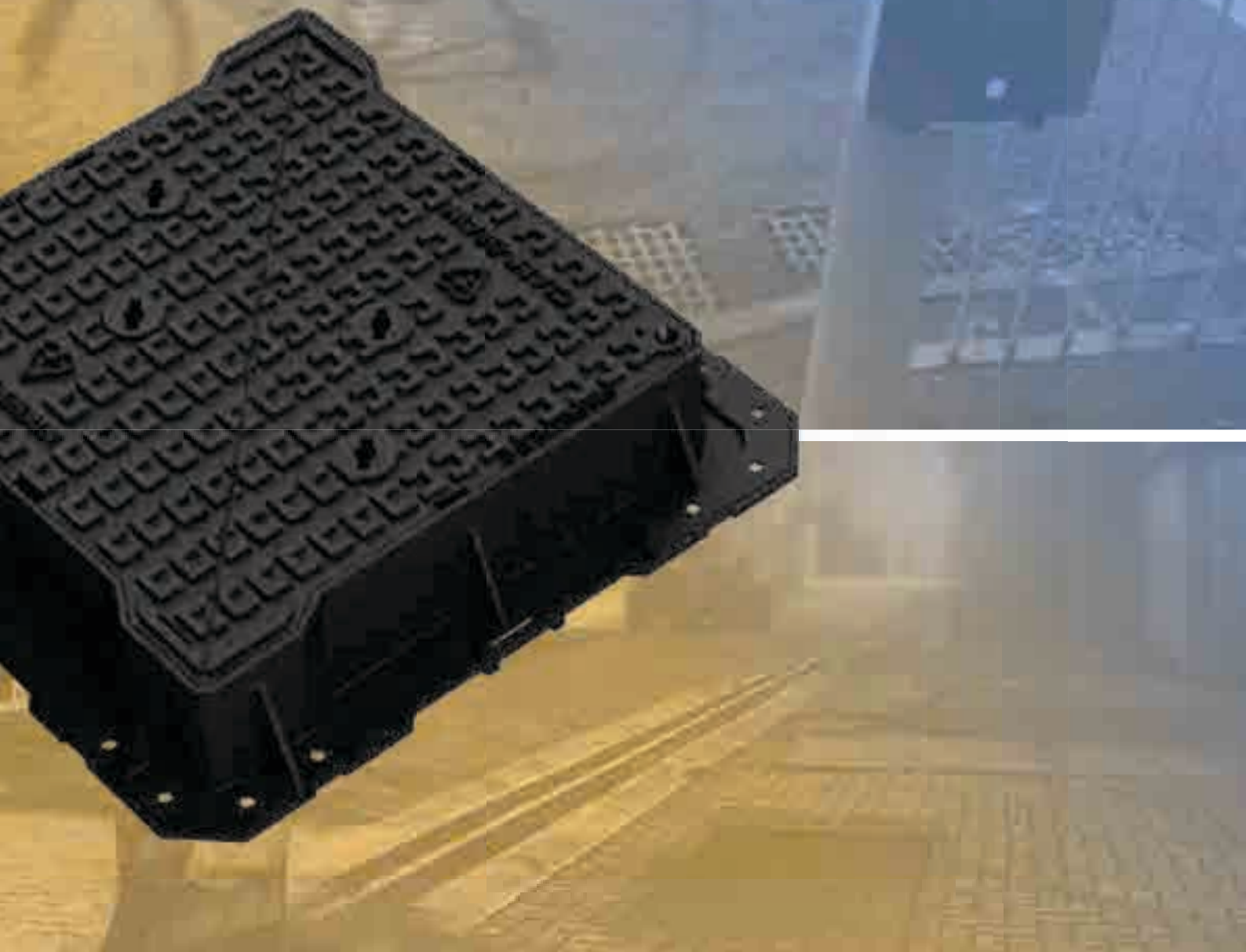
CLARK-DRAIN

THE DRAINAGE COMPANY

DUCTILE IRON ACCESS COVERS AND GRATINGS

PRODUCT SELECTION AND SPECIFICATION GUIDE



CLARK-DRAIN

THE DRAINAGE COMPANY

Foreword

The growth in traffic density is placing greater strain on road networks emphasising the importance of high quality, reliable products in both highways and non-highways applications.

Clark-Drain develops quality products to meet the requirements of both the road maintenance and new build sectors, focusing on long-term durability.

Our wide range of access covers, gully grates, chambers and surface boxes are designed to maximise customer satisfaction, maintain high levels of safety, help manage risk and minimise whole life costs.

This product selection and specification brochure is designed to provide useful information about our ductile iron range, including main features, application options, sizes and accredited loading class.

The brochure eases product selection whilst providing the technical details for Specifiers, Installers and end-users to make informed, accurate decisions.

Ron Clark
Managing Director

CLARK-DRAIN

THE DRAINAGE COMPANY

As a leading supplier of access covers and drainage products, Clark-Drain is committed to innovation and high product performance for a wide variety of construction projects.

We design and develop products which are easy to install, durable and safe offering long-term performance and value for money. Clark-Drain's access covers and drainage products comprise a wide spectrum, from manhole covers and frames, to linear drainage systems, to underground chambers, fittings and fixtures and bespoke access cover solutions.

We manufacture our products in the UK and world-wide using high quality, modern and highly productive technology including automated high pressure moulding, finite element and structural analysis and the latest CNC and robotic methods. In-depth research, design and manufacturing expertise built up over many years' provide a solid platform for product development using the following materials: polymer concrete, galvanised steel, polypropylene and ductile iron.

Clark-Drain is a primary supplier of ductile iron and related products to the UKs housing, commercial and industrial, civil engineering, highways, telecommunications, defence and utilities sectors, including:

- Ductile iron access covers and frames
- Ductile iron gully grates
- Surface boxes
- Access chambers

Contents

The icons explained

At the top of each product page you will find a set of icons that represent the product specification and provide a quick reference guide to product selection. Our aim is to make it as easy as possible for you to choose the appropriate product for your project needs.

APPLICATIONS

Pedestrian

Suitable for use in residential areas with light vehicular traffic

For kerbside use and areas accessed by light commercial vehicles

Non-carriageway use in areas subjected to slow moving vehicles only, including occasional HGV's in car-parks and retail delivery areas. Not suitable for use in carriageways

Suitable for use in carriageways subject to low-density traffic including HGV's – fast or slow moving

Suitable for use in carriageways subject to high-density traffic, fast or slow moving

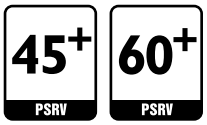
Suitable for areas subject to slow moving heavy loadings, docks, industrial areas

Suitable for areas subject to very heavy wheel loads such as aircraft pavements

FEATURES

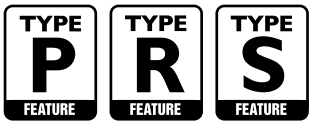
Indicates product is BSI Kitemark Certified to either BS EN124:1994 or BS EN124-2:2015

Includes Load Dispersion Modelling for optimum strength and durability



Indicates skid resistance value (for access cover only). The Design Manual for Roads and Bridges (DMRB) recommends a value of not less than PSRV 45 for low risk sites or PSRV 60 for potentially high risk sites

Includes security features to deter unauthorised access ranging from high security to standard locking depending on product design



Indicates the HA Grating Type (HA 102/00) to help calculate the length of road between gullies that can be drained by grating and kerb outlets

Includes sealing feature which reduces egress of unwanted odours

Includes a grating designed specifically for cycle routes (For gully gratings only)

Includes ergonomic design to aid manual handling. E+ represents a hinged or slide out feature or anti slip keyholes

Our know-how

As road traffic intensifies and weather conditions become more changeable the 'best-fit' specification of access covers has an important role to play in supporting the 'whole life costs' associated with installation, operation and maintenance. Clark-Drain delivers products with proven design to installers, housebuilders, contractors and architects in the UK and worldwide.

With a solid track record of more than fifty years you can be confident in our know-how.

DURABILITY

Product performance is foremost in our minds. We use Finite Element Analysis (FEA) and 3D modelling to analyse the dispersion of dynamic loads from traffic. We load test beyond the parameters set out in BS EN 124, both in a cover's geometric centre and also off centre, to provide certainty that stresses are evenly distributed to minimise the impact on chamber top installations and reduce the risk of early bedding failure.

SAFETY

A key aim for Clark-Drain is to help safeguard its customers, employees and the public. Our long term commitment to safety is central to the design of our products with features such as 'enhanced tread patterns', 'Integral hinge stops' and 'non-slip key holes'.

Our development of access covers which help to prolong surface wear and skid resistance life is a vital consideration for organisations interested in 'value improvement'. Sealing plates, low leak options for flood risk areas and safety grids can also enhance safety on certain ranges. We also provide a comprehensive range of hinged access covers and gully grates to help minimise the risk of injury and promote correct manual handling.

SECURITY

We provide tried and tested security solutions aimed at deterring theft, unauthorised access and vandalism. Factory-fitted locking bolts are a standard feature on many access covers, or can be fitted retrospectively, and our gully grates incorporate a captive hinge. Extra security features built into our security range include steel security plates, tamper proof hinges and concealed padlocking.

COMPLIANCE+

Every product that we make complies with the appropriate regulations. Furthermore, our work with end-clients often combines our design know-how, technical innovation and product expertise to exceed the standard that has been set.

PROVEN PRODUCTS, CUSTOMER SERVICE AND TRAINING

Having designed and developed thousands of access covers we are committed to making sure every one exceeds expectations. It's the knowledge and experience we've accumulated that's enabled us to gain recognition for our product design and customer training.

"Clark-Drain's long experience in the civil engineering market, innovative product range and customer service have been very impressive"

Persimmon Homes

Commitment to quality

Clark-Drain has a quality, health and safety and environmental led focus. We achieve and maintain a comprehensive range of accreditations and certifications providing our customers with the peace of mind that our processes, procedures, technical expertise and services are backed by industry leading accreditations and approved supplier recognition. Our products comply to the following standards, specifications and guidelines:

ISO 9001:2008

All work is carried out under the international quality standard, BS EN ISO9001:2008 that governs our product manufacture. Our whole team is committed to the principles of Total Quality Management.

BS EN 124

Our ductile iron covers are Kitemark certified to BS EN 124 including B125 to F900 load rating capabilities.

JSP 604 PART 2

Our heavy duty chamber access systems complete with security covers are manufactured in accordance with the Ministry of Defence JSP 604 Part 2 – Regulations for the Installation of Information Communication Technology as well as the out-going JSP 480 Manual of Regulations for Installation of Communication & Information Systems.

UVDB VERIFY

Clark-Drain has Category A status with The Utilities Vendor Database (UVDB) Verify scheme against key criteria such as Health and Safety, Environmental controls & procedures and quality.

HA 104/09

Many of our covers are designed to comply with the Highways England 'Design Manual for Roads' for low and high risk areas.

BS 7903

Relevant highways products can be selected safe in the knowledge that they follow the BS 7903 guidelines for highway installations, including the recommendation for 150mm deep that the solid width of the ange shall be a minimum of 75mm, improving frame bedding performance.

HA 102/00

Many of our gully grates comply with the Highways England design guidance for determining the length of road between gullies that can be drained by grating and kerb outlets to BS EN 124 and BS 7903.

BS 5834-2:2011

Our double tri and solid top cover surface boxes are manufactured to meet the British standard specification and are Kitemark certified to BS 5834-2:2011.

BS 750

Our CD 847 FH surface box is manufactured to meet the BS 750 British standard Kitemark.

"Overall, we were looking for a quality drainage product that would be easy to install and that has certainly been the case."

A E Duffield

FM 86830

High quality manufacturing

Clark-Drain is a leading manufacturer of access covers and remains at the forefront of quality design and manufacture. Generations of foundry experience, technical expertise, process control and innovative design all support our product focus and more importantly our customer's needs.

In the manufacture of our products Clark-Drain sources raw materials that include recycled metal to help minimise our impact on the environment. We also invest in foundry processes which use clean production techniques such as automated moulding and pouring and have emission restriction systems in place.

Continuous improvement of our manufacturing performance is another aim we have which ensures that our customers benefit from the results of efficient production methods. This includes areas of quality management which encourages zero tolerance towards product defects.

Our structured operational methods have also proven to be effective whereby we have a 95% Achilles UVDB Verify Category A standard in our safety, quality and environmental practices. Achilles UVDB verify helps utility companies manage risk within their supply chain and comply with EU Procurement Legislation.

Meeting the BS EN 124 standard

Access covers and gully gratings installed in the UK should meet the requirements of the European Standard BS EN 124. This applies to on and off road situations and to all materials. However, we go one step further. We design and test our products to exceed the load test requirements by 10%.

The appropriate class of manhole cover or gully gratings required depends on the place of installation. It is the responsibility of the engineer or designer to ensure that the correct product is specified. Where there is any doubt the stronger class should be selected.

APPLICATION AREA	GROUP	BS EN 124 CLASS	BS EN 124 TEST LOAD
Areas which can only be used by pedestrians and pedal cyclists	1	A15 15kN [1.5T]	1.5 Tonnes
Footways, pedestrian areas and comparable areas, car parks or car parking decks	2	B125 EN124 B125 [12.5T]	12.5 Tonnes
For gully tops installed in the area of kerbside channels of roads which when measured from the kerb edge extend a maximum of 0.5m into the carriageway and a maximum of 0.2m into the footway	3	C250 EN124 C250 [25T]	25 Tonnes
Carriageway and non-carriageway of roads (including pedestrian streets, hard shoulders and parking areas for all types of road vehicles). Please see page 21 for further clarity.	4	D400 EN124 D400 [40T]	40 Tonnes
Areas imposing high wheel loads e.g. docks	5	E600 EN124 E600 [60T]	60 Tonnes
Areas imposing particularly high wheel loads e.g. aircraft pavements	6	F900 EN124 F900 [90T]	90 Tonnes

Product specification under BS EN 124

The European standard BS EN 124-2:2015 applies to gully tops and manhole tops with a clear opening up to and including 1000mm, for installation within areas subjected to pedestrian and/or vehicular traffic.

All our ductile iron covers gratings and frames meet the 2015 standard. Other ductile iron covers with steel or plastic frames comply to the 1994 standard.

The purpose of this standard is to establish definitions, loading classes, materials, design and testing requirements, marking and quality control of gully tops and manhole tops.

This European Standard does not apply to surface boxes which are specified in BS 5834.

BS EN 124 also requires third party certification of gully tops and manhole tops to verify a manufacturers' quality assurance system.

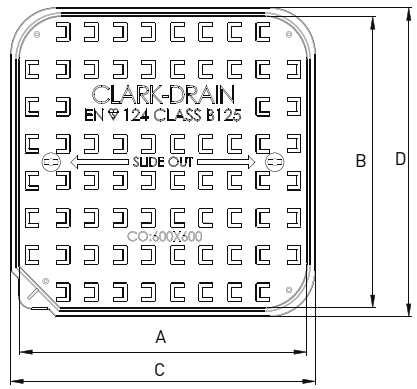
Extending beyond the requirements of BS EN 124, we have also developed an in depth understanding of the dynamic loads applied to modern roads which are in certain areas subjected to more extreme loadings.

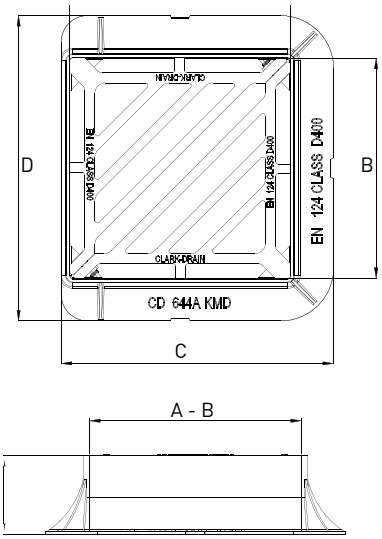
To satisfy this we have our own 'Critical to Quality' programme which we apply to all our ductile iron products.

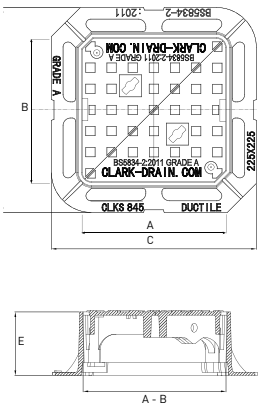
This includes parameters which extend beyond the quality standards expected by BS EN 124 to include off-centre load testing of covers and additional thresholds when testing to destruction.

PRODUCT SIZES

Access covers, gully grates and surface boxes are specified by their clear opening dimensions (A x B), depth (E) and overall size (C x D). The product sizes indicated in the drawings below are referenced on each product page.







TECHNICAL ADVICE

As a UK leading supplier of access covers and gratings, Clark-Drain offers specifiers, end-clients, contractors and merchants with a comprehensive technical advisory service. This is provided free of charge by a team of experienced professionals who can offer telephone assistance and site visits to advise on use and installation methods.

TRAINING

For site operatives and contractors we also provide training and issue information on:

- Product standards and guidance
- Installation guidance
- Product range and history
- Product performance
- Product data sheets

What makes us different?

Clark-Drain is committed to designing and manufacturing products that perform. Clark-Drain's investment in research and development delivers a portfolio of products that benefit from a significant understanding of the distribution of dynamic loads through the bedding material. We call this 'Load Dispersion Modelling' (LDM). It enables us to develop products to conform to legislative requirements but also push the design boundaries to meet most specifications based on what customers are telling us.

For example, a product compliant to EN124 D400 loading is merely making a statement about its static vertical loading capability under laboratory conditions, not that it is suitable for any location with any amount of road traffic. This is because in certain situations, such as roundabouts, road junctions, main roads, areas of high traffic density, etc., the dynamic loading effects exerted by vehicles passing over manhole covers either at high frequency and/or at speed means they are potentially subject to far greater stresses than other locations. This in turn can produce stress fatigue failures either in the manhole cover itself or more likely through the frame and to the bedding. A product's ability to resist a static vertical load of 400kN is only one small part of the equation of what goes into making a product suitable for a given application in terms of durability in service.

With conventional designs the load is concentrated at the corners of the casting creating excess strain on specific areas of the bedding material. LDM technology enables us to purposely design the cover so that dynamic loads are dispersed as evenly as possible away from the corners as illustrated in the FEA image showing red areas.

This has, for example, resulted in the following features being incorporated into our High Max products to improve load dispersion:

Enlarged frame corners increase the pressure bearing area where loads are usually concentrated

Extra-wide flange designs increase the pressure bearing area for improved distribution of loading where the load is concentrated

The thickness of the Inboard cover supports reduce the risk of cover collapse under extreme loads

Bonding ribs significantly improve the bonding of the casting to the bedding material creating a resistance to lateral shift

Vented corner grouting pockets on frame flange to improve bond to bedding mortar in highly stressed areas for durability in service

LDM FEATURE

The LDM technology feature is highlighted on relevant 'At-A-Glance' product pages

DESIGN-LED SOLUTIONS

The causes of most manhole failures are due to incorrect installation, poor product choice or sub-surface defects.

Working closely with end users we monitor how our manhole cover designs interact with the highway. It provides valuable research material which helps us to determine performance-related features and advise on best practice relating to:

- Seating areas
- Flange thickness
- Load tolerances and dispersion
- Bedding mortar
- Build type
- Installation considerations

UNRIVALED EXPERTISE

From our Field Sales Managers to our customer support teams, we invest heavily in our people. With over 50 years of experience working on highways projects across the UK and abroad, their expertise and experience are invaluable. Rest assured we'll deliver the right solution.

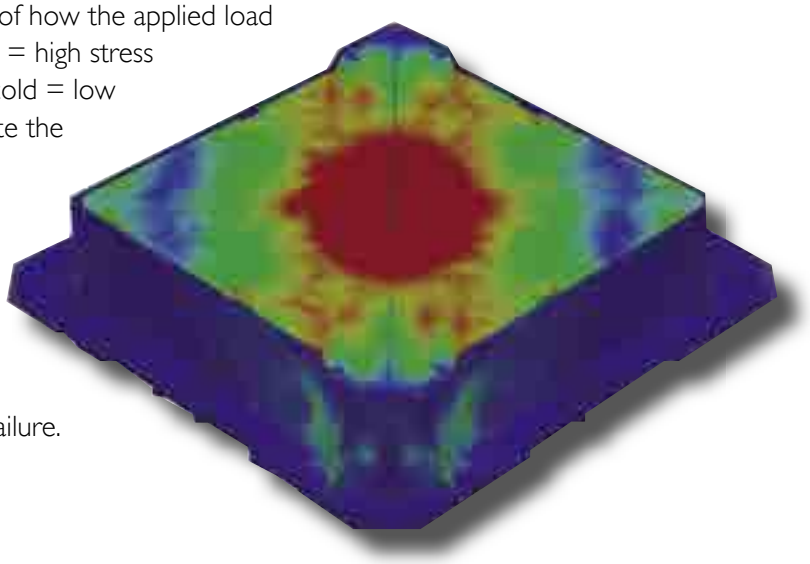
EXPECT MORE WITH CLARK-DRAIN KNOW-HOW

We use the results of our research to reduce the dynamic load stresses applied to products ensuring optimum performance. It ensures, under a variety of traffic conditions, that loadings are distributed as evenly as possible on the bedding, minimising the impact on chamber top installations and reducing the risk of early failure. Our aim is to increase the life of the product and avoid the need for frequent reinstatement.

PRODUCT DESIGN WITH COMPLETE PIECE OF MIND

Our product engineers efficiently optimise and validate each design step using CAD design simulations to ensure quality, performance and safety. Load dispersion models are created in 3D to provide Finite Element Analysis (FEA) to calculate component displacements, strains, and stresses under internal and external loads.

The results of an FEA analysis give a 'heat map' of how the applied load permeates through the product, with red = hot = high stress varying through orange and yellow to green = cold = low stress. In the case of the diagram shown opposite the applied load on the top of the manhole cover can be seen to dissipate substantially as it passes through the structure of the product and most critically result in very low stress around the frame ange. This in turn results in low stress on the frame bedding with a lower likelihood of bedding failure or collapse, the most common cause of manhole failure.



Section 1
Access Covers

Contents

F900 High Max

CD 802AH KMF

FEATURES

- Double triangular
- HA104/09 (High risk areas) compliant
- Non-rock three point suspension
- LDM features
- Closed keyways

OPTIONS

- Badging
- Security locking
- Safety grills
- Security plates

APPLICATIONS

- Suitable for use in areas imposing very heavy wheel loads such as aircraft pavements

Code	BS EN 124 loading class	Clear opening size (mm)	Overall size C x D (mm)	Depth E (mm)	Total weight (kg)
CD 801AH KMF	F900	600 x 600	906 x 906	150	145
CD 802AH KMF	F900	675 x 675	952 x 952	150	172
CD 807AH KMF	F900	750 x 750	1013 x 1013	150	200

TECHNICAL ENQUIRIES:
Tel: +44 (0) 1733 765317

E600 High Max

CD 801AH KME

FEATURES

- Double triangular
- HA104/09 (High risk areas) compliant
- Non-rock three point suspension
- LDM features
- Closed keyways

OPTIONS

- Badging
- Security locking
- Safety grills
- Security plates

APPLICATIONS

- Suitable for use in areas imposing very heavy wheel loads such as ports and dock sides

Code	BS EN 124 loading class	Clear opening size (mm)	Overall size C x D (mm)	Depth E (mm)	Total weight (kg)
CD 801AH KME	E600	600 x 600	813 x 813	150	102
CD 802AH KME	E600	675 x 675	875 x 875	150	110
CD 808AH KME	E600	1200 x 675	1365 x 835	150	200

Achieving the very best access solutions is essential to ensure the success of a project which is why we encourage all our customers to take advantage of our know-how.

D400 High Max Range

As the intensity of road traffic increases and weather conditions become more changeable, specifying and installing iron works which perform well under dynamic loading is key to its longevity in service

The LDM technology feature is highlighted on relevant 'At-A-Glance' product pages

Our research and development into the needs of end-clients such as Local Councils and Water Authorities has helped to determine the High Max design and incorporates our LDM technology. High Max is specifically engineered to cope under heavy, dynamic load stresses by distributing them as evenly as possible on the bedding, reducing the risk of early bedding failure.

High Max features a tread pattern with 25% more density than the minimum specified in EN 124 and 66% more tread height to prolong surface wear and the skid resistant life. The LDM technology enables us to test the dispersion of dynamic loads from traffic on the cover and frame structure so that they affect non-critical areas to aid bedding interaction.

Exceeds the BS EN 124 D400 loading requirement

The Cover and frame is capable of withstanding a 44 tonne test load. Made from high grade ductile iron for optimum strength and durability, High Max meets the needs of HA104/09 (High risk areas).

Silent in use

Non-rock three point suspension using oversized cover corners to direct the loading stresses for best-case frame and bedding interaction which minimises surface noise when trafficked.

Perfectly positioned seating

'Inboard' cover supports reduce the risk of cover collapse under extreme loads.

Exceeds HA104/09 (High risk areas) specification

Tread pattern area has 25% more density than the minimum specified in EN 124 and 66% greater tread height, helping to prolong surface wear and the skid resistant life of the product.

Flexible design

For existing, older installations that need replacement covers the 600x600mm clear opening High Max products incorporate a frame design to accommodate imperial 24"x24" pit sizes.

Easy utility access

Anti-disengagement safety key holes compatible with long handle lifting keys and other mechanical lifting devices supports safe manual handling.

Security

Recessed locators provide bolt locking option.

Durability

The shape of the flange has been optimised to increase the area where the load is concentrated, whilst the flared frame helps to transfer dynamic loads around the corners to minimise the stresses on the bedding. The solid flange meets the minimum 75mm width conforming to BS 7903.

Ease of use

Prising access locators enable covers to be levered from frame when required.

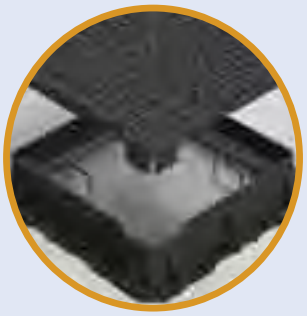
Effective installation

Vented grouting pockets on flange improves bond to mortar and lateral stability of manhole cover in service.

High Max provides a comprehensive range of sealing plates, low leak and safety grids specifically developed to offer safe and secure access to underground services. High Max single frame design offers benefits over traditional covers in that the accessories can be both factory fitted and retrofitted, avoiding the costly purchase of separate or complete replacement products.

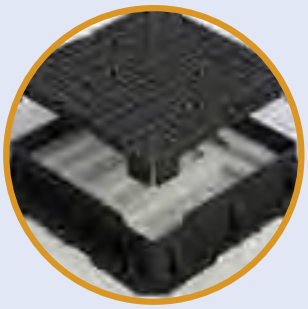
1. Drop in ductile iron low leak plate

Ingress of surface water into a sewer system can add to the problem of surging during periods of increased flows in the drainage system. The High Max low leak plate provides an additional seal to slow down/prevent the ingress of surface water in gully chamber systems.



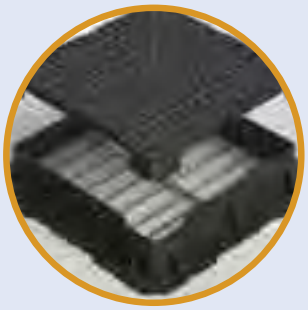
2. Bolt-down steel sealing plate

During heavy rains and subsequent flood conditions, water surges can cause traditional manhole covers to be forced out of the ground, either becoming a hazard or simply leaving a hole in the road - having serious consequences for pedestrian and road users. High Max features a bolt-in sealing plate for added security for areas where flooding may be an issue. High Max sealing plates are specially designed to overcome problems of back pressure experienced in sewer shafts up to 0.5 bar (equivalent to pressure of five metres head of water). Mild-steel galvanised sealing plates are fixed inside the access frame and secured using screws enabling water to dissipate safely through the drain system, while ensuring that the cover doesn't become a hazard for pedestrians or motorists.



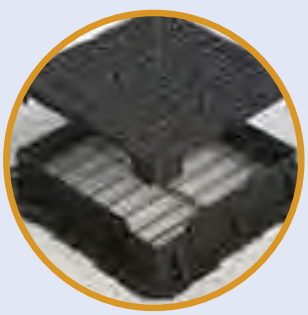
3. GRP sealing plate

Light in terms of manual handling, drop in Glass Reinforced Plastic (GRP) sealing plates act as a protective barrier against the egress of odours and the corrosive properties of sewer gases particularly in countries with hot climates.



4. Safety Grids

A specially designed galvanised steel safety grid rests on the frame lip to prevent accidental man-entry into the chamber during access or maintenance.



5. Security grills (Prisons)

Fabricated medium to heavy duty high security steel hinged and locking grills and frames can be used in highly sensitive prison areas as a second level security barrier against unauthorised entry into and out of access chambers. They are designed and manufactured for all categories of HM Prison contracts with design variations to suit category A, B and C security levels.

D400 High Max

CD 901AH KMD

FEATURES

- Double triangular cover
- HA104/09 (High risk areas) compliant
- Non-rock three point suspension
- Compliant to BS 7903
- Closed safety keyways

(For further features see pages 18+19)

OPTIONS

- Badging
- Security locking
- Safety grills
- Security plates

APPLICATIONS

- Suitable for use in carriageways subject to high-density traffic, fast or slow-moving areas

Code	BS EN 124 loading class	Clear opening size (mm)	Overall size C x D (mm)	Depth E (mm)	Total weight (kg)
CD 901H KMD	D400	600 x 600	847 x 847	100	104
CD 901AH KMD	D400	600 x 600	851 x 851	150	115
CD 902H KMD	D400	675 x 675	915 x 915	100	125
CD 902AH KMD	D400	675 x 675	925 x 925	150	137

PLEASE VISIT OUR WEBSITE:
www.clark-drain.com
To download technical specifications or to request copies of our brochures

Not all D400s are created equal

On UK busy roads a product compliant to EN124 D400 loading is merely making a statement about its static vertical loading capability under laboratory conditions, not that it is suitable for any location with any amount of road traffic.

This is because in certain situations, such as roundabouts, road junctions, main roads, areas of high traffic density, etc., the dynamic loading effects exerted by vehicles passing over manhole covers either at high frequency and/or at speed means they are potentially subject to far greater stresses than other locations. At Clark-Drain we recognise that a static vertical load of 40 Tonnes (400kN) is only one small part of the equation for a product's suitability in terms of durability in service.

To ensure the right products are specified and selected we provide 3 types of D400 products marked with the following icon on each product page to aid selection:

Non-carriageway D400 products (e.g. CD 701 KMD, CD 1659 KMD, etc.)
Suitable for use in areas subjected to slow-moving vehicles only, including occasional HGVs. Car-parks, cul-de-sacs, retail delivery areas, private access roads, etc. Not suitable for use in carriageways.

Carriageway D400 products (e.g. CD 701H KMD, CD 695H KMD, etc.)
Suitable for use in carriageways subject to low-density traffic including HGVs, fast or slow-moving.

Heavy-duty D400 products (e.g. CD 901H KMD, CD 902H KMD, etc.)
Suitable for use in carriageways subject to high-density traffic, fast or slow-moving.

Project
A12
Product
CD 901H KMD

D400 Multi Tri

CD 694AH KMD

FEATURES

- Multi triangular cover
- Non-rock three point suspension
- HA104/09 (Low risk areas) compliant
- Closed keyways

OPTIONS

- Badging
- Security locking
- Safety grills
- Security plates

APPLICATIONS

- Suitable for use in carriageways subject to low-density traffic, fast or slow moving areas

Code	BS EN 124 loading class	Clear opening size (mm)	Overall size C x D (mm)	Depth E (mm)	Total weight (kg)
CD 693H KMD	D400	1200 x 675	1345 x 820	100	145
CD 693AH KMD	D400	1200 x 675	1374 x 850	150	160
CD 694AH KMD	D400	1800 x 675	1940 x 820	150	260

D400 Double Tri (Non-Carriageway)

CD 701 KMD

FEATURES

- Double triangular cover
- Non-rock three point suspension
- Closed keyways

OPTIONS

- Badging
- Security locking
- Safety grills
- Security plates

APPLICATIONS

- Suitable for use in non-carriageway areas subjected to slow moving vehicles only, including occasional HGV's, e.g. Car-parks, cul- de-sacs and retail delivery areas

Code	BS EN 124 loading class	Clear opening size (mm)	Overall size C x D (mm)	Depth E (mm)	Total weight (kg)
CD 770 KMD	D400	300 x 300	450 x 450	100	32
CD 755 KMD	D400	450 x450	550 x 550	100	38
CD 756 KMD	D400	600 x 450	737 x 587	100	50
CD 701 KMD	D400	600 x 600	728 x 728	100	60
CD 701A KMD	D400	600 x 600	750 x 750	150	70
CD 1659 KMD	D400	675 x 675	813 x 813	100	76
CD 1659A KMD	D400	675 x 675	821 x 821	150	85

D400 Double Tri

CD 701AH KMD

FEATURES

- Double triangular cover
- Non-rock three point suspension
- HA104/09 (Low risk areas) compliant
- Closed keyways

OPTIONS

- Badging
- Safety grills
- Security locking
- Security plates

APPLICATIONS

- Suitable for use in carriageways subject to low-density traffic including HGVs, fast or slow moving

Code	BS EN 124 loading class	Clear opening size (mm)	Overall size C x D (mm)	Depth E (mm)	Total weight (kg)
CD 701H KMD	D400	600 x 600	746 x 746	100	62
CD 701AH KMD	D400	600 x 600	768 x 768	150	74
CD 1659H KMD	D400	675 x 675	813 x 813	100	74
CD 1659AH KMD	D400	675 x 675	824 x 824	150	88
CD 750H KMD	D400	750 x 600	880 x 730	100	84
CD 750 AH KMD	D400	750 x 600	915 x 765	150	94
CD 753H KMD	D400	750 x 750	910 x 910	100	110
CD 751H KMD	D400	900 x 900	1050 x 1050	100	155
CD 752H KMD	D400	900 x 600	1054 x 754	100	105
CD 752AH KMD	D400	900 x 600	1065 x 765	150	118

D400 Multi Tri (Hinged)

CD 695H KMD

FEATURES

- Non-rock three point suspension
- HA104/09 compliant (Low risk areas)
- Closed keyways

OPTIONS

- Badging
- Security locking
- Safety grills
- Security plates

APPLICATIONS

- Suitable for use in carriageways subject to low-density traffic in fast or slow moving areas

Code	BS EN 124 loading class	Clear opening size (mm)	Overall size C x D (mm)	Depth E (mm)	Total weight (kg)
CD 695H KMD	D400	1500 x 750	1633 x 898	100	235

D400 Hinged

Making the checking and maintenance of underground structures and services as routine and safe as possible can save operators lost time and cost.

The Clark-Drain D400 hinged cover has been specifically developed to offer enhanced manual handling and health and safety benefits. The ergonomic design provides quick, easy and safe access to below ground utilities without reducing performance.

Safe operation

Hinge design reduces the effort required to lift the covers and the risk of manual handling injuries

Integral hinge stop at 90° when in open position prevents accidental closing

Each cover opens to 105° for optimum access

Hinge is designed for easy cover removal when moved to the 90° position

Improved bedding performance

Offset cover design distributes the load away from the corners onto the side of the frame

Durable installation

Three point suspension for non-rock stability and quietness in busy traffic

Exceeds the BS EN 124 loading requirement

D400 loading is Kitemark certified to 44 tonne test load.

Safe product supply

Banding locators provide stability when palletised

D400 Hinged Double Tri

CD 1660H KMD

FEATURES

- Double triangular hinged cover
- Non-rock three point suspension
- HA104/09 (Low risk areas) compliant
- Closed keyways

APPLICATIONS

- Suitable for use in carriageways subject to low-density traffic including HGVs, fast or slow moving

Code	BS EN 124 loading class	Clear opening size (mm)	Overall size C x D (mm)	Depth E (mm)	Total weight (kg)
CD 1660H KMD	D400	675 x 675	813 x 813	100	105
CD 1664AH KMD	D400	900 x 600	1084 x 774	150	120
CD 1667AH KMD	D400	900 x 900	1075 x 1075	150	170

D400 Hinged Circular

CD 705 KMD

FEATURES

- Circular solid top cover
- Fitted with EPDM gasket to prevent movement/noise in service
- Integral turn-catch lock (supplied with lock and lift key)

APPLICATIONS

- Suitable for use in non-carriageway locations

Code	BS EN 124 loading class	Clear opening size (mm)	Overall size C x D (mm)	Depth E (mm)	Total weight (kg)
CD 705 KMD	D400	600 diameter	820 diameter	100	55

D400 Solid Top

CD D600H-DSL

FEATURES

- Double seal design
- Locking screws for security and stability in use
- Closed keyways

APPLICATIONS

- Suitable for use in busy built up areas, bus depots, car parks, petrol stations, municipal maintenance facilities and eet fueling sites

Code	BS EN 124 loading class	Clear opening size (mm)	Overall size C x D (mm)	Depth E (mm)	Total weight (kg)
CD D600H-DSL	D400	600 x 600	830 x 810	100	92

Seal requires 0.75kg of manhole grease (CD 285 sold separately)

D400 Recessed

CD D630J-DSL

FEATURES

- Discreet locking screws
- Double seal design
- Closed keyways

APPLICATIONS

- Suitable for use in busy built up areas, bus depots, car parks, petrol stations, municipal maintenance facilities and eet fuelling sites

Code	BS EN 124 loading class	Clear opening size (mm)	Overall size C x D (mm)	Depth E (mm)	Total weight (kg)
CD D630J-DSL	D400	600 x 600	800 x 800	125	94

Seal requires 0.75kg of grease (CD 285 sold separately)

B125 Solid Top

CD 779 KMB

FEATURES

- One piece solid top cover
- Lift out cover design
- Closed keyways

OPTIONS

- Badging
- Security locking

APPLICATIONS

- Suitable for use in pavements and driveways

Code	BS EN 124 loading class	Clear opening size (mm)	Overall size C x D (mm)	Depth E (mm)	Total weight (kg)
CD 779 KMB	B125	600 x 450	710 x 570	75	44
CD 778 KMB	B125	600 x 600	760 x 760	75	47
CD 752 KMB	B125	900 x 600	990 x 690	45	56

B125 Circular (Skeletal Frame)

CD 759 KMB

FEATURES

- One piece solid top cover
- Lift out cover design
- Closed keyways

OPTIONS

- Badging
- Security locking

APPLICATIONS

- Suitable for use in pavements and driveways

Code	BS EN 124 loading class	Clear opening size (mm)	Overall size C x D (mm)	Depth E (mm)	Total weight (kg)
CD 759 KMB	B125	600 diameter	680 x 680	40	32

B125 Slide Out

CD 777 KMB

FEATURES

- One piece solid top cover
- Slide out design to reduce manual handling concerns
- Closed keyways

OPTIONS

- Badging
- Security locking

APPLICATIONS

- Suitable for use in pavements and driveways

Code	BS EN 124 loading class	Clear opening size (mm)	Overall size C x D (mm)	Depth E (mm)	Total weight (kg)
CD 761 KMB	B125	450 x 450	510 x 510	40	20
CD 762 KMB	B125	600 x 450	662 x 512	40	26
CD 777 KMB	B125	600 x 600	663 x 663	40	34
CD 780 KMB	B125	675 x 675	760 x 760	40	49
CD 722 KMB	B125	750 x 600	820 x 668	40	45

B125 Slide Out (Single Seal)

CD 853 KMB

FEATURES

- One piece solid top cover
- Slide out design to reduce manual handling concerns
- Single seal for odour prevention
- Close keyways

OPTIONS

- Badging
- Security locking
- Safety grills
- Security plates

APPLICATIONS

- Suitable for use in pavements and driveways

Code	BS EN 124 loading class	Clear opening size (mm)	Overall size C x D (mm)	Depth E (mm)	Total weight (kg)
CD 877 KMB	B125	600 x 600	720 x 720	75	42
CD 853 KMB	B125	750 x 750	850 x 830	40	57

CD 877 KMB seal requires 0.5kg of grease / CD 853 KMB seal requires 0.6kg of grease (CD 285 sold separately)

B125 Square to Round

CD 761SR KMB+R

FEATURES

- Standard locking bolts
- Slide out design reduces manual handing concerns
- Chamber reducer cuts clear opening size from 450m to 350mm, for use when chamber depth is greater than 1.2m
- Clear opening reducer lessens risk of entrapment as set out in Part H of the Building Regulations
- Closed keyways

OPTIONS

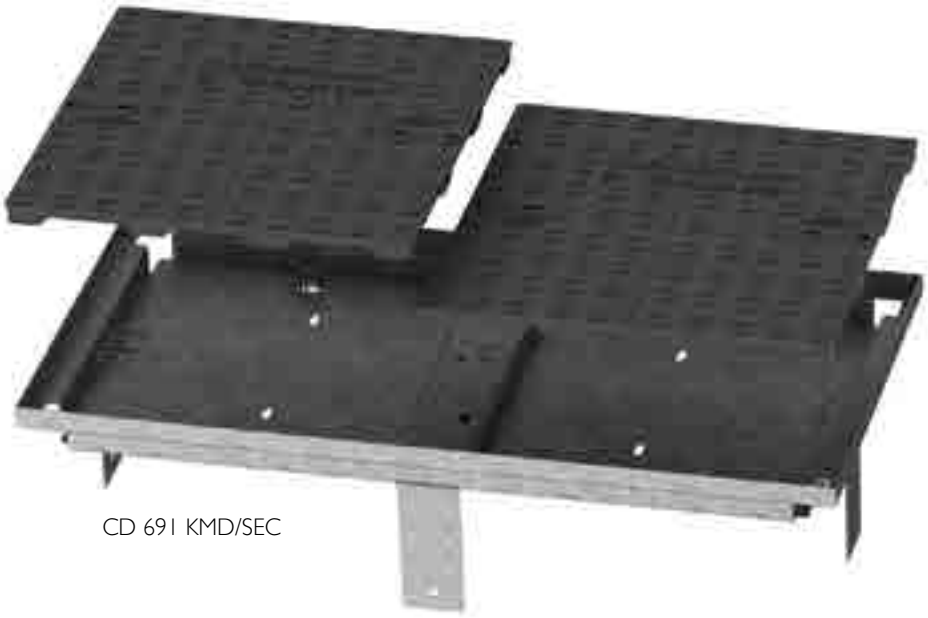
- High security bolts

APPLICATIONS

- Suitable for use by slow moving driveway traffic/ ideal for tarmac areas in driveways and footpaths

Code	BS EN 124 loading class	Clear opening size (mm)	Overall size C x D (mm)	Depth E (mm)	Total weight (kg)
CD 761SR KMB+R	B125	450 x 450	507 x 507	30	22

B125 Slide Out (Steel Frame with Inner Security)



CD 691 KMD/SEC

FEATURES

- Two part ductile iron manhole cover with galvanised steel frame
- Slide out design reduces manual handing concerns
- Closed keyways

OPTIONS

- Badging
- Security locking

APPLICATIONS

- Suitable for use in pavements and driveways

Code	BS EN 124 loading class	Clear opening size (mm)	Overall size C x D (mm)	Depth E (mm)	Total weight (kg)
CD 691 KMB/SEC	B125	1200 x 600	1290 x 651	86.5	92

B125 Solid Top (Polypropylene Frame)

FEATURES

- Circular and square frame options to fit 300 PPIC chambers
- 15° tilt action enables easy leveling on sloped surfaces
- Enhanced slip resistant tread pattern
- Closed keyways

APPLICATIONS

- Suitable for use in driveways

Code	BS EN 124 loading class	Clear opening size (mm)	Overall size C x D (mm)	Depth E (mm)	Total weight (kg)
CD 1649 KMB	B125	300 diameter	388 diameter	30*	7.5
CD 1649 KMB/SR	B125	300 diameter	380 x 380	30*	8

*Depth. inc. locating ring is 80mm

CD U355

CD U354

CD U353

CD U351

PPIC COMPATIBILITY

- CD 1649 KMB and CD 1649 KMB/SR are designed to locate on top of our 300mm diameter polypropylene inspection chamber.

COMPATIBLE WITH:

- 320mm diameter PPIC 190mm riser complete with seal (Product code: CD U354)
- 320mm diameter PPIC 400mm riser complete with seal (Product code: CD U355)
- 320mm diameter 3 inlet PPIC base (Product code: CD U351)
- 320mm diameter 5 inlet PPIC base (Product code: CD U353)

PLEASE VISIT OUR WEBSITE:
www.clark-drain.com
To download technical specifications or to request copies of our brochures

B125 Circular Solid Top

CD 1657 KMB

FEATURES

- One piece solid top cover
- Fits the majority of 450mm diameter chambers
- Closed keyways

OPTIONS

- Skid resistance coating

APPLICATIONS

- Suitable for use in pavements and driveways

Code	BS EN 124 loading class	Clear opening size (mm)	Overall size C x D (mm)	Depth E (mm)	Total weight (kg)
CD 1657 KMB	B125	450 diameter	550 diameter	30	16.5

B125 Solid Top (Double Seal)

CD B400B-DSL

FEATURES

- Solid top cover
- Double seal design
- Locking screws
- Closed keyways

APPLICATIONS

- Suitable for use in pavements and driveways

Code	BS EN 124 loading class	Clear opening size (mm)	Overall size C x D (mm)	Depth E (mm)	Total weight (kg)
CD B400B-DSL	B125	450 x 450	590 x 590	40	31

15kN Solid Top

CD62

FEATURES

- Solid top cover
- Integral lifting keyway

OPTIONS

- Skid resistant coating

APPLICATIONS

- For pedestrian use only

Code	BS EN 124 loading class	Clear opening size (mm)	Overall size C x D (mm)	Depth E (mm)	Total weight (kg)
CD 62	N/A	600 x 450	678 x 528	27	22
CD 12	N/A	600 x 600	678 x 678	27	28

Project
Blackburn Bus Station
Product
CD D630J-DSL

Section 2
Gully Grates

Contents

Understanding the waterway

Safety, durability and cost efficiency are important criteria when choosing gully grates for today's busy roads. Product features such as taper-lock frames, captive hinges and reversible grates aid performance and lead to the reduction of maintenance or replacement costs.

Clark-Drain also designs and produces gully grates to be highly efficient in clearing waterways as well as providing additional functional benefits which help improve operator safety and asset security.

SPECIFYING PRODUCTS BY GRATING TYPE – HA102/00

The HA102/00 section of the Highways England Design Manual for Roads & Bridges provides a general guide to determining the length of road between gullies that can be drained by grating and kerb-side outlets to BS EN 124.

It takes into account the hydraulic design of road gratings and kerb inlets considering the ow of water parallel to the kerb and the efficiency of the grating in collecting this ow.

To help make product selection easy our HA102/00 compliant gully grates follow the recommendation outlined in the advice note using the method of classifying gratings based on their hydraulic characteristics – Types P, Q, R, S or T in decreasing hydraulic capacity. The advantage of this approach is that the Designer or Specifier is able to specify a grating type and be sure of achieving the required hydraulic performance based on their grating type calculations.

D400 is also specified as the minimum loading class in HA104/09.

Project
Broadway Precinct, Peterborough
Product
CD 231 KMD

D400 Double Tri (3-sided flange)

CD 644 KMD

FEATURES

- Non-rock 3 point suspension
- 3-Sided ange for installing against kerbs
- Compliant to the design requirements of Highways England DMRB HA104/09 for Gully Tops and HA102/00

APPLICATIONS

- Suitable for use in carriageway kerbside and commercial/industrial areas

Code	BS EN 124 loading class	Clear opening size A x B (mm)	Overall size C x D (mm)	Depth E (mm)	Waterway area (cm^2)	HA grating type (HA102/00)	Total weight (kg)
CD 644 KMD	D400	415 x 415	570 x 505	100	1076	R	32
CD 644A KMD	D400	415 x 415	576 x 514	150	1076	R	40
CD 502 KMD	D400	400 x 440	550 x 527	100	1208	R	34
CD 732 KMD	D400	600 x 600	750 x 690	100	2203	P	65

D400 Double Tri (4-sided flange)

CD 732H KMD

FEATURES

- Non-rock 3 point suspension
- 4-Sided ange
- Compliant to the design requirements of Highways England DMRB HA104/09 for Gully Tops and HA102/00

APPLICATIONS

- Suitable for use in carriageway/highways and commercial/industrial areas

Code	BS EN 124 loading class	Clear opening size A x B (mm)	Overall size C x D (mm)	Depth E (mm)	Waterway area (cm^2)	HA grating type (HA102/00)	Total weight (kg)
CD 732H KMD	D400	600 x 600	748 x 748	100	2203	P	68

D400 Hinged

CD 178 KMD

FEATURES

- Captive hinge design to deter thieves
- 'Taper-Lock' grating design to ensure non-rock
- Integral lever point to aid opening
- Compliant to the design requirements of Highways England DMRB HA104/09 for Gully Tops and HA102/00

APPLICATIONS

- Suitable for use in carriageway kerbside and commercial/industrial areas

Code	BS EN 124 loading class	Clear opening size A x B (mm)	Overall size C x D (mm)	Depth E (mm)	Waterway area (cm^2)	HA grating type (HA102/00)	Total weight (kg)
CD 178 KMD	D400	385 x 317	520 x 402	100	750	N/A	22
CD 180 KMD	D400	430 x 370	570 x 459	100	994	S	30
CD 180 KMDL†	D400	430 x 370	570 x 459	100	994	S	30
CD 180A KMD†	D400	430 x 370	580 x 465	150	994	S	35
CD 179 KMD	D400	510 x 360	665 x 458	100	1184	R	32
CD 184S KMD*	D400	425 x 425	580 x 521	100	1103	R	34
CD 185S KMD*†	D400	450 x 450	592 x 538	100	1258	R	36

CD 180 KMDL supplied with locking screw
*Reversible hinge
†Solid ange

At the heart of our ethos is Clark-Drain know-how. Whether the gully grate is trafficked by heavy vehicles, motorists or cyclists our expert technical designers consider the surface water impact when developing new ideas for gratings.

Project
A10
Product
CD 185 KMD

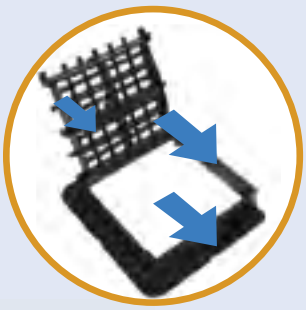
Cycle friendly gully grates

Our cycle friendly gully grates are designed to safeguard cyclists, motorists and pedestrians. Narrow mesh designs on the grates reduce the number of incidents of bicycles, prams and wheel chair tyres getting caught or deflected when compared to traditional slotted grates. This reduces the potential for accidents and the possibility of subsequent insurance claims by the public.

Their application in cycle-routes also efficiently tackle the problems of ponding that can obscure kerb edges and force cyclists into main carriageways whilst reducing splashing which can adversely affect cyclist and pedestrian safety.

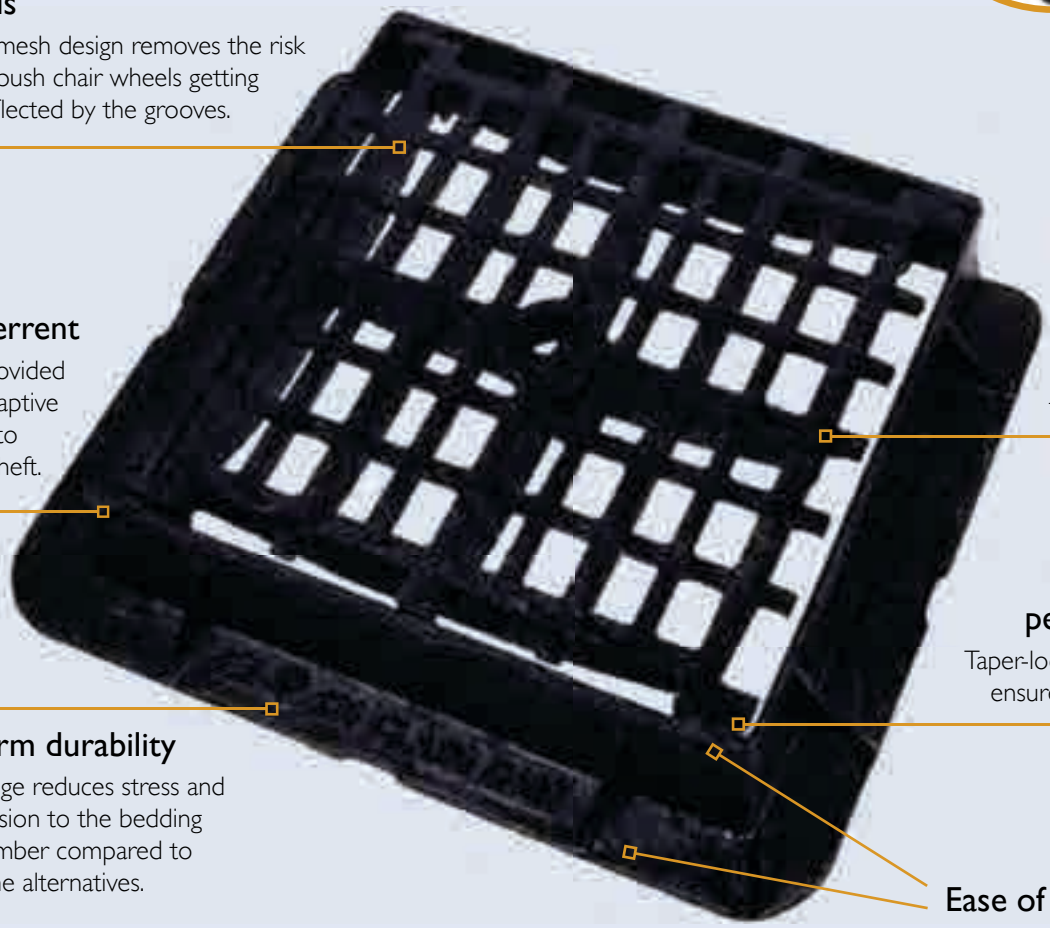
Safety by design

Grate is designed to close naturally with the flow of traffic to help avoid serious accidents if a vehicle collides with the open lid.



Safer roads

Non-slotted mesh design removes the risk of bicycle or push chair wheels getting caught or deflected by the grooves.



Theft deterrent

Security is provided by a bolted captive hinge design to deter metal theft.

Ease of access

Prising location used for lifting grate.

In-situ performance

Taper-lock grate design ensures non-rocking.

Longer-term durability

The solid flange reduces stress and load transmission to the bedding area and chamber compared to skeleton frame alternatives.

Ease of installation

The 3-sided frame is designed to sit flush against the road kerb; particularly useful where dropped kerbs must be level, within certain tolerances of their adjacent surfaces. It also has a reversible grating for use in all road configurations. A directional flow arrow provides additional installation guidance.

Low maintenance

Grate mesh is designed to stop large non-bio-degradable rubbish falling into chamber and causing blockages.

D400 V-Profile

CD 733H KMD

FEATURES

- Dished 'V' profile grating
- Captive hinge design to deter thieves
- Reversible to suit traffic ow direction
- Large waterway area
- Compliant to the design requirements of DMRB HA104/09 for Gully Tops and HA102/00

APPLICATIONS

- Suitable for use in carriageways/highways and commercial/industrial areas

Code	BS EN 124 loading class	Clear opening size A x B (mm)	Overall size C x D (mm)	Depth E (mm)	Waterway area (cm^2)	HA grating type (HA102/00)	Total weight (kg)
CD 733H KMD	D400	628 x 628	780 x 780	150	2385	Q	102

Project
A5-M1 Dunstable Northern Bypass
Product
CD 733H KMD

D400 Mesh

CD 185 KMD

FEATURES

- Taper-Lock" grating design to ensure non-rock
- Captive hinge to deter thieves
- Mesh grating for use in pedestrian areas
- Compliant to the design requirements of Highways England DMRB HA104/09 for Gully Tops and HA102/00

APPLICATIONS

- Suitable for use in carriageway kerbside and commercial/industrial areas

Code	BS EN 124 loading class	Clear opening size A x B (mm)	Overall size C x D (mm)	Depth E (mm)	Waterway area (cm^2)	HA grating type (HA102/00)	Total weight (kg)
CD 185 KMD†	D400	452 x 452	592 x 538	100	996	R	37
CD 231 KMD†	D400	430 x 370	580 x 463	100	818	N/A	30

†Pedestrian area mesh grating

C250 Hinged

CD 129 KMC

FEATURES

- 3-sided ange for installation against kerbs
- Theft-deterrent captive hinge

APPLICATIONS

- Suitable for use in kerbside areas

Code	BS EN 124 loading class	Clear opening size A x B (mm)	Overall size C x D (mm)	Depth E (mm)	Waterway area (cm^2)	Total weight (kg)
CD 127 KMC	C250	440 x 335	530 x 495	75	866	29
CD 128 KMC	C250	336 x 308	480 x 393	75	686	14
CD 129 KMC	C250	336 x 308	482 x 395	100	686	19
CD 130 KMC	C250	440 x 335	535 x 500	100	866	33
CD 131 DL KMC**	C250	390 x 315	590 x 520	100	746	29
CD 232 KMC†	C250	336 x 308	486 x 400	100	505	26
CD 60 DDI KMC	C250	302 x 302	400 x 362	75	583	13

Optional extras: locking

†Pedestrian area mesh grating **Dished design

B125 Hinged

CD 172 KMB

FEATURES

- Flat grating
- Captive hinge to deter thieves
- 3-sided ange for installation against a kerb

APPLICATIONS

- Suitable for use in pedestrian areas and driveways

Code	BS EN 124 loading class	Clear opening size A x B (mm)	Overall size C x D (mm)	Depth E (mm)	Waterway area (cm^2)	Total weight (kg)
CD 172 KMB	B125	280 diameter	450 x 410	50*	604	22

*Not including chamber locating ring

125kN Hinged

CD 58DDI

FEATURES

- Dished grating
- Captive hinge to deter thieves
- 3-sided ange for installation against kerbs

APPLICATIONS

- Suitable for use in pedestrian areas and driveways

Code	BS EN 124 loading class	Clear opening size A x B (mm)	Overall size C x D (mm)	Depth E (mm)	Waterway area (cm^2)	Total weight (kg)
CD 58DDI	N/A	302 x 302	350 x 333	50	583	10

Section 3
Surface Boxes

Contents

Surface boxes

The Clark-Drain surface box range has been designed to offer a protective chamber for the operation of buried valves used for water distribution whilst offering easy access for emergency services.

CONFORMS TO BS 5834

Our Grade A surface boxes fully meet the requirements of BS 5834-2: 2011 and are Kitemark certified to this British Standard specification.

MANUAL HANDLING

Integral lifting key holes provide easy access to utilities when required.

BADGING

'AV'', 'G', 'W', 'FH' or 'SV' badged options are available. Please contact us for individual requirements.

PERFORMANCE IN SERVICE

Non rock seating offers stability under heavy wheel loads up to 5 tonnes and reduces surface noise when trafficked.

ACCESS

Prising slots enable easy opening of the surface box covers for fast access to services.

Prising Slots

Large seating area

Open keyhole

LOAD RATING CLASSIFICATION

APPLICATION AREA	BRITISH STANDARD
Suitable for use in carriageways carrying fast-moving commercial vehicles with loads up to 5 tonnes	Grade A — BS 5834 Grade A

Double Tri Surface Box

CD 841

FEATURES

- Non-rock covers
- Integral lifting key hole (to suit CD 553, CD 552 or CD 556 lifting keys)

OPTIONS

- Badging

APPLICATIONS

- Suitable for use in carriageways carrying fast-moving commercial vehicles having wheel loads up to 5 tonnes)

Code	BS 5834 Grade	Clear opening size (mm)	Overall size C x D (mm)	Depth E (mm)	Total weight (kg)
CD 841	A	150 x 150	262 x 262	100	7.5
CD 845	A	225 x 225	323 x 323	100	13
CD 843	A	300 x 300	408 x 408	100	18
CD 840	A	380 x 230	490 x 340	100	20
CD 842	A	430 x 280	540 x 390	100	26

Solid Top Surface Box

CD 847

FEATURES

- Badged version of CD 847 FH is BS 750 compliant
- Integral lifting key hole (to suit CD 552 or CD 552L lifting keys, available separately)

OPTIONS

- Badging
- Locking

APPLICATIONS

- Suitable for use in carriageways carrying fast-moving commercial vehicles having wheel loads up to 5 tonnes)

Code	BS 5834 Grade	Clear opening size (mm)	Overall size C x D (mm)	Depth E (mm)	Total weight (kg)
CD 847	A	380 x 230	489 x 339	100	18
CD 844	A	300 x 300	420 x 420	100	18

Section 4
Accessories and Options

Contents

Accessories

LIFTERS

The CD 281 hydraulic lifter is a powerful, fast lifter for heavy duty use. Quick to assemble and easy to use, this lifter can give up to 1.5 tons of lift, making easy work of the heaviest manhole cover.

Ideal for councils and sewer/drainage contractors.

CD 281

STEP IRONS

- Galvanised ductile iron step irons
- Manufactured to EN 13101:2002

Code	Length
CD 212	115mm (approx box qty 15)
CD 213	225mm (approx box qty 10)
CD 24840	Bolt-on step iron

CD 212

CD 213

LIFTING KEYS

Lifting keys are available separately for use with F900, E600, D400, C250 and B125 castings and surface boxes. See website for full lifting key list.

Code	Length
CD 552	160mm length ductile iron heavy duty lifting keys
CD 552L	600mm length long handle heavy duty lifting keys
CD 553	145mm length ductile iron light to medium duty lifting keys
CD 553L	600mm length light to medium duty lifting keys
CD 556	Nylon light duty lifting keys

CD 556

CD 552L

CD 552

BADGING

We provide standard 'FW' (Foul Water) and 'SW' (Surface Water) badging as variants on many of our ductile iron range. Other badging we provide on standard products include the 'Pheon' identification for our range of Ministry of Defence security covers and 'AV' (Air Valve), 'SV' (Sluice Valve), 'FH' (Fire hydrant), 'G' (Gas) and 'W' (Water) for our surface boxes. Specific badging to individual customer requirements is also available depending on order quantities and product design suitability.

Service	Badge
Foul Water	FW
Surface Water	SW
Air Valve	AV
Sluice Valve	SV
Fire Hydrant	FH
Water	W
Gas	G

Clark-Drain has been authorised by the Ministry of Defence to use the Pheon symbol for identification of pit ownership.

MANHOLE GREASE

Code	Description
CD 285	Sealing grease for sealed manhole covers (3kg)

Section 5
Access chambers complete with covers

Access systems for safeguarding communication and utility networks

With the aim of contributing to network access and security, Clark-Drain chamber systems are designed and engineered to accommodate fibre optic networks and broadband CATV networks in footways and carriageways as well as other underground assets such as electric cables, pumping systems and valves, etc.

Our chambers are moulded from recycled polypropylene and retain exceptional strength to weight properties. Their excellent durability and loading performance results from a lattice structure inside each moulded segment which lock tightly together to form 150mm ring sections, secured by internal wall bearer bars to add further stability during transit, installation and use.

A wide choice of chamber systems are available with a variety of pre-determined duct entry patterns as well as plain sided options for bespoke drilling requirements.

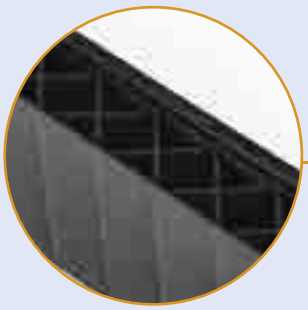
The chambers are manufactured under a certified BS EN ISO 9001:2008 Quality Management System and are tested to BS EN 124 D400 loading whilst our covers and frames are compliant to FACTA and BS EN 124 B125 and D400. Coupled with this is a long product life, which is further enhanced by the chambers' resistance to ground acids, alkalines, petrol and diesel.

MANDREL TEST

To verify the integrity of the duct installation, Mandrel testing will ensure that the minimum acceptable internal diameter of the duct entries is maintained throughout. The chamber bellmouths are designed to be Mandrel test friendly.

Tested up to 40T load rating classification

A strong uniform lattice structure inside the chamber walls reduces flexing and provides a firm structure for easy manual handling and assembly



Moulded duct aperture will accommodate 96mm and 110mm bellmouth and cap.

Galvanised steel internal bearer bars stabilise the chamber wall and prevent ring movement

Cast in Ministry of Defence Pheon logo.

The thickness of the chamber walls have been optimised to provide excellent cover seating and good interaction with the bedding material.

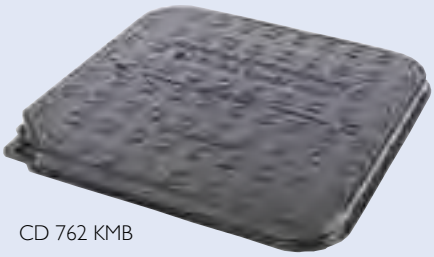
Factory fitted step irons have a slip-resistant tread pattern and are designed, manufactured & tested to EN13101:2002.

Due to the lattice strength structure within the chamber walls there is minimal flexing on the step irons which prevent operator uncertainty during access.

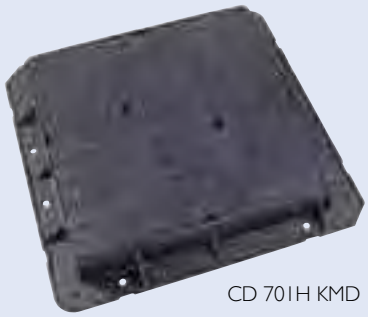
Duct-entries can be supplied in various configurations.

To complement our chambers, a comprehensive range of security and non-security covers and frames are available, manufactured from galvanised steel or ductile iron, depending on the loading required.

A selecton is shown below:



CD 762 KMB



CD 701H KMD

CD 701H KMD/SEC

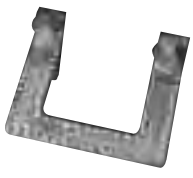
	Chamber clear opening size (mm)						
	300 x 300	450 x 450	600 x 450	600 x 600	675 x 675	750 x 600	
B125 Ductile Iron Covers (BSI Kitemark Certified to BS EN 124-2:2015)		■	■	■	■	■	
D400 Ductile Iron Cover options 100mm depth (Carriageway and non-carriageway) (BSI Kitemark Certified to BS EN 124-2:2015)	■	■	■	■	■	■	
D400 Ductile Iron Cover options 150mm depth (Carriageway and Non-carriagway) (BSI Kitemark Certified to BS EN 124-2:2015)				■	■	■	

Accessories

Padlock Cen Grade 5 (Two types are available 'keyed alike' and 'keyed to differ') as used by the MOD

96 and/110mm Plain Bellmouth (Mandrel test friendly)

Cover Cap for Bellmouth



Step Iron (Including bolts and washers)

Cable Bearer Bracket

Ring sections are 150mm depth							Applications		
750 x 750	900 x 600	900 x 900	1200 x 600	1200 x 675	1500 x 750	1800 x 675	Motorway communications	Traffic signals	Street lighting
	■						■	■	■
■	■	■	■	■	■	■	■		
■	■			■		■	■		

Cable Bearer Locking Pin

Wall Cable Bearer

Chamber Anchor Plate

Chamber Sump and Grill

Section 6
Installation Guides

Clark-Drain B125, C250, D400, E600 and F900 Ductile Iron Manhole Cover & Gully Grate Installation Guidelines

GENERAL ADVICE:

1. Before commencing works, ensure that the correct Clark-Drain product has been chosen in terms of:
   a. Clear-Opening size (measure *before* ordering)
   b. Depth
   c. Loading class (B125, C250, D400, E600 or F900)
   d. Specification (e.g. HA104-compliant, PSRV value, etc)
2. **For D400 manhole cover products, ensure the correct specification (non-Carriageway, Carriageway or High-Max specification) has been chosen/sourced.**
3. Manhole cover and gully grate replacement/installation should only be attempted by qualified and experienced contractors. If in doubt, seek advice.
4. The placement of manhole covers and gully grates directly onto a concrete 'biscuit' (i.e. without bedding mortar) is not recommended.
5. Exposed ironworks are vulnerable to damage by vehicles so should be protected at all times and not trafficked while they are proud of the surrounding surface. Ideally, manhole covers and gully grates should not be trafficked until such time as the final road course has been laid and all construction works has been completed. Ensure that ironworks are not directly trafficked by site construction machinery or vehicles at any time.
6. The orientation of hinged gully grates in their frames should be checked in accordance with intended traffic ow direction and corrected if needed **before** installation (all Clark-Drain gully grates are marked with an → arrow and "Traffic Flow" to indicate correct installation orientation).
7. Covers and grates should not be mixed & matched from one frame to another; doing so will have a detrimental effect on product performance.
8. Please note that the bitumen painted coating used on all Clark-Drain ductile iron products is a **temporary** coating only and is intended to wear off quickly once the product is being trafficked. Any surface oxidization of the iron that occurs has no detrimental effect upon the product's strength or its performance in service.

BEDDING MORTAR:

Whether carrying out a new or replacement installation the use of proprietary purpose-specific bedding mortar, such as those offered in the Instarmac Ultra-Crete range, is strongly recommended. Mixing up mortar on-site with an assumed sand/cement ratio is **not** recommended and likely to lead to early manhole failure. Two types of bedding mortar are recommended, depending on use:

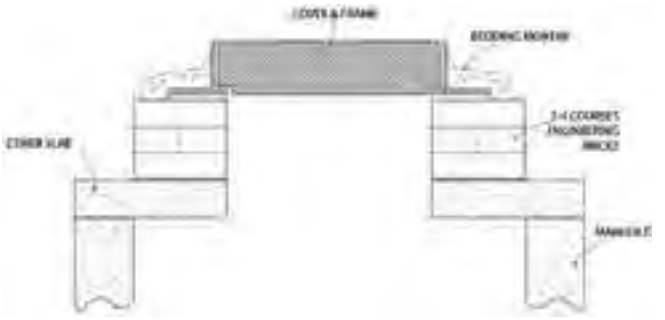
1. For general purpose installations in slow-moving (20mph or less) infrequently-trafficked areas a conventional cement-based mortar with a minimum compressive strength of 21N/mm^2 in 2 hours, such as Instarmac's M90 All Purpose Fast Set Mortar, should be used. For faster results a product such as Instarmac's M60 Rapid Strength Bedding Mortar (24N/mm^2 compressive strength in 1 hour) can be used.
2. For areas of fast-moving (above 20mph) and/or heavily trafficked (greater than 1500 vehicles per day) roads, or where bedding mortar compliant to the requirements of HA104/09 has been specified, a cement-based or thermosetting polymer resin based bedding mortar complying to HA104/09 (Tensile strength of >5N/mm^2 at 3 hours), such as Instarmac's Envirobed HA104 High Performance Bedding Mortar or PY4 Polyester Resin System, should be used.

Please note that resin-based mortars should only be used in dry conditions; in wet conditions the performance and durability of such mortars is affected dramatically. In all cases mixing should be carried out mechanically to ensure a thorough and consistent mix, and it is recommended that mixed batches of mortar are no greater than can be used in the time before the material starts to set. Always follow the manufacturer's instructions when mixing mortar, taking note of any PPE required when handling (gloves, goggles, etc.). Do not 'guess' the amount of water required for cementitious mortars, measure accurately as incorrect amounts can affect performance and durability significantly. Please note that the performance of such bedding materials is severely affected if the mating surfaces are not clean and dry. Any unused mortar should be disposed of appropriately according to COSHH regulations.

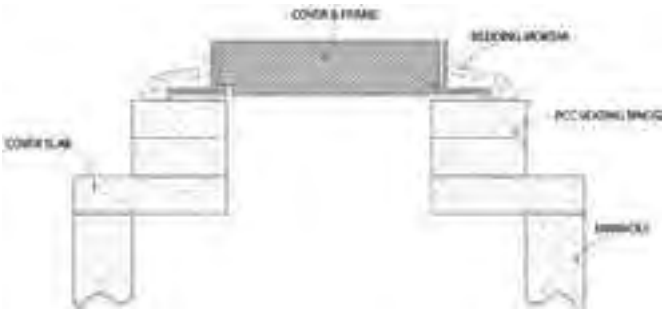
FOR NEW INSTALLATIONS:

Ensure the general work area is as clean as possible and free from debris. The manhole cover or gully grate frame should be placed on top of a layer of bedding mortar, which in turn is laid on top of 2-4 courses of 'blue' or 'red' solid engineering bricks or pre-cast concrete seating rings, as per the diagrams below:

On Engineering Bricks:



On Precast Concrete Rings:



The bedding material should be placed as soon as it is mixed, at a depth approximately 5-6mm greater than the required bedding thickness, and across the full width of

the brick or concrete bedding area. The top surface of the mortar should be smooth and even, with no deep trowel marks.

The frame should then be placed as soon as possible, having been separated from its covers/grate and using mechanical lifting aids where appropriate, onto the bedding layer such that it is fully supported around the full perimeter of the frame flange and there are no voids at any point. The frame can then be tamped down to the required level, using surrounding road surfaces or other height markers as guides. Take care to ensure that the top edge of the frame is level with the intended final road surface, as failure to do so will result in excessive noise in service and/or potentially early failure of the manhole cover/gully grate. Ensure that bedding material is not obstructing the cover seatings, cleaning off excess material where needed.

Any holes in the frame flange should be filled with bedding material and the top face of the flange should be then covered in at least 10mm of the same. More may be added, if desired, to use up excess bedding material as long as it will not affect the placement of any subsequent surfacing courses. Clean up any exposed areas of bedding material on the inside of the frame by pointing to a smooth finish.

The covers/grate should not be placed into their frame until such time as the bedding has achieved full cure. When doing so, use mechanical lifting aids where appropriate. Surrounding surface courses can be laid only when the bedding has achieved full cure. The use of bitumen-based sealant/tack spray between the vertical face of the manhole cover/gully grate frame and surrounding tarmac is strongly recommended.

Do not allow the manhole cover/gully grate to be trafficked in any way until all bedding materials used have fully cured or while the manhole cover/gully grate is proud the surrounding road surface. Ideally, the manhole cover/gully grate should not be trafficked until the final road course is laid. Failure to follow this advice will result in irreparable damage to the manhole cover/gully grate.

FOR REPLACEMENT INSTALLATIONS:

Before commencing work, remove the existing covers from their frame and inspect the chamber below to assess size and condition. Do not commence work until it is assured that the correct-sized replacement manhole cover or gully grate plus all tools and materials to affect any necessary chamber repairs have been brought to site.

Start by using a disk-cutter to cut a 'picture frame' around the manhole cover/gully grate that is to be replaced that is at least 300mm larger than the visible size of the existing manhole cover/gully grate. Excavate around the existing manhole cover/gully grate to remove all old material, taking care not to damage the chamber below when doing so. Remove the existing covers from the frame then the frame itself. Remove all old bedding materials using hand-tools only. Inspect the existing chamber top (brick or pre-cast concrete) for signs of damage or failure and repair as needed. When replacing engineering bricks use 'red' or 'blue' solid types. The same bedding mortar that will be used for the new manhole cover/gully grate can be used for replacing engineering bricks.

The bedding material should be placed as soon as it is mixed, at a depth approximately 5-6mm greater than the required bedding thickness, and across the full width of the brick or concrete bedding area. The top surface of the mortar should be smooth and even, with no deep trowel marks.

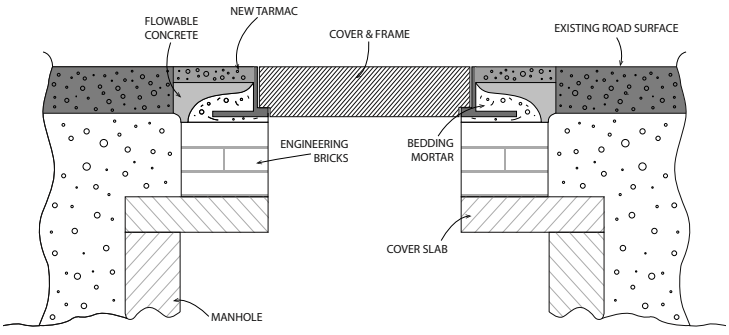
The frame should then be placed as soon as possible, having been separated from its covers/grate and using mechanical lifting aids where appropriate, onto the bedding layer such that it is fully supported around the full perimeter of the frame flange and there are no voids at any point. The frame can then be tamped down to the required level, using surrounding road surfaces or other height markers as guides. Take care to ensure that the top edge of the frame is level with the existing road surface, as failure to do so will result in excessive noise in service and/or potentially early failure of the manhole cover/gully grate. Ensure that bedding material is not obstructing the cover seatings, cleaning off excess material where needed.

Any holes in the frame flange should be filled with bedding material and the top face of the flange should be then covered in at least 10mm of the same. More may be added, if desired, to use up excess bedding material as long as it will not affect the placement of any subsequent surfacing courses. Clean up any exposed areas of bedding material on the inside of the frame by pointing to a smooth finish.

The use of a flowable concrete to surround the new frame and create a strong concrete ring is strongly recommended. A product that achieves a compressive strength of at least 20N/mm^2 in 2 hours, such as Instarmac's QC10F Rapid Set Flowable Concrete, should be used. Mix and pour according to the manufacturer's instructions to a depth of at least 60mm, but ensuring that a depth of at least 40mm remains to the top road surface to allow for tarmac.

Once the flowable mortar has cured the final layer of tarmac can be laid and compacted, although the use of bitumen-based sealant/tack spray between the vertical face of the manhole cover/gully grate frame and surrounding tarmac is strongly recommended before doing so. Ensure that the newly-laid tarmac is well compacted and that any loose debris is cleared away. Ensure that the top edge of the manhole cover/gully grate frame is not proud of the tarmac and hence exposed to impact from passing traffic as this will damage and shorten the life of the manhole cover/gully grate considerably. Do not allow the manhole cover/gully grate to be trafficked until such time as all materials have fully cured.

The finished result should be as per the diagram below:



This document is provided as guidance only – if in any doubt, consult an experienced professional contractor for further advice before commencing works.

Installation Guidelines for Clark-Drain Modular Chamber System

These are intended as guidelines only – if in doubt, seek advice. Always take care when using hand and power tools and wear PPE

NOTES BEFORE STARTING WORKS:

a) All Clark-Drain modular chambers are supplied with a pre-determined configuration of duct entries along with a selection of 96mm or 110mm bellmouths, and universal blanking caps.

   i. The blanking caps should be used on all unused duct entries, fitted on the outside wall of the chamber, to prevent back-fill from entering during subsequent installation.

   ii. Bellmouths should be fitted on the inside as required for all duct entries.

   iii. Should additional quantities of bellmouths or blanking caps be required these can be purchased separately (product codes CD 24281/96, CD 24281/110 and CD 24282).

b) Should additional duct entries be required the chamber walls can be drilled with a hole-saw at an appropriate position, ideally along the same horizontal plane and without cutting across any joint lines if possible. Please note: breaching too many joint lines while drilling bespoke duct entries may compromise the chamber wall strength.

c) All ducting should enter at 90° to the chamber wall.

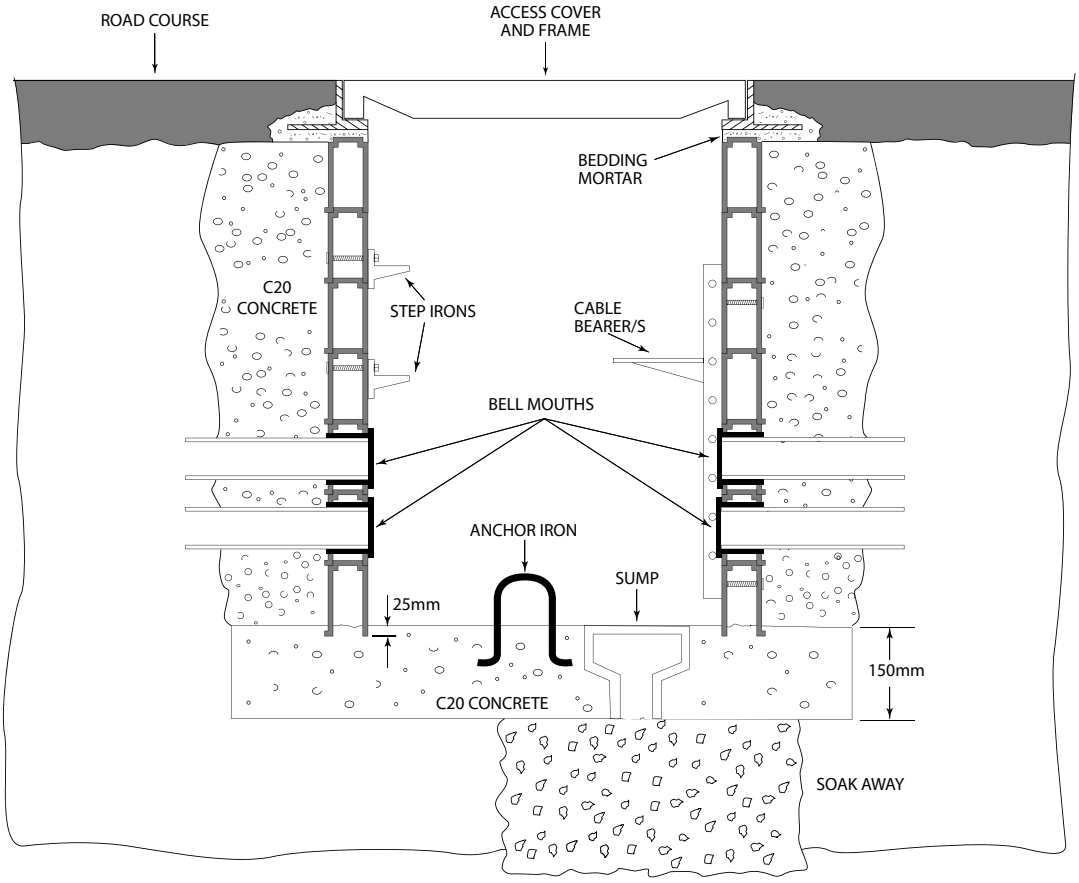
d) Chamber depth can be increased using additional ring sections, purchased separately. Each ring increases the chamber depth by 150mm, and must be secured to the adjacent ring by use of link plates provided. When adding rings to increase chamber depth, please remember to purchase and fit additional step-irons (product code CD 24840) as needed. We recommend at least one step every third ring (i.e. every 450mm).

INSTALLATIONS:

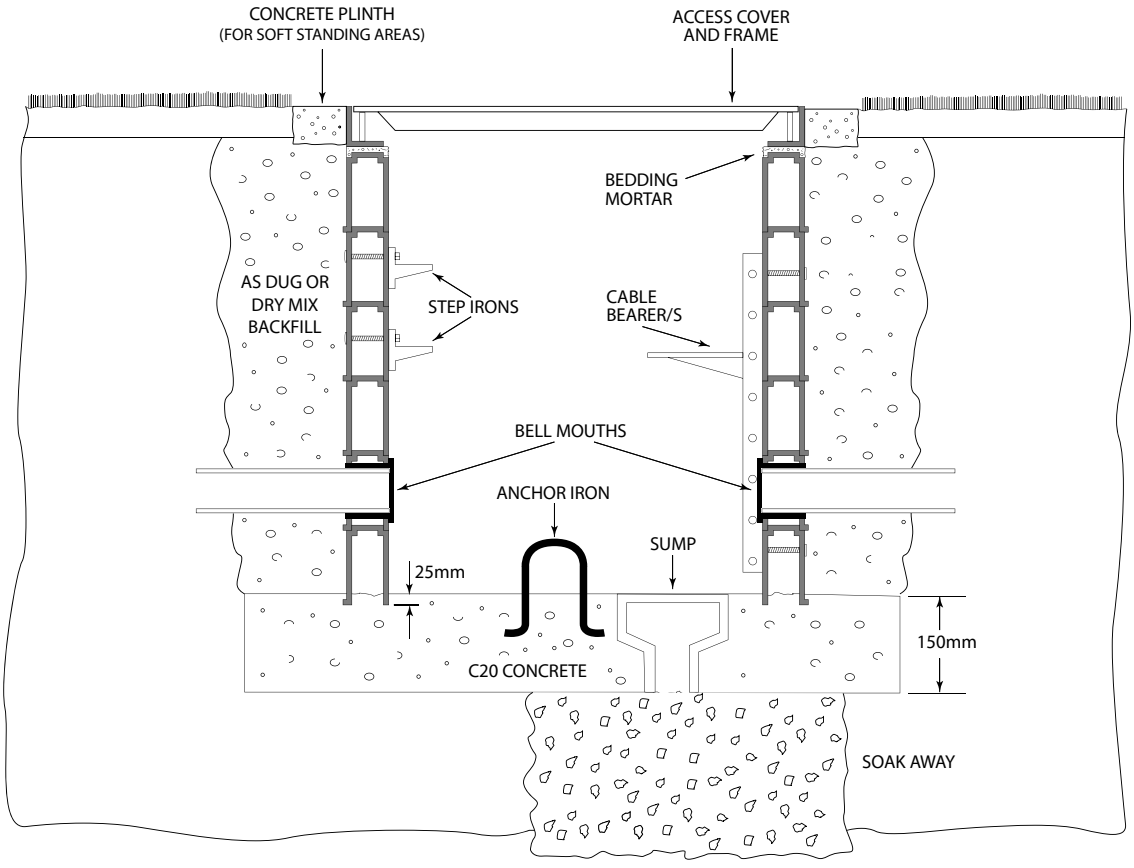
1. Mark out the area where the pit is to be excavated, allowing a minimum of 150mm (or more to allow space to work as needed) around the full perimeter of the chamber for backfilling and compaction.
2. Within the marked area, excavate from finished surface level to the total depth of the chamber, plus the depth of the concrete base, plus the depth of the access cover and frame (including a small allowance for bedding mortar).
3. Once the pit has been excavated, compact the base then install/position the anchor iron and/or sump unit with soakaway if required in their intended positions before pouring a concrete base to form the foundation of the chamber. The concrete used for the base should be of at least C20 grade and be at least 150mm thick. While the concrete is still wet it is recommended that the bottom ring of the modular chamber be set into it by approx. 25mm. To facilitate this, Clark-Drain modular chambers are supplied with the bottom ring easily detachable by removal of the relevant cable bearer bracket fixings, if fitted, or by removal of the plastic welds that hold the bottom ring to the one above.
4. When the bottom ring of the chamber is in position finish the floor using a float and trowel to achieve an even surface that is sloped slightly towards the sump (if installed).
5. The remaining ring sections of the chamber can then be installed on top of the base ring, securing the two together with the fixings provided, and ensuring the ducting is fitted in the relevant duct entry holes and trimmed to the correct length.
6. Prior to back-filling around the chamber, the inside walls must be braced adequately to avoid the walls bowing inwards. This bracing can be removed when the chamber installation is complete and all concrete used has fully cured. At this point all required bell-mouths should be fitted.
7. For FACTA AAA/B125 applications the back-fill can be as-dug material or dry mix concrete. For D400 applications the back-fill must be concrete of at least C20 grade. Back-fill in 300mm maximum layers and where dry mix or concrete has been used allow to cure before applying the next layer. Chambers installed in turfed or soft-standing areas should also have a concrete ring around the frame of the access cover of at least 100mm wide x 75mm deep to prevent damage to the access cover by non-road vehicles (e.g. lawn-mowers) and/or long-term sinking issues.
8. When the back-filling is complete and any concrete used has fully cured the access cover and frame can be fitted as per normal procedure. Resin-based bedding mortar between the access cover frame and chamber top is recommended for FACTA AAA/B125 applications, and a necessity for D400 applications (as per standard industry practice).

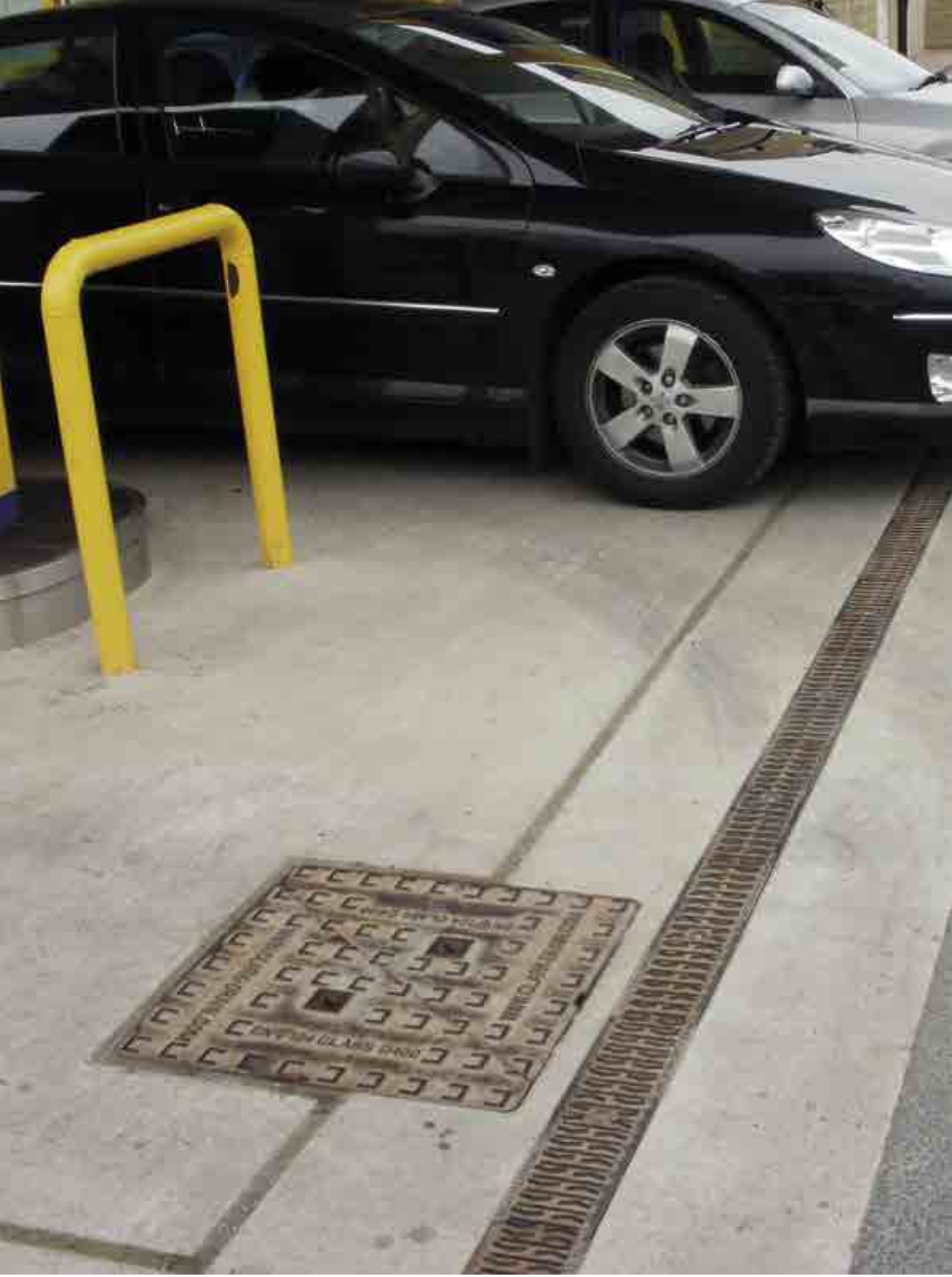
Example installation diagrams

D400 CHAMBER INSTALLATION



FACTA AAA/B125 CHAMBER INSTALLATION





Section 7
Product Selector

Contents

Access Covers

	Product code	Clear opening size (mm)		Installation and durability	Skid Resistance		Security	Odour/ Egress	Health and Safety		Non-rock stability
			KITEMARK	FEATURE	45+ PSRV	60+ PSRV	FEATURE	FEATURE	FEATURE	Traditional lift out	
F900											
Double Tri	CD 801AH KMF	600 x 600	■	■		■	○			■	■
	CD 802AH KMF	675 x 675	■	■		■	○			■	■
	CD 807AH KMF	750 x750	■	■		■	○			■	■
E600											
Double Tri	CD 801AH KME	600 x 600	■	■		■	○			■	■
	CD 802AH KME	675 x 675	■	■		■	○			■	■
	CD 808AH KME	1200 x 675	■	■		■	○			■	■
D400											
High Max	CD 901H KMD	600 x600	■	■		■	○	○	■		■
	CD 901AH KMD	600 x 600	■	■		■	○	○	■		■
	CD 902H KMD	675 x 675	■	■		■	○	○	■		■
	CD 902AH KMD	675 x 675	■	■		■	○	○	■		■
Hinged	CD 705 KMD	600 diameter	■	■			■	○	■		
	CD 1660H KMD	675 x 675	■	■	■		○		■		■
	CD 1664AH KMD	900 x 600	■	■	■		○		■		■
	CD 1667AH KMD	900 x 900	■	■	■		○		■		■
Multi-Tri	CD 693H KMD	1200 x 675	■	■	■		○			■	■
	CD 693AH KMD	1200 x 675	■	■	■		○			■	■
	CD 694AH KMD	1800 x 675	■	■	■		○			■	■
Multi-Tri Hinged	CD 695H KMD	1500 x 750	■	■	■		○		■		■
Double Tri	CD 701H KMD	600 x 600	■	■	■		○			■	■
	CD 701AH KMD	600 x 600	■	■	■		○			■	■
	CD 1659H KMD	675 x 675	■	■	■		○			■	■
	CD 1659AH KMD	675 x 675	■	■	■		○			■	■
	CD 750H KMD	750 x 600	■	■	■		○			■	■
	CD 750 AH KMD	750 x 600	■	■	■		○			■	■
	CD 753H KMD	750 x 750	■	■	■		○			■	■
	CD 751H KMD	900 x 900	■	■	■		○			■	■
	CD 752H KMD	900 x 600	■	■	■		○			■	■
	CD 752AH KMD	900x 600	■	■	■		○			■	■
	CD 770 KMD	300 x 300	■	■	■		○			■	■
	CD 755 KMD	450 x 450	■	■	■		○			■	■
	CD 756 KMD	600 x 450	■	■	■		○			■	■

	Product code	Clear opening size (mm)		Installation and durability	Skid Resistance		Security	Odour/ Egress	Health and Safety		Non-rock stability
			KITEMARK	FEATURE	45+ PSRV	60+ PSRV	FEATURE	FEATURE	FEATURE	Traditional lift out	
Double Tri	CD 701 KMD	600 x 600	■	■	■		○			■	■
	CD 701A KMD	600 x 600	■	■	■		○			■	■
	CD 1659 KMD	675 x 675	■	■	■		○			■	■
	CD 1659A KMD	675 x 675	■	■	■		○			■	■
Solid Top	CD D600H-DSL	600 x 600	■	■			■	■		■	
Recessed	CD D630J -DSL	600 x 600	■	■			■	■		■	
B125											
Solid Top	CD 1649 KMB	303 diameter	■				■			■	
	CD 1649 KMB/SR	303 diameter	■				■			■	
	CD 761 KMB	450 x 450	■				○		■		
	CD 761SR KMB+R	450 diameter reduced to 350 diameter	■				○		■		
	CD 691 KMB/SEC	1200 x 600	■				■		■		
	CD 762 KMB	600 x 450	■				○		■		
	CD 779 KMB	600 x 450	■				○			■	
	CD 759 KMB	600 diameter	■				○			■	
	CD 777 KMB	600 x 600	■				○		■		
	CD 778 KMB	600 x 600	■				○			■	
	CD 780 KMB	675 x 675	■				○		■		
	CD 722 KMB	750 x 600	■				○		■		
	CD 752 KMB	900 x 600	■				○		■		
	CD 853 KMB	750 x 750	■				○	■	■		
	CD 877 KMB	600 x 600	■				○	■	■		
	CD 1657 KMB	450 diameter	■				○			■	
	CD B400B-DSL	450 x 450	■				■	■		■	
15kN											
Solid Top	CD 62	600 x 450								■	
	CD 12	600 x 600								■	

KEY:

■ Standard in product ○ Optional

Gully Grates

	Product code	Clear opening size (mm)	KITEMARK	Drainage efficiency: TYPE P FEATURE	Drainage efficiency: TYPE Q FEATURE	Drainage efficiency: TYPE R FEATURE	Drainage efficiency: TYPE S FEATURE	Security: FEATURE	Safety: E+ FEATURE	Safety: Traditional lift out	FEATURE
D400											
Double Tri	CD 644 KMD	415 x 415	■			■		○		■	
	CD 644A KMD	415 x 415	■			■		○		■	
	CD 502 KMD	440 x 400	■			■		○		■	
	CD 732 KMD	600 x 600	■	■				○		■	
	CD 732H KMD	600 x 600	■	■						■	
Hinged	CD 178 KMD	385 x 317	■					○	■		
	CD 180 KMD	430 x 370	■				■	○	■		
	CD 180 KMDL	430 x 370	■				■	■	■		
	CD 180A KMD	430 x 370	■				■	○	■		
	CD 231 KMD	430 x 370	■					○	■		■
	CD 179 KMD	510 x 360	■			■		○	■		
	CD 184S KMD	425 x 425	■			■		○	■		
	CD 185 KMD	452 x 452	■			■		○	■		■
	CD 185S KMD	450 x 450	■			■		○	■		
Vee	CD 733H KMD	628 x 628	■		■						
C250											
Hinged	CD 128 KMC	336 x 308	■					○	■		
	CD 232 KMC	336 x 308	■					○	■		■
	CD 129 KMC	336 x 308	■					○	■		
	CD 131 DL KMC	390 x 315	■					○	■		
	CD 127 KMC	440 x 335	■					○	■		
	CD 130 KMC	440 x 335	■					○	■		
	CD 60 DDI KMC	302 x 302	■					○	■		
B125											
Hinged	CD 172 KMB	280 diameter	■					○	■		

KEY:

■ Standard in product ○ Optional

Surface Boxes

	Product code	Clear opening size (mm)	Grade	Security 	Traditional lift out	Non-rock stability
Double Tri	CD 841	150 x 150	A	○	■	■
	CD 845	225 x 225	A	○	■	■
	CD 843	300 x 300	A	○	■	■
	CD 840	380 x 230	A	○	■	■
	CD 842	430 x 280	A	○	■	■
Solid Top	CD 847	380 x 230	A	○	■	
	CD 844	300 x 300	A	○	■	

KEY:

■ Standard in product ○ Optional

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