Project	Accor Tribe Hotel
Specification Type	R12 Drainage Specification
Reference	1513-SPW-Z0-ZZ-SP-C-0001-A-D3
Revision	E

The following specification of drainage works is based on the requirements set out in Approved Document Part H and Sewers for Adoption 7th Edition. These documents are to be referred to prior to the commencement of any drainage works.

General Description

This development is phased and therefore the R12 specification [REVISION A] has been prepared for the works within the building and upto the first manhole chamber/ inspection chamber only. No further works on the external drainage has been done to date.

The contractor is reminded to use this specification for the drainage below ground only. Please ensure to review all other consultants drawings alongside the material prepared by Spillways Limited.

Revision E is a draft as-built record of the installation at the time of preparing the specification. Any products, devices or materials used which are other than those recommended by Spillways Limited are assumed to be designed by a specialist and Spillways Limited offer no design warranty on the performance or adequacy of that item. Revision P18 of the below ground drainage design should be referred to along with the Specification and details provided.

SURFACE WATER

Surface water routed by rainwater pipes and door threshold drainage will be conveyed into the below ground drainage system. Rainwater is aimed to be conveyed out of the footprint of the building in the shorted / efficient route.

FOUL WATER

Foul water is proposed to be generated within the development. Foul water will be routed by stacks and gullies and conveyed into the below ground drainage system.

General Below Ground Drainage System

Materials of pipe to be chosen by contractor as and where required however, consult the design engineer for any specific pipe requirements in instances of heavy loading during works or other special applications.

Pipes	Standards
Vitrified Clay (lateral drain connection to External Drains)**:**	**BS 65, BS EN 295-1**
Ductile Iron (drainage internal to building)**:**	**BS EN 598**

Surface water / rainwater drainage sources:	Rainwater downpipes (nonsiphonic), By Others. Surface water gullies Linear drainage channels
Foul drainage sources:	Discharge stack and branch pipes Foul water gullies and shower gullies Kitchen Drain Points Plant Room Gullies Kitchen Gullies
Pipes, bends and junctions:	To be confirmed by others
Accessories:	Access points; Standard couplings; Rodding points; Sump pits; Bitumen sealant.
Manholes:	Pre-cast Concrete Chambers (PCC) Polypropylene Inspection Chambers (PPIC)

Accessories:	Manhole channels and branches Slippers and benching Access covers and frames
Disposal:	To External Drainage

Temporary Works

When required by the CA the contractor shall provide sufficient calculations and/or method statements to substantiate any proposed temporary works at least fourteen days prior to starting such works.

Adoptable Works and Standards

Works which are to be adopted shall be carried out in accordance with the adopting authority's standard specifications and requirements. Where inconsistencies occur between this Specification and the adopting authority standard specifications and requirements, the adopting authority standard specifications and requirement shall take precedence on adoptable works. The Contractor shall confirm with the adopting authority requirements with regard to inspection notices, approvals, procedures, submissions etc. in advance of any works. The above requirements shall also apply to areas of work already under the control of the Local Authority.

Below Ground Drainage System Design

Design:	Complete the design of the below ground drainage system in accordance with BS EN 752, BS EN 1295-1, BS EN 1610, and BS EN 437.
Ground conditions:	Refer to Site Ground Investigation Report. No evidence of contamination found however contractor should advise Spillways Limited of any contamination which may impact the robustness of the below ground drainage design.
Performance criteria:	Refer to Site Ground Investigation Report

Adaptors to Iron Drainage - Foul and Surface Water Drainage Internal to Building

Material and standard:	Cast Iron Fittings - to BS EN 598
Type:	DN 100 discharge stacks to DN 100 Iron Pipe DN 150 discharge stacks to DN 150 Iron Pipe
Manufacturer:	Hargreaves Foundry Drainage
Model:	Halifax Drain

Adaptors to Vitrified Clay Drainage – Lateral Drain Connection to External Drains

Material and standard:	Vitrified Clay Fittings - to BS 65, BS EN 295-1
Type:	DN 100 discharge stacks to DN 100 Vitrified Clay Pipe DN 150 discharge stacks to DN 150 Vitrified Clay Pipe
Manufacturer:	Naylor
Model:	Densleeve
Crushing Strength:	40kN/m

Pipe Bends and Junctions – Rigid Joints – Foul and Surface Water

Pipes and fittings:	From same manufacturer for each pipeline.
Material and standard:	Cast Iron - to BS EN 598 Vitrified Clay - to BS 65, BS EN 295-1
Manufacturer:	Cast Iron – Hargreaves Foundry Drainage Vitrified Clay - Naylor
Model:	Cast Iron - Halifax Drain Vitrified Clay - Densleeve
Sizes:	DN 100, DN 150

Surface Water Large Diameter Pipes

Pipes and fittings:	JFC Corripipe Twinwall Drainage System
Material and standard:	HDPE
Manufacturer:	JFC Plastics Ltd
Sizes:	DN 225, DN 300, DN 375, DN450

Perforated Land Drain Pipes – French Drain

Material and standard:	HDPE
Manufacturer:	JFC Plastics Ltd
Model:	JFC Corripipe Twinwall High Density Polyethylene Filter Pipe
Sizes:	DN 150mm
Accessories:	Pipe Couplers 67.5° Equal Junctions End Caps

Couplings

Standard:	Cast Iron - to BS EN 598 and Kitemark certified, or Agrément certified. Vitrified Clay - to BS 65, BS EN 295-1 and Kitemark certified, or Agrément certified. HDPE – to BS EN 681-1
Manufacturer:	Cast Iron – Hargreaves Foundry Drainage Vitrified Clay – Naylor HDPE – JFC Plastics Ltd
Model:	Cast Iron – Halifax Drain Two-Piece Ductile Iron Coupling – Standard and Transitional Vitrified Clay – Densleeve Couplings JFC Corripipe Twinwall High Density Polyethylene Filter Pipe

Saddle Connectors

Standards:	Cast iron: To BS 437 and Kitemark certified, or Agrément certified. Clay: To BS EN 295-1 and Kitemark certified, or Agrément certified. Concrete: To BS 5911-6 and Kitemark certified, or Agrément certified. Plastics: To BS 4660 and Kitemark certified, or Agrément certified.
Material:	Clay.
Manufacturer:	Naylor
Sizes:	100, 150mm, 225mm, 300mm, 450mm

Manhole Chamber Internal Branches – Foul Water Manhole

Standard:	Vitrified Clay - to BS 65, BS EN 295-1
Manufacturer:	Naylor
Model:	Channel pipes and fittings
Material:	Vitrified Clay
Size:	As per latest drainage layout – Consult Spillways Limited for confirmation on latest drainage layout.
Channels and connections:	As per Spillways Limited drainage construction details drawing
Benching:	As per Spillways Limited drainage construction details drawing
Formwork for concrete surround:	As per Spillways Limited drainage construction details drawing

Access Covers And Frames

Standard:	To BS EN 124.
Types:	Double sealed and bolted for all Chambers Recessed Cover, Cast Iron Cover

Loading:	C250 D400
Manufacturer:	R&B UK
Materials:	To contractor design – details not available
Finishes:	To contractor design – details not available

10
Tracey-Concrete-Dra

Sizes:	Refer to Manhole Schedule
Accessories:	Stays to restrain covers Standard Locking Bolts Locking Keys Lifting Keys (Ref: HKEY) Moly Sealing Grease

Concrete Manhole Chambers – Surface, Foul and (INTERNAL)

Standard:	BS EN 1917:2002/BS 5911-3:2010
Design:	To structural engineers' details
Dimensions:	Refer to drainage plan
Accessories:	Cover Slabs Catchpits Sealing strips Fixed Double Steps

Precast Concrete Manholes Chambers – Surface Water & Foul Water

Standard:	To BS EN 1917, BS 5911-3
Manufacturer:	Tracey Concrete
Model:	Civils and Drainage Precast Concrete Manhole Chamber Rings
Material:	Precast Concrete (Rings)
Size:	1000mm diameter 1200mm diameter 1500mm diameter 1800mm diameter
Accessories:	Double stepped rungs Catchpit bases Sealing strips Cover slabs Adjusting units/Seating rings/Corbel slabs Stepped Rungs
Additional Items:	Refer to manhole schedule for catchpits 300mm Deep

Ground Stabilisation

Manufacturer:	Tensar
Model:	Geogrid – Design to be warranted by Tensar (specialist subject to detail design and levels). Contractor to allow Geogrid to cover the entire are around the perimeter of the building. This

product is recommended to be used for any pipes or foundations shallower than 600mm Cover for external areas immediately outside of the building footprint.

Manhole Chambers – PPIC – Foul and Surface Water Drainage

Standard:	To BS 7158:2001 & BS EN 13598
Manufacturer:	Wavin or Similar Approved (Contractor to Confirm)
Product reference:	Wavin Range 600 Inspection Chamber 450 Inspection Chamber - Code – 6D929 - Code – 6D928
Material:	Polypropylene
Shape:	Circular
Size:	As per latest drainage layout - Consult Spillways Ltd for confirmation on latest drainage layout.
Base units:	Wavin Inspection Chamber Base – Equal & Unequal – Various configurations 150mm INLETS + 100mm INLETS
Accessories:	Restrictor Access Caps Connector Kits

One Piece Gullies and Covers

Standards:	To BS EN 1253-1, -2, -3, -4 and -5; or
Cast iron:	To BS 437 and Kitemark certified, or Agrément certified.
Clay:	To BS EN 295-1 and Kitemark certified, or Agrément certified.
Concrete:	To BS 5911-6 and Kitemark certified, or Agrément certified.
Plastics:	To BS 4660 and Kitemark certified, or Agrément certified.
Polypropylene:	To BS EN 1852-1.

Gullies - Surface Water & Foul Water (INTERNAL)

Manufacturer:	WADE
Model:	Vari-Level - Cast Iron body with Foul Air Traps
Type:	Contractor's choice
Cover:	To architect's specification

Road Gully Pots - Surface Water (EXTERNAL)

Manufacturer:	FP McCann
Model:	Concrete Road Gully 450mm Internal Diameter
Type:	Depth 750mm
Cover:	Standard 100mm Thick Gully Cover

Road Gully Grating - Surface Water (EXTERNAL)

Manufacturer:	Wreckin

Model:	DGH0D6/4545/KT
Range:	Tristar
Type:	Depth 150mm
Grade:	D400

Linear Channel Drains - Surface Water

Manufacturer:	ACO
Model:	M100D – Door Threshold M200D – Landscape Drainage
Grating:	To architect's specification
Accessories:	Universal Sump Units Multifunctional End Caps Roddable Foul Air Traps Step Connectors Brickslot access points and covers

Cellular Surface Water Storage Tanks

TANK-01 & TANK-02

Manufacturer:	SDS Water Infrastructure Systems
Model:	GEOlight 400
Unit Dimensions:	Refer to Drainage Details Sheet
Overall Dimensions:	As per latest below ground drainage plan - Consult Spillways Ltd for confirmation on latest below ground drainage plan
Volume:	As per latest below ground drainage plan - Consult Spillways Ltd for confirmation on latest below ground drainage plan
Invert Level:	As per latest below ground drainage plan - Consult Spillways Ltd for confirmation on latest below ground drainage plan
Cover Level:	Refer to landscaping strategy
Surround:	Refer to Spillways typical drainage details

Tanking Membrane for Cellular Storage Tanks

Manufacturer:	Visqueen
Model:	High Performance Urban Drainage Geomembrane

Geotextile Surround for Cellular Storage Tanks

Manufacturer:	As per SDS Specified
Model:	As per SDS Specified

Flow Control Devices – Surface Water

Manufacturer:	CROWN WATER
Model:	147mm QR5F Type Vortex Flow Control

Design Flowrate:	11.5.0 l/s
Chamber Size:	⌀1800mm
Outflow Pipe Dimensions:	⌀450mm
Note:	TO BE UPGRADED AS PART OF THE PERMANENT DESIGN

Flow Meter – Foul Water

Manufacturer:	Pulsar Measurement
Model:	DB6 Ultrasonic Transducers Microflow – 0.2 – 6 m/s FlowCERT
Chamber Size:	1200mm
Outflow Pipe Dimensions:	⌀225mm

Petrol Interceptor

Manufacturer:	Marsh Industries
Model:	NSBP 15 GA
Note:	TO BE UPGRADED AS PART OF THE PERMANENT DESIGN

Granular Sub-Base Material

Standard:	To Highways Agency Volume 1, 'Specification for Highway Works', Type 1 Unbound mixtures for sub-base.
Recycled content:	Contractor's choice

Execution

Stripping Out

To be carried out safely by a competent contractor. Ensure Health and Safety is adhered to at all times.

Extent of stripping out: As per Spillways Limited drainage layout drawing

Existing Drains

Every drain to be tested by the contractor prior to confirm if it is live or redundant. Spillways Limited to be notified immediately upon confirmation.

Setting out: Before starting work, check invert levels and positions of existing drains, sewers, inspection chambers and manholes against drawings. Report discrepancies.

Protection: Protect existing drains to be retained and maintain normal operation if in use

Excavated Material

Turf, topsoil, hardcore, etc: Set aside for use in reinstatement.

Selected Fill for Backfilling

Selected fill: As-dug material, free from vegetable matter, rubbish, frozen soil and material retained on a 40 mm sieve.

Compaction: By hand in 100 mm layers

Lower Part of Trench - General

Trench up to 300 mm above crown of pipe: Vertical sides, width as small as practicable.

Width (minimum): External diameter of pipe plus 300 mm or as advised by construction details.

Lower Part of Trench – Transition Depth

Trench widths up to 300 mm above crown of pipe (maximum):
DN 100 pipelines more than 6.0 m deep: 600 mm.
DN 150 pipelines more than 5.4 m deep: 700 mm.
DN 225 pipelines more than 4.0 m deep: 800 mm.
DN 300 pipelines more than 2.9 m deep: 900 mm

Type of Subsoil

General: Where type of subsoil at level of crown of pipe differs from that stated for the type of bedding, surround or support, give notice.

Formation for Beddings

Timing: Excavate to formation immediately before laying beddings or pipes.

Mud, rock projections, boulders, and hard spots: Remove. Replace with consolidated bedding material.

Local soft spots: Harden by tamping in bedding material.

Inspection of excavated formations: Give notice

Pipes at Different Levels in Common Trench

Subtrench: Permissible provided soil of step is stable and unlikely to break away.

Subtrench not permissible: Trench depth as required for lower pipe. Increase thickness of bedding to upper pipe as necessary.

Lower pipe: Backfill with compacted granular material to at least halfway up higher pipe.

Clear horizontal distance between pipes (minimum):
Pipes up to DN 700: 350 mm.
Pipes exceeding DN 700: 500 mm.

Class S Surround to Bends and Junctions

Type of subsoil: As per site investigation report.

Trench width up to 300 mm above crown of pipe (maximum):
DN 100 nominal pipe size: 600 mm.
DN 150 nominal pipe size: 700 mm.
DN 225 nominal pipe size: 800 mm.
DN 300 nominal pipe size: 900 mm.

Granular material: Contractor's choice.
Pipe sizes DN 100 and DN 150: Size 4/10.
Pipe sizes DN 225 and DN 300: Size 4/10, 10/20 or 4/20.
Pipe sizes DN 375-500: Size 10/20 or 4/20.
Pipe sizes DN 600 and above: Size 10/20, 20/40, 4/20 or 4/40.

Bedding material: Granular, compacted over full width of trench.

Thickness (minimum): 50 mm for sleeve jointed pipes, 100 mm for socket jointed pipes. Where trench bottom is uneven, increase depth by 100 mm.

Pipes: Dig slightly into bedding, rest uniformly on barrels and adjust to line and gradient.

Initial testing before placing surround: Required.

Surround material: Granular.

Depth: To 50 mm above crown of pipe.

Compaction: By hand in 100 mm layers.

Backfilling material: Protective cushion of selected fill.

Depth: 150 mm (250 mm for adoptable sewers) above crown of pipe.

Compaction: By hand in 100 mm layers

Class Z Surround to Pipework Less Than 1.2m Deep

Type of subsoil: As per site investigation report.

Blinding material: Concrete (general).

Thickness (minimum): 25 mm.

Width: Full width of trench. Allow to set before proceeding.

Pipes temporary support: Folding wedges of compressible board. Prevent flotation.

Clearance under pipes (minimum): 100 mm. Adjust pipes to line and gradient.

Initial testing before placing surround: Required.

Surround material: Concrete (general).

Depth: To 150 mm above crown of pipe.

Width: Full width of trench.

Vertical construction joints location: At face of flexible pipe joints.

Material: 18 mm thick compressible board precut to profile of pipe.

Socketed pipes:	Fill gaps between spigots and sockets with resilient material to prevent entry of concrete

Concrete Surround for Pipe Runs Near Foundations

Class Z surround:	Provide in locations where bottom of trench is lower than bottom of foundation and as follows (horizontal clear distance between nearest edges of foundations and pipe trenches):
Trenches less than 1 m from foundations:	Top of concrete surround not lower than bottom of foundation.
Trenches more than 1 m from foundations:	Top of concrete surround not lower than Dmm below bottom of foundation, where D mm is horizontal distance of trench from foundation, less 150 mm

Laying Pipes

Laying pipes:	To true line and regular gradient on even bed for full length of barrel with sockets (if any) facing up the gradient.
Ingress of debris:	Seal exposed ends during construction.
Timing:	Minimize time between laying and testing

Tolerances in Pipelines

The position of the internal face of any pipeline shall not deviate from the line and level described in the agreement by more than ±10mm, provided that no pipe shall have a reverse gradient.

Where rising mains are laid to curves, the deflection at any pipe joint as laid shall not exceed three quarters of the maximum deflection recommended by the manufacturer.

Jointing Pipelines

Connections:	Durable, effective, and free from leakage.
Junctions, including to differing pipework systems:	With adaptors intended for the purpose.
Cut ends of pipes:	Clean and square. Remove burrs and swarf. Chamfer pipe ends before inserting into ring seal sockets.
Jointing or mating surfaces:	Clean and, where necessary, lubricate immediately before assembly.
Allowance for movement:	Provide and maintain appropriate clearance at ends of spigots as fixing and jointing proceeds.
Jointing material:	Do not allow to project into bore of pipes and fittings

Concrete Surround for Crossovers

Class Z surround:	Provide where two pipelines (other than plastics pipes) cross with less than 300 mm separation.
Extent, on both pipes:	1 m centred on the crossing point, and beyond as necessary t come within 150 mm of nearest flexible joints.

Pipelines Passing Through Structures

Pipelines that must be cast in or fixed to structures (including manholes, catchpits, and inspection chambers): Provide 600 mm long rocker pipes adjacent to the external face of the structure (or both faces where appropriate, e.g., walls to footings), with flexible joints at both ends.

Distance to rocker pipe from structure (maximum):150 mm.

Provision for movement for pipelines that need not be cast in or fixed to structures (e.g., walls to footings):

Rocker pipes as specified above or openings in the structures to give 50 mm minimum clearance around the pipeline.

Closely fit a rigid sheet to each side of opening to prevent ingress of fill or vermin

Bends at Base of Soil Stacks

Type:	Nominal 90° rest bends.
Radius to centreline of pipe (minimum):	200 mm.

Height of invert of horizontal drain at base of stack below centreline of lowest branch pipe (minimum): 450mm.

Bedding:	Do not impair flexibility of pipe couplings.
Material:	Concrete (general)

Installing Flexible Couplings

Ends of pipes to be joined:	Cut cleanly and square.
Outer surfaces of pipes to be joined:	Clean and smooth. Where necessary, e.g., on concrete or iron pipes, smooth out mould lines and/ or apply a cement grout over the sealing area.
Clamping bands:	Tighten carefully to make gastight and watertight seals.

Initial Testing of Pipelines

Before testing:	Cement mortar jointing: Leave 24 h. Solvent welded pipelines: Leave 1 h.
Method:	Block open ends of pipelines to be tested and pressurise. Air test short lengths to BS EN 1610.

Trench Supports

Removal of trench supports and other obstacles:	Sufficient to permit compacted filling of all spaces.

Backfilling to Pipelines

Backfilling above top of surround or protective cushion: Material excavated from trench, compacted in layers 300 mm (maximum) thick.

Heavy compactors:	Do not use before there is 600 mm (total) of material over pipes.

Backfilling Over Concrete

Minimum times from placing concrete:	Backfilling generally: 24 h. Heavy compactors and traffic loads: 72 h.

Backfilling Under Roads and Pavings

Backfilling from top of surround or protective cushion up to formation level: Granular sub-base material, laid and compacted in 150 mm layers.

Temporary Bridges

Trench bridges:	To prevent construction traffic damaging pipes after backfilling.

Installing Concrete Inspection Chamber (refer to structural details)

Fixing Manhole Steps

Fixing:	Secure to chamber wall.
Positioning:	300 mm vertical centres staggered 300 mm horizontally, with lowest step 300mm (maximum) above benching and top step 450 mm (maximum) below top of cover.

Jointing Concrete Manhole Chambers Section

Jointing and sealing:	For concrete manholes.
Inner joint surface:	Trim surplus jointing material extruded into chamber and point neatly

Laying Conventional Channel, Branches and Benching

Main channel:	Bed solid in 1:3 cement: sand mortar.
Branches:	Connect to channel, preferably at half pipe level, so that discharge flows smoothly in direction of main flow.
Branches greater than nominal size 150 mm:	Connect the branch soffit level with the main drain soffit.

Connecting angles more than 45° to direction of flow: Use three-quarter section channel bends.

Benching material:	Concrete (adoptable manhole benching and topping).
Profile:	Rise vertically from top of main channel to a level not lower than soffit of outlet pipe, then slope upwards at 10% to walls.
Topping material:	Concrete (adoptable manhole benching and topping).
Application:	Before benching concrete has set, and with dense smooth uniform finish.

Installing Access Covers and Frames

Seating:	Concrete as instructed by structural engineers.
Bedding and haunching of frames:	Continuously.
Material:	1:3 cement:sand mortar.
Top of haunching:	30 mm below surrounding surfaces.
Horizontal positioning of frames:	Centred over openings. Square with joints in surrounding paving.
Vertical positioning of frames:	Level; or marry in with levels of surrounding paving.

Permissible deviation in level of external covers and frames: +0 to -6 mm

Exposed Openings in Inspection Chambers, Access Points, Fittings and Equipment

General:	Fit purpose made temporary caps. Protect from site traffic.

Removal of Debris and Cleaning

Preparation:	Lift covers to manholes, inspection chambers and access points. Remove mortar droppings, debris, and loose wrappings.
Timing:	Before cleaning, final testing, CCTV inspection if specified, and immediately before handover.
Cleaning:	Thoroughly flush pipelines with water to remove silt and check for blockages. Rod pipelines between access points if there is any indication that they may be obstructed.
Washings and detritus:	Do not discharge into sewers or watercourses.
Covers:	Securely replace after cleaning and testing.

Temporary Measures

Water used to stabilize tanks and the like during installation: Drain

Final Testing of Private Gravity Drains and Sewers up to DN 300

Before testing:	Cement mortar jointing: Leave 24 h. Solvent welded pipelines: Leave 1 h.
Standard:	To Building Regulations.
Method:	Contractor's choice

Final Testing of Adoptable Sewers

Standard (sewers up to and including size DN 1800): to Sewers for Adoption 7th Edition

Water Testing of Manholes and Inspection Chambers

Timing:	Before backfilling.
Standard:	Exfiltration: To BS EN 1610.
Method:	Testing with water (method W).
Infiltration:	No identifiable flow of water penetrating the chamber.

CCTV Inspection of Adoptable Pipelines

General:	Permit the Adopting Authority or its agent to carry out and record internal CCTV inspection of pipelines and associated manholes after completion.
Locations to be inspected:	As per Spillways Limited drainage layout drawing. Contractor to report back to Spillways Limited upon project completion. Spillways Limited will provide locations drawing
Pipelines under highways:	Complete construction, except for laying of wearing course, before inspection.

Lifting Keys

Lifting keys:	Supply suitable keys for each type of access cover.
Timing:	At completion.

Operation Manual

Contractor to:	Provide copies all material specifications Installation and Maintenance guides Operational manuals Maintenance manuals
For:	Copies of above to be left for occupiers of building. Copies to be sent to Spillways Limited

johnhuyton@rubycivils.com

From: Steve Burns <steve@groundtechuk.co.uk>
Sent: 21 April 2023 12:59
To: johnhuyton@rubycivils.com
Subject: FW: New site- Manchester Airport. - MIM
Attachments: CUST NSBP 15 GA (Rev.B).pdf; MI-separators-installation-operation-manual-0921-RevB.pdf

Here you go John…

Bypass Separator Class 1	
Marsh product code	**NSBP15**
Product description	**Hydroil Bypass Separator**
Peak flow rate [l/s]	**150**
Drainage area [m^2]	**8510**
Length [m]	4.03
Diameter [m]	1.2
Height [m]	1.8
Inlet invert [m]	0.9
Inlet connection [mm]	315
Outlet invert [m]	0.95
Outlet connection [mm]	315
Number of turrets	2

All Marsh Hydroil Separators are designed and tested to **BS EN858 parts 1 & 2** and are manufactured from virgin resin offering exceptional durability including a **25 year Structural Guarantee**

Heavier duty units installed deeper than 2m to inlet invert are readily available and costed to site requirements

Venting: Vent should terminate 2.4m above ground & 1m away from opening windows, covered to prevent debris access.

Please see attached standard generic drawings and installation details and do not hesitate to contact me should you require any
further assistance or information regarding this quotation

Quotation valid for 30 days

Site off load required ***

- Please note that due to production processes, dimensions of finished units are within a tolerance of +/- 2.5%.

Regards

Steve Burns
Managing Director

groundtech UK Ltd
Innovative Construction Solutions

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Warrington
WA3 3PY

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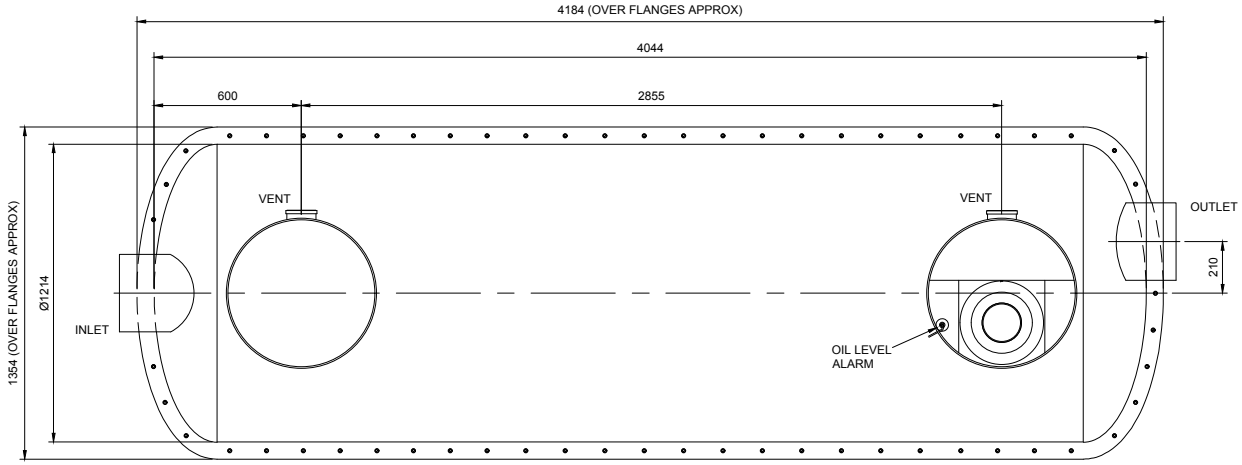
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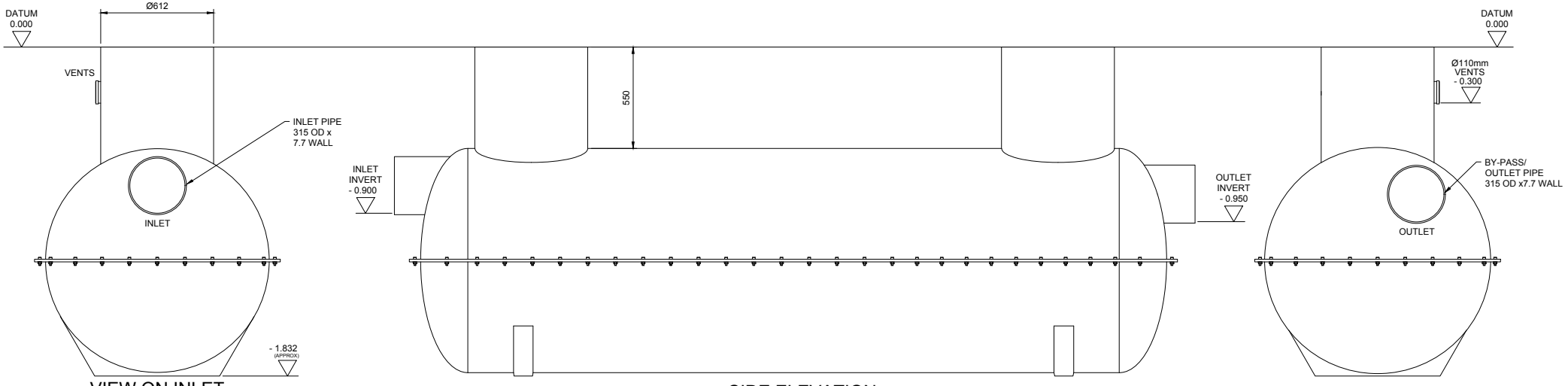

CELEBRATING
20
YEARS

GENERAL NOTE:
All tanks are subject to a 2.5% tolerance on all dimensions.
Any internals (if shown) are for guidance only, and may vary due to individual specifications.

MAX. FLOW RATE : 150 LPS.



PLAN



VIEW ON INLET

SIDE ELEVATION

VIEW ON OUTLET

REV	DESCRIPTION	DATE	SIG
A	For Approval	03.07.17	P.L.
B	INLET / OUTLET PIPE SIZES AMENDED.	16.04.19	GLF

THIS DRAWING IS THE PROPERTY OF MARSH INDUSTRIES LTD. AND MUST NOT BE REPRODUCED OR CIRCULATED FOR ANY PURPOSE WHATSOEVER WITHOUT FIRST OBTAINING WRITTEN CONSENT FROM THE MARSH INDUSTRIES LTD.

ORIG. | CHKD | APP'D

SCALE: N.T.S. | DATE: 03.07.2017

3 RD ANGLE PROJECTION | DO NOT SCALE IF IN DOUBT ASK

CLIENT

TITLE

MARSH NSBP15 (CLASS 1)
BYPASS SEPARATOR
Ø1.2m x 4.30m LONG.

MARSH
UNITS 9-13 ADDINGTON PARK IND. EST., LITTLE ADDINGTON, KETTERING, NORTHAMPTONSHIRE, NN14 4AS.
MARSH INDUSTRIES
Leaders in off-mains drainage

DRG. CUST NSBP 15 | REV B

Marsh Industries
Tank Warranty

This warranty covers the Marsh range of underground tanks (domestic and commercial sewage treatment plants, pump stations, oil separators, cesspools and septic tanks for off-mains drainage) if installed strictly in accordance with the company's installation procedures. These procedures are explained in the company's installation manuals that have accompanied the delivery of the tank.

The units must be installed and the design be by a qualified consultant or engineer. During installation, photographs of each stage should be taken and recorded to show the correct methodology has been undertaken throughout.

From the beginning to completion of the installation please take into account the following factors; the local ground conditions, water table/surface water and the depth of excavation. The backfill surround must meet the engineer's specifications taking into account the depth, seasonality, external loadings and traffic loadings, along with ground and surface water conditions.

This tanks must only be used for holding the effluent and water that it is designed for. Corrosive liquids, high temperatures or adverse ground conditions will invalidate the warranty.

This warranty covers manufacturing and material specification only and is valid for twenty five years from date of manufacture.

Marsh Industries' options for liability are limited to either repairing the tank, issuing a replacement tank to site or refunding the original purchase cost. Marsh Industries is not liable for installation and labour charges, delivery costs or any other consequential losses.

Damage to covers, frames, filters, pumps, compressors, alarms, pipework are not covered by this warranty. Damage by interference or tinkering will invalidate this warranty.

Marsh Industries

Marsh Hydroil: Oil separators

Bypass separators
Full retention separators
Forecourt separators
Wash-down separators and silt traps
Alarm systems



www.marshindustries.co.uk

WE are the **innovators** in domestic, commercial and agricultural waste and surface water treatment products

WE are Marsh Industries

Our brand communicates the straight talking approach we have become known for

WE deliver world-class waste and surface water products and solutions to the domestic, commercial and agricultural sectors from our UK manufacturing plants in Kettering and Bridgwater.

WE think smarter

Efficiently meeting the demands of our customers

We strive to be recognised as a collaborative and trusted partner for our customers, aligned to their business, and with a reputation for providing quality products that really do add value.

WE innovate

Enabling technologies that deliver tangible benefits

Working across many areas of the UK and European construction sectors our specialist 'innovation' team combines 100+ years' experience of designing, manufacturing and testing water/wastewater treatment products that are proven to be economic, efficient and environmentally sensitive.

WE comply

With UK/EU building and environmental regulations

Our products are fully type-tested and certified to ensure compliance with relevant environmental permitting programmes and Building Regulations.

WE deliver

UK nationwide and overseas

With one of the largest merchant distributor networks available in Europe, customers specify Marsh products and services because they know WE deliver from a solid foundation of knowledge, experience, product quality and proven performance.

WE support

Specialist services to further enhance customer requirements

There are times when our customers need a little extra support. Whether this is on-site advice, backup support, specialist testing or bespoke project solutions, WE offer a range of services when and where required.

TOGETHER we are a strategic partnership

Our core strength lies in the knowledge, experience and enthusiasm of our staff and our customers combined



Marsh Hydroil separators undergoing testing at PIA GmbH in Aachen, Germany





Marsh Hydroil separators are tested and approved by PIA GmbH

BRITISH WATER

Future Water Association
Informing, Innovating, Influencing

MADE IN BRITAIN

Oil separators

Separation by flotation and settlement

Oil separators are designed to prevent oil and other hydrocarbons from entering the drainage system. They separate oil from water, and safely retain the oil until it is removed.

Oil cannot be treated easily and will therefore cause severe pollution if allowed to enter mains sewers or drainage fields. Statutory controls enforce strict regulations on the discharge of such pollutants.

Separators should be used in such applications as petrol stations, industrial yards and garages; or virtually anywhere that a risk of oil contamination exists.

Discharge requirements for oil separators may vary in different areas of the country and it is therefore essential to consult the appropriate environmental controlling authority prior to specifying an oil separator. If the discharge is to a public sewer then local Building Control, the Water Authorities and water companies should also be contacted.

Separator types and principles of operation

Classes

Separators are classed in two categories based on performance under standard test conditions.

Class 1 separators are designed to achieve a discharge concentration of less than 5mg/litre of oil. These separators are required for discharges to surface water drains and the water environment.

Class 2 separators are designed to achieve a discharge concentration of less than 100mg/litre of oil under standard test conditions. They are suitable for dealing with discharges where there is a lower quality requirement, such as discharges to the foul sewer.

Both classes can be produced as 'full retention', 'bypass' or 'forecourt' separators as explained below.

Bypass separators

Bypass separators treat all flows from rainfall events of up to 6.5mm/hr. This covers over 99% of all rainfall events. Flows higher than 6.5mm/hr are designed to bypass the separator.

These separators are used in a 'low risk' environment where there is no requirement to provide full treatment for the flow; for example a car park where the risk of a significant spillage is small.

Full retention separators

Full retention separators treat the full flow that is delivered by the drainage system, which is normally equivalent to the flow generated by a rainfall intensity of 65mm/hr.

These separators are used where there may be a 'high risk' of a significant fuel spillage, such as vehicle workshops

Forecourt separators

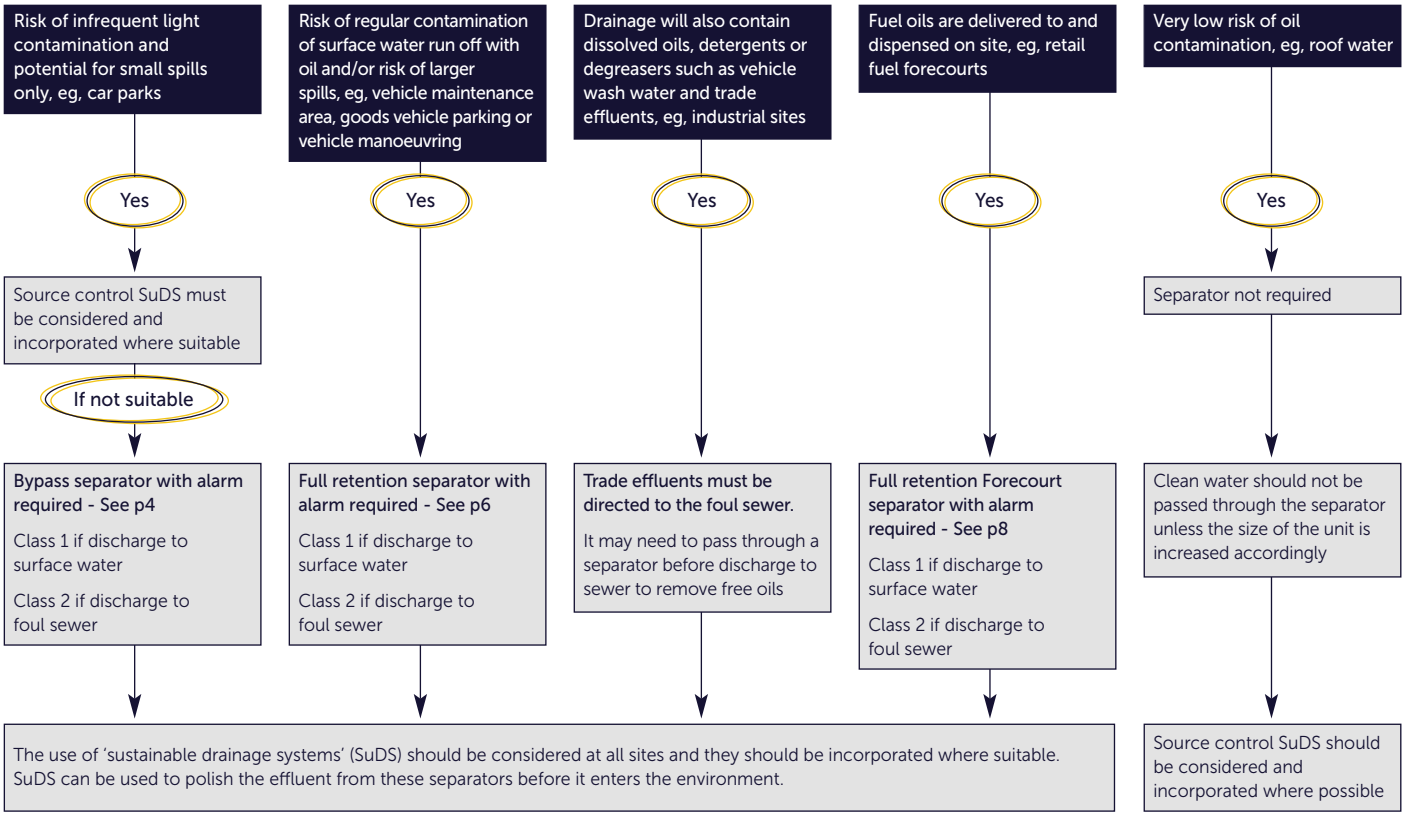
Forecourt separators are a type of full retention separator, however they are specifically designed to store the maximum spillage likely to occur on a petrol station forecourt.

These separators are manufactured to a specific size in order to retain the potential spillage from a single compartment of a road tanker – currently up to 7,600 litres in the UK.

Wash-down separators and silt traps

It is a legal requirement to install a silt trap or wash-down separator on commercial sites, such as vehicle wash bays, where there is an environmental risk of contamination from dirt, brake dust, traffic film residue, cleaning agents, oil, etc.

Choosing the right separator



Bypass separators

For areas at ‘low risk’ of oil contamination

Overview

Bypass separators are used in a ‘low risk’ environment where there is no requirement to provide full treatment for the flow; for example a car park where the risk of a significant spillage is small.

Designed and tested to BS EN858 parts 1&2, Marsh Hydroil bypass separators are manufactured from virgin unfilled resin offering exceptional durability, impact resistance and are guaranteed to be watertight and of uniform thickness. These combined properties ensure that the full range of separators stand up to the most rigorous conditions during their service life.

Internal working components, such as coalescing filters, weirs, oil skimmer plates, and their configurations offer the most modern and efficient oil/water separation capability available to the market today.

A wide choice of inlet and outlet positions are available on the units - detailed requirements should be provided at time of order (standard inlet and outlet positions will otherwise be fitted).

Operating principle

Marsh Hydroil bypass separators are designed to treat 10% of peak flow.

The drainage areas served by each separator are determined in accordance with both BS EN858 parts 1&2, but also with reference to a formula provided by the Environment Agency, where NSB=0.0018xA (catchment area in m^2). Flows from higher rainfall rates are allowed to bypass the main separation chamber.

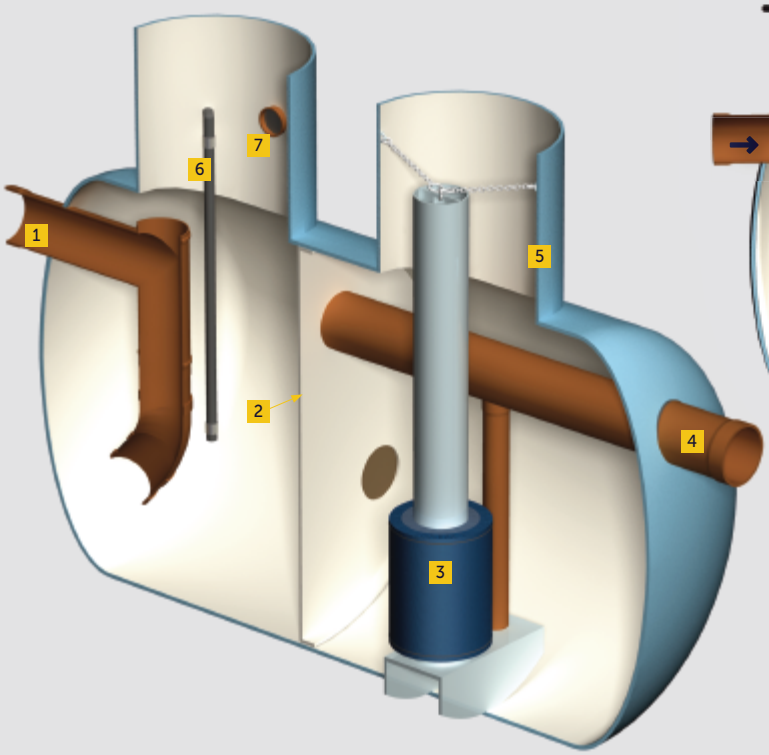
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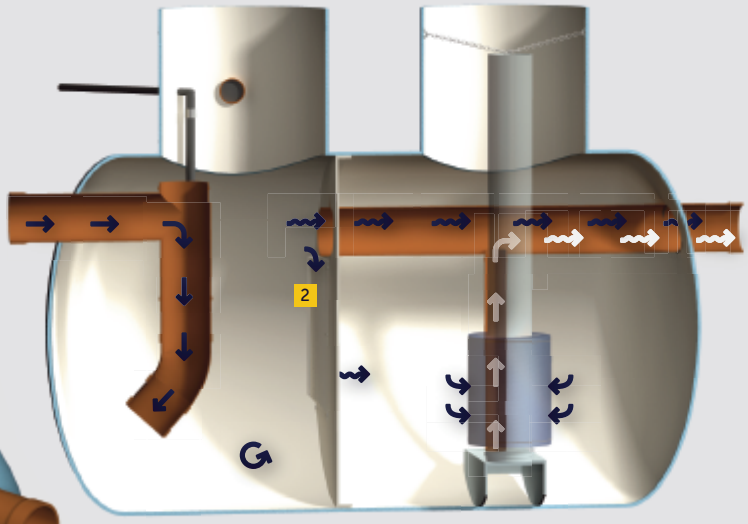
1 Inlet
2 Oil skimmer plate
3 Coalescer
4 Outlet
5 Access turret
6 Level alarm dip pipe
7 Air vent

Flowpath

Oil/water mixture

Water





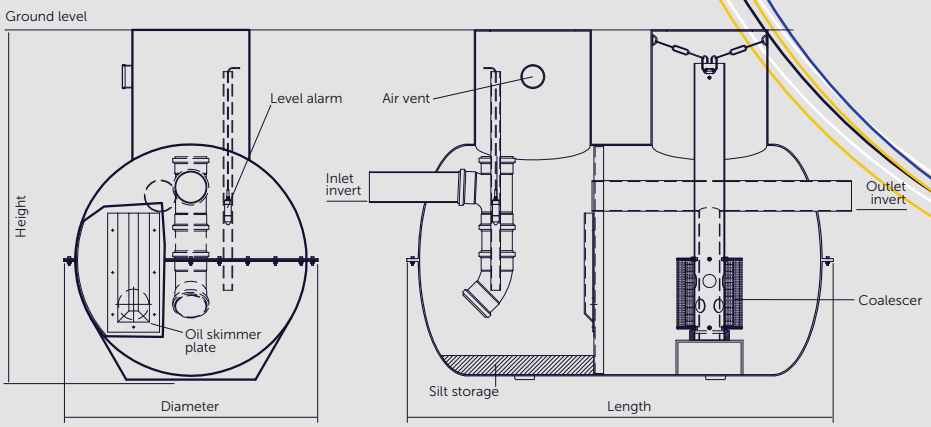
Benefits

- Designed and tested to meet latest UK and European standards
- Corrosion resistant
- Tank shells guaranteed for 25 years with a design life of 50 years
- Heavy duty shells enable installation in all ground conditions
- Easy access turrets for maintenance and servicing (Turret guards optional)
- Various alarm types available (Required by EN858-1)
- Variable invert depths and inlet/outlet configurations to suit individual site conditions
- Vented turrets dissipate excessive fumes and vapours

Typical applications

- *Car parks*
- *Roadways*
- *Industrial estates*
- *SuDS*

Specifications



View on inlet end

Section through tank centre

Bypass separator range

Model	Max flow litre/sec	Drainage area m²	Silt storage litres	Oil storage litres	Diameter	Length	Height	Connection size	Inlet invert	Outlet invert
NSBP 3	3	1700	300	45	1200	2100	1840	160	900	950
NSBP 4.5	4.5	2550	450	67.5	1200	2100	1840	160	900	950
NSBP 6	6	3400	600	90	1200	2100	1840	160	900	950
NSBP 8	8	4530	800	120	1200	2110	1840	160	900	950
NSBP 10	10	5660	1000	150	1200	2760	1840	160	900	950
NSBP 15	15	8510	1500	225	1200	4030	1840	200	900	950
NSBP 18	18	9940	1800	270	1800	2380	2440	200	900	1000
NSBP 20	20	11370	2000	300	1800	2620	2440	200	900	1000
NSBP 25	25	14185	2500	375	1800	3180	2440	250	900	1000
NSBP 30	30	17000	3000	450	1800	3740	2440	250	900	1000
NSBP 40	40	22650	4000	600	1800	4860	2440	315	900	1000
NSBP 45	45	25325	4500	675	1800	5420	2440	315	900	1000
NSBP 50	50	28000	5000	750	1800	5980	2440	315	900	1000
NSBP 60	60	32333	6000	900	2500	4006	3140	315	900	1000
NSBP 70	70	36665	7000	1050	2500	4566	3140	315	900	1000
NSBP 75	75	41000	7500	1125	2500	4886	3140	315	900	1000
NSBP 80	80	45330	8000	1200	2500	5126	3140	315	900	1000
NSBP 100	100	56660	10000	1500	3000	4674	3640	315	900	1000
NSBP 125	125	70820	12500	1875	3000	5713	3640	400	900	1000

Notes:

> *The dimensions given on this page are for guidance only*
> *For precise tank sizes and configurations, please contact Marsh Industries*
> *Number of access shafts will be built to suit site specifications and to maintain safe access for emptying*
> *All dimensions in mm*

Illustrations shown for visual reference only

Full retention separators

For areas at ‘high risk’ of oil contamination

Overview

Full retention separators are used where there may be a ‘high risk’ of a significant fuel spillage, such as vehicle workshops

Designed and tested to BS EN858 parts 1&2, Marsh Hydroil full retention separators are manufactured from virgin unfilled resin offering exceptional durability, impact resistance and are guaranteed to be watertight and of uniform thickness. These combined properties ensure that the full range of separators stand up to the most rigorous conditions during their service life.

Internal working components, such as coalescing filters, automatic closure devices, weirs, oil skimmer plates, and their configurations offer the most modern and efficient oil/water separation capability available to the market today.

A wide choice of inlet and outlet positions are available on the units - detailed requirements should be provided at time of order (standard inlet and outlet positions will otherwise be fitted).

Operating principle

Marsh Hydroil full-retention separators treat the full flow that is delivered by the drainage system, which is normally equivalent to the flow generated by a rainfall intensity of 65mm/hr.

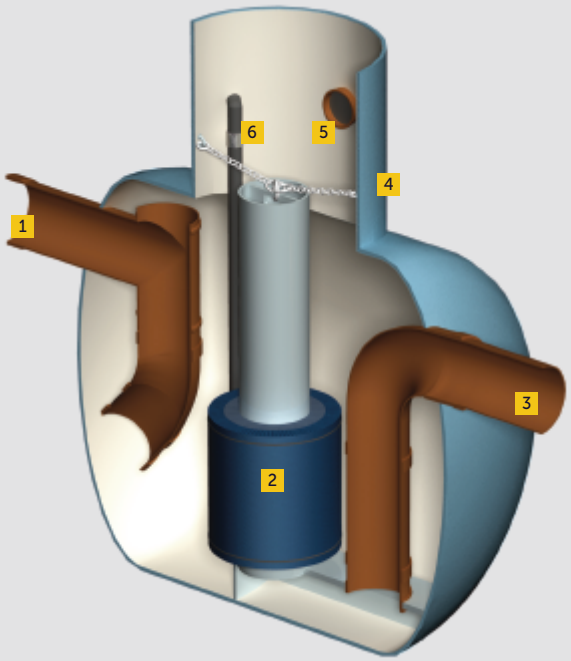
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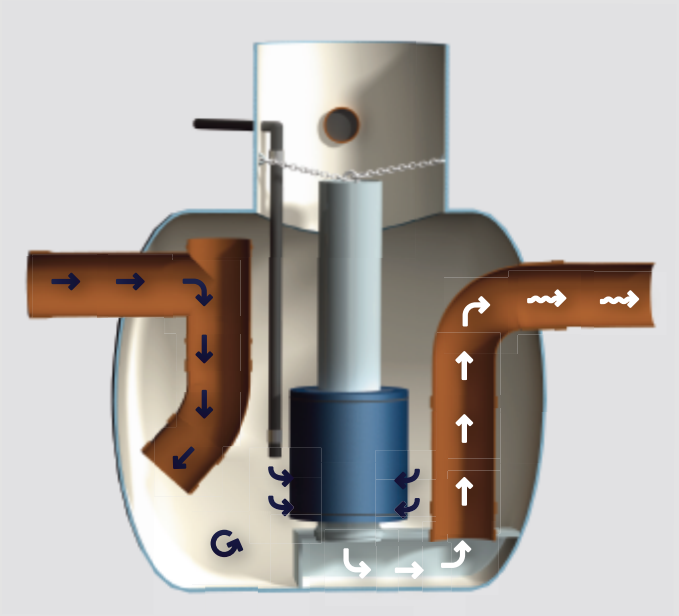
1 Inlet
2 Coalescer
3 Outlet
4 Access turret
5 Air vent
6 Level alarm dip pipe

Flowpath

Oil/water mixture

Water





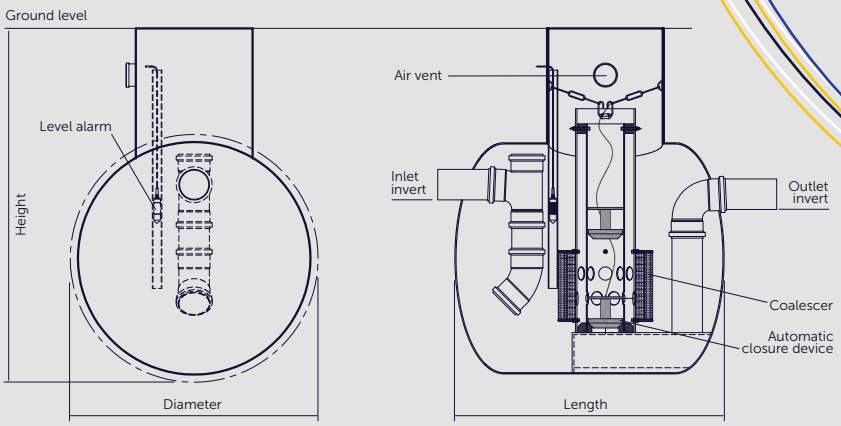
Benefits

- Designed and tested to meet latest UK and European standards
- Corrosion resistant
- Tank shells guaranteed for 25 years with a design life of 50 years
- Heavy duty shells enable installation in all ground conditions
- Easy access turrets for maintenance and servicing (Turret guards optional)
- Various alarm types available (Required by EN858-1)
- Variable invert depths and inlet/outlet configurations to suit individual site conditions
- Vented turrets dissipate excessive fumes and vapours

Typical applications

- *Vehicle workshops*
- *Refuel facilities*
- *Fuel storage sites*

Specifications



View on inlet end

Section through tank centre

Full retention separator range

Model	Max flow litre/sec	Drainage area m²	Silt storage litres	Oil storage litres	Diameter	Length	Height	Connection size	Inlet invert	Outlet invert
NSFR 3	3	170	300	30	1200	1400	1840	160	900	950
NSFR 4.5	4.5	255	450	40	1200	1700	1840	160	900	950
NSFR 6	6	340	600	60	1200	2400	1840	160	900	950
NSFR 8	8	453	800	80	1200	3200	1840	160	900	950
NSFR 10	10	566	1000	100	1200	3500	1840	160	900	950
NSFR 15	15	851	1500	150	1800	3600	2440	200	900	1000
NSFR 20	20	1137	2000	200	1800	4000	2440	200	900	1000
NSFR 30	30	1700	3000	300	1800	4800	2440	250	900	1000
NSFR 40	40	2265	4000	400	1800	6200	2440	315	900	1000
NSFR 50	50	2800	5000	500	1800	7500	2440	315	900	1000
NSFR 60	60	3233	6000	600	2500	5200	3140	315	900	1000
NSFR 65	65	3670	6500	650	2500	5600	3140	315	900	1000
NSFR 70	70	4318	7000	700	2500	6000	3140	315	900	1000
NSFR 80	80	4533	8000	800	2500	6600	3140	315	900	1000
NSFR 100	100	5666	10000	1000	2500	8600	3140	315	900	1000
NSFR 125	125	7082	12500	1250	3000	7200	3640	400	900	1000
NSFR 150	125	8500	12500	1500	3000	8400	3640	450	900	1000

Notes:

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> *Number of access shafts will be built to suit site specifications and to maintain safe access for emptying*
> *All dimensions in mm*

Illustrations shown for visual reference only

Forecourt separators

For areas at ‘significant risk’ of oil contamination

Overview

Designed and tested to BS EN858 parts 1&2, Marsh Hydroil forecourt separators are manufactured from virgin unfilled resin offering exceptional durability, impact resistance and are guaranteed to be watertight and of uniform thickness. These combined properties ensure that the full range of separators stand up to the most rigorous conditions during their service life.

Internal working components, such as coalescing filters, weirs, oil skimmer plates, and their configurations offer the most modern and efficient oil/water separation capability available to the market today.

A wide choice of inlet and outlet positions are available on the units - detailed requirements should be provided at time of order (standard inlet and outlet positions will otherwise be fitted.

Operating principle

Marsh Hydroil forecourt separators are manufactured to a specific size in order to retain the potential spillage from a single compartment of a road tanker – currently up to 7,600 litres in the UK.

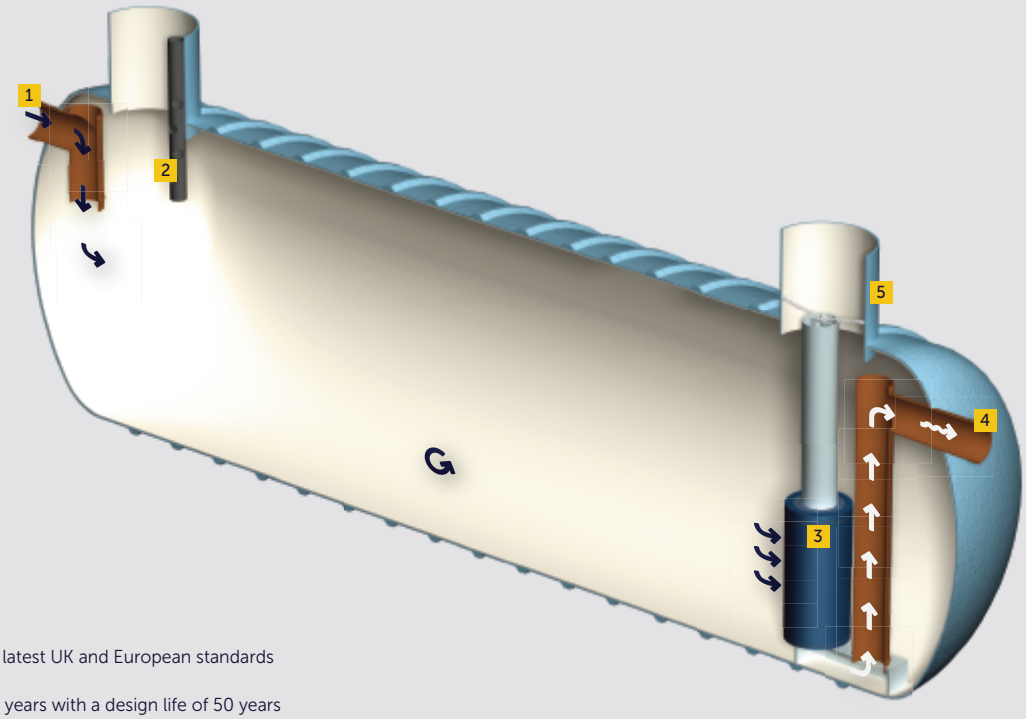
Key

1 Inlet
2 Oil level alarm (in 3" pipe)
3 Coalescer
4 Outlet
5 Access turrets

Flowpath

Oil/water mixture

Water



Benefits

- Designed and tested to meet latest UK and European standards
- Corrosion resistant
- Tank shells guaranteed for 25 years with a design life of 50 years
- Heavy duty shells enable installation in all ground conditions
- Easy access turrets for maintenance and servicing (Turret guards optional)
- Various alarm types available (Required by EN858-1)
- Variable invert depths and inlet/outlet configurations to suit individual site conditions
- Vented turrets dissipate excessive fumes and vapours

Typical applications

- *Petrol stations*
- *Refuel facilities*
- *Fuel storage sites*

Forecourt separator range

Model	Capacity litres	Diameter	Length	Height	Connection size	Inlet invert	Outlet invert
Class 1 C	10000	1800	4200	2200	160	700	800
Class 2 C	10000	1800	4200	2200	160	700	800
Class 1 PS	10000	1800	4200	2200	160	700	800
Class 2 PS	10000	1800	4200	2200	160	700	800

Notes:
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> *All dimensions in mm*

Illustrations shown for visual reference only

Wash-down separators / silt traps

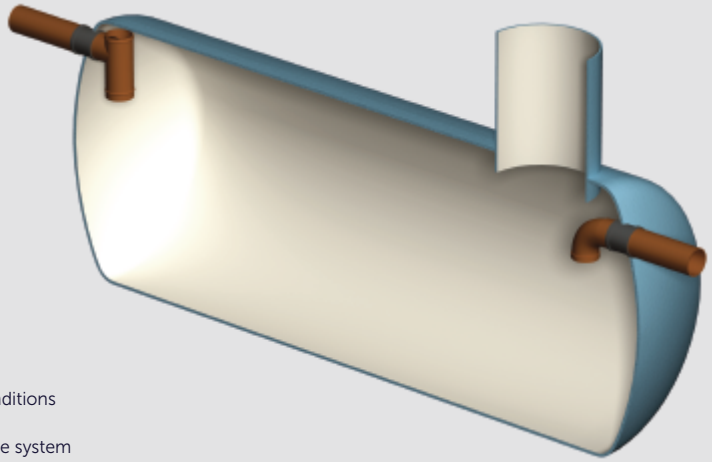
Pollution prevention

Wash-down separators

Available in capacities from 2000-20,000 litres, Marsh wash-down separators safely remove silt and debris from vehicle wash-down facilities.

These units are primarily used on car wash bays, pressure wash facilities or other cleaning facilities where the effluent must be discharged to the foul water drainage system.

It is a legal requirement to install a silt trap or wash-down separator on commercial sites, such as vehicle wash bays, where there is an environmental risk of contamination from dirt, brake dust, traffic film residue, cleaning agents, oil, etc. In all cases, you should contact your local building control or environmental agency for specific site requirements.



Benefits

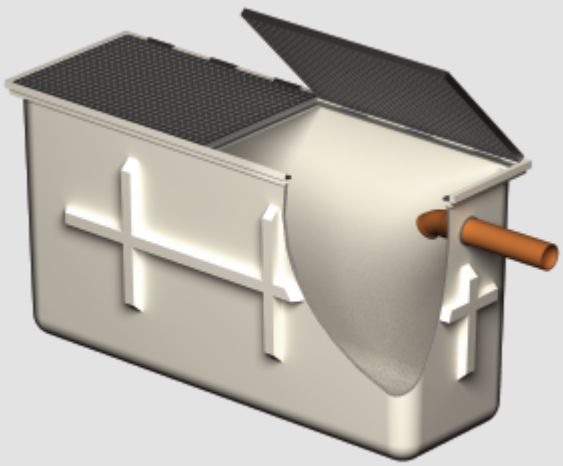
- Heavy duty shells enable installation in all ground conditions
- Tank shells guaranteed for 25 years with a design life of 50 years
- Variable invert depths and inlet/outlet configurations to suit individual site conditions
- Easy access turrets for maintenance and servicing (Turret guards optional)
- Optional Polylok filter can further reduce pollutants from entering the drainage system
- Various alarm types available (Required by EN858-1)
- Corrosion resistant

Wash-down separator range

Model	Capacity litres	Diameter	Length	Height	Connection size	Inlet invert	Outlet invert
WD2800	2800	1250	3000	1750	110	700	750
WD3800	3800	1250	4000	1750	110	700	750
WD4500	4500	1600	2650	2100	110	700	750
WD6000	6000	1800	2950	2300	110	700	750
WD8000	8000	1800	3600	2300	160	700	750
WD10000	10000	1800	4200	2300	160	700	750
WD12000	12000	1800	5000	2300	160	700	750
WD15000	15000	2500	3100	3000	160	700	750
WD18000	18000	2500	4100	3000	160	700	750
WD20000	20000	2500	4500	3000	160	700	750

Notes:

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> *Number of access shafts can be built to suit site specifications and to maintain safe access for emptying*
> *All dimensions in mm*



Silt traps

With a capacity of 1050 litres, Marsh silt traps provide effective storage of silt and debris from vehicle wash-down facilities.

Positioned ahead of an oil separator, the silt trap gathers and stores silt and sediment, and prevents it from entering the oil separator system.

Benefits

- Heavy duty body enables installation in all ground conditions
- Hinged, galvanised steel grating provides structural integrity and easy emptying
- Tank body guaranteed for 25 years with a design life of 50 years

Silt trap

Model	Capacity litres	Length	Width	Height	Connection size	Outlet invert
CST1	1050	2110	720	1140	110mm	315

Alarm systems

For oil separators, wash-down units and silt traps

Oil separator alarms monitor the level of liquid in separator units. An alarm signal is generated when there is an excessive level of oil, liquid or silt, or when the unit requires emptying.

An oil separator alarm is required on all separators to prevent hydrocarbons from entering the drainage system, and to ensure safe and economic operation of the unit.

Marsh Industries can supply various types of oil level, silt level and high level alarms, as well as bespoke options as required.

All alarms supplied by Marsh comply with EN858 parts 1&2, provide explosion protection and are ATEX approved.

Mains alarm

Suitable for sites where mains supply is available.

- Alert: Beacon or SMS text message (optional)
- High quality oil probe with 5m cable
- Probe range 200 metres max (dependent on cable style)
- 240V control panel
- IP65 ABS enclosure
- Supplied with junction box





Battery alarm

Battery alarms are suitable for sites where mains supply is not readily available or for retrofitting.

- Alert: Beacon or SMS text message (optional)
- Probe range: 200 metres max (dependent on cable style)
- Powered by 4x1.5V alkaline D cell batteries
- IP65 ABS enclosure
- Manual probe status check





Solar alarm

Suitable for remote locations and where mains power is unavailable.

- Alert: Beacon or SMS text message (optional)
- High quality oil probe with 5m cable
- Intuitive control panel
- Supplied with battery plus backup battery
- Supplied with clean contact relay
- Alarm stand rotates 360 degrees





For advice and guidance on choosing the right alarm for your site please contact Marsh Industries on +44 (0)1933 654582 or email separators@marshindustries.co.uk

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Prüfinstitut für Abwassertechnik GmbH
PIA
Report on practical testing according to EN 858-1 of glass reinforced separator systems for light liquids
"Hydroil Separator"
Marsh Industries Ltd.
Report – No PIA2017-AB-1607-1089.01
Germany, Aachen, February 2017
PIA GmbH
Dipl.-Ing. Markus Meuser
(Testing Engineer)
Dipl.-Ing. Daniel Vorsehlc
(Head of Material Testing)

Other products from the Marsh range

- Domestic/commercial sewage treatment plants
- Domestic/commercial Pump chambers
- Septic tanks
- Cesspools
- Grease traps
- Domestic/commercial rainwater harvesting systems



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MI-HYDROIL-STP-0717-B

Flow Control Chamber

Operation & Maintenance Instructions

Item: Crown Vortex Flow Control Unit

Operation.
The Vortex Flow Control unit is a surface water regulator. It is entirely self activating and requires no manual intervention.

Maintenance
The flow control unit requires no routine maintenance. Action is only required in the event of a blockage or suspected blockage.

Inspection
The chamber containing the flow control unit and disc valve should be inspected in line with normal practice. Any debris or silt should be removed.Any visible fixing bolts should be checked. If an internal blockage is suspected the vortex unit can be inspected internally and cleaned out by opening the inspection/access cover on the upstream end. The cover must be replaced and secured before the unit becomes operational.

Emergency Draindown
An emergency draindown valve is provided in the chamber to allow the upstream system to be drained independently, bypassing the flow control unit entirely. The draindown valve is operated by pulling the wire cable fixed near the chamber access.

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Gibbs House
Kennel Ride
Ascot SL5 7NT
Tel 01344 886996
Fax 01344 885986

HAPAS
Roads and Bridges

JFC Plastics Ltd
Unit 6
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Tel: 01789 740102 Fax: 01789 740037
e-mail: info@jfc.ie
website: www.jfc.ie

BBA APPROVAL INSPECTION TESTING CERTIFICATION
TECHNICAL APPROVALS FOR CONSTRUCTION

Agrément Certificate
02/H069
Product Sheet 1

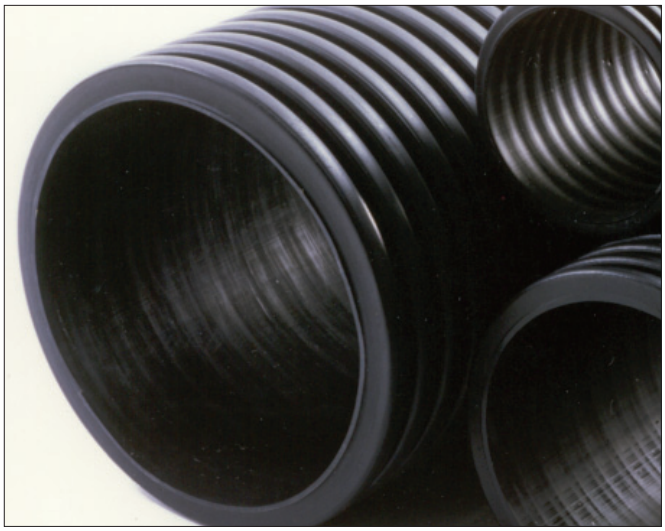
JFC CORRIPIPE TWINWALL DRAINAGE SYSTEM

JFC CORRIPIPE TWINWALL HIGH-DENSITY POLYETHYLENE FILTER AND CARRIER PIPES AND COUPLINGS

This Certificate is issued under the Highway Authorities' Product Approval Scheme (HAPAS) by the British Board of Agrément (BBA) in conjunction with the Highways Agency (HA) (acting on behalf of the overseeing organisations of the Department for Transport; the Scottish Executive; the Welsh Assembly Government and the Department for Regional Development, Northern Ireland), the Association of Directors of Environment, Economy, Planning and Transport (ADEPT), the Local Government Technical Advisers' Group and industry bodies. HAPAS Agrément Certificates are normally each subject to a review every five years.

PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This Certificate relates to JFC CorriPipe Twinwall High-Density Polyethylene Filter and Carrier Pipes and Couplings, in a range of sizes for use in highway drainage for the collection and disposal of surface and sub-surface water.



AGRÉMENT CERTIFICATION INCLUDES:

- factors relating to compliance with HAPAS requirements
- factors relating to compliance with Regulations where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal five-yearly review.

KEY FACTORS ASSESSED

Strength — the fittings have adequate strength to resist loads associated with installation and service (see section 5).

Performance of joints — the system will remain watertight under normal service conditions (see section 6).

Durability — the system will have a service life in excess of 50 years (see section 10).

The BBA has awarded this Agrément Certificate to the company named above for the system described herein. This system has been assessed by the BBA as being fit for its intended use provided it is installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Date of First issue: 18 July 2011

Brian Chamberlain
Head of Approvals — Engineering

Greg Cooper
Chief Executive

Originally certificated on 28 March 2002 (150 mm, 225 mm and 300 mm) and on 23 December 2005 (375 mm, 450 mm and 600 mm).

The BBA is a UKAS accredited certification body — Number 113. The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at www.bbacerts.co.uk

Readers are advised to check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA direct.

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HAPAS Requirements

Requirements

The general requirements for drains are contained in the Manual of Contract Documents for Highway Works (MCHW), Volume 1.

The general requirements for structural wall pipes and fittings are contained in the MCHW, Volume 1, Clause 518.

Further information and guidance is given in the MCHW, Volume 2 and Volume 3 (Drawing Numbers F1 and F2).

Additional site requirements may be included on particular contracts.

Regulations

Construction (Design and Management) Regulations 2007

Construction (Design and Management) Regulations (Northern Ireland) 2007

Information in this Certificate may assist the client, CDM co-ordinator, designer and contractors to address their obligations under these Regulations.

See sections: 1 *Description* (1.3), 2 *Delivery and site handling* (2.1), 3 *General* and 11 *General* of the *Installation* part of this Certificate.

General

This Certificate relates to JFC CorriPipe Twinwall 150 mm, 225 mm, 300 mm, 375 mm, 450 mm and 600 mm High-Density Polyethylene Filter and Carrier Pipes and Couplings.

The system is for use in highway drainage for the collection and disposal of surface and sub-surface water in accordance with Highways Agency (HA) requirements, *Manual of Contract Documents for Highway Works* (MCHW), Volume 1, Clause 518, and Volume 2, and the conditions set out in the *Design Considerations* and *Installation* parts of this Certificate.

Technical Specification

1 Description

1.1 JFC CorriPipe Twinwall 150 mm, 225 mm, 300 mm, 375 mm, 450 mm and 600 mm Diameter High-Density Polyethylene Filter and Carrier Pipes and Couplings are manufactured from a blended, black polyethylene by a twin extrusion process. The two high-density polyethylene pipes are extruded simultaneously, one inside the other, and heat-welded together in one continuous process.

1.2 The products tested and covered by this Certificate are manufactured from material with the specification given in Table 1.

Table 1 Material properties/specification

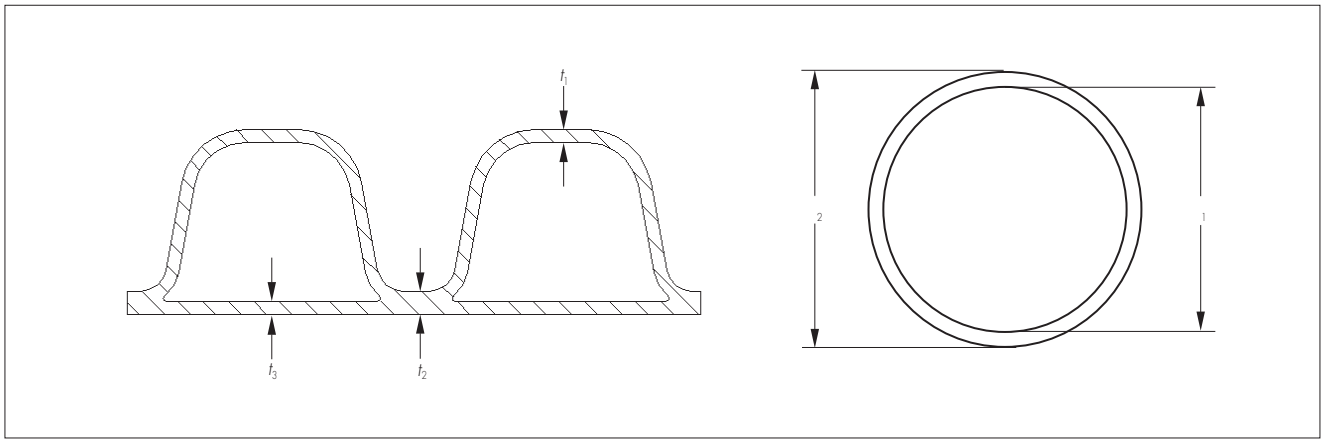
Property	Test method reference	Specification
Tensile properties	EN 638, ISO 527-2	≥18 MPa
Oxygen induction time	EN 728	≥4 mins
Melt flow rate	ISO 1133	≤0.75 g (10 mins) 2.16 kg at 190°C
Density	ISO 1183-3	≥935 kg·m^{-3}
Heat reversion	ISO 12091	N/A

1.3 The outer wall is corrugated and the inner wall is smooth finished. Details and dimensions are given in Table 2 and Figure 1.

Table 2 Pipe dimensions

Nominal internal pipe diameter d_1 (mm)	External pipe diameter d_2 (mm)	t_1 min (mm)	t_2 min (mm)	t_3 min (mm)	Nominal length (m)	Nominal weight (kg·m^{-1})	Pitch (mm)
150	178 ± 1.5	0.8	1.8	1.0	6	1.4	20.0
225	265 ± 2	0.9	2.6	1.2	6	3.0	25.5
300	354 ± 2.5	1.2	3.0	1.5	6	5.0	31.0
375	426 ± 3	1.5	3.5	1.5	6	6.0	39.9
450	512 ± 3	1.8	4.0	1.5	6	8.5	50.1
600	680 ± 4	2.1	4.3	1.8	6	14.5	66.9

Figure 1 Twinwall pipe



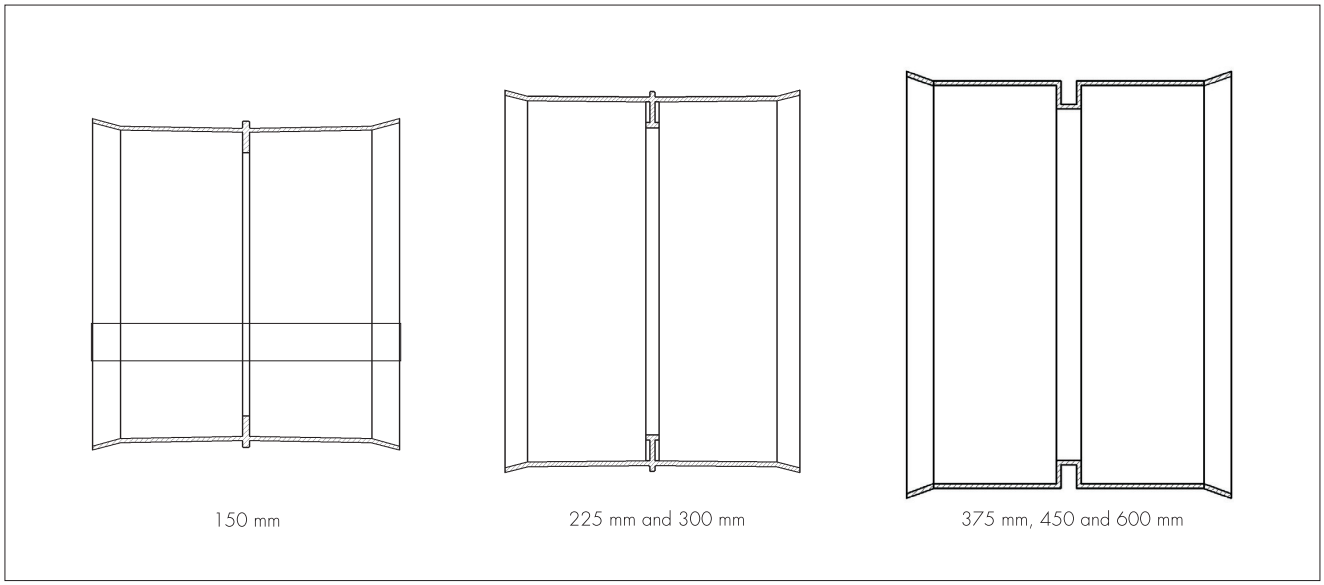
1.4 Black polypropylene couplings are available for the 150 mm, 225 mm and 300 mm sizes of pipe and black polyethylene for the 375 mm, 450 mm and 600 mm sizes (see Table 3 and Figure 2).

Table 3 Coupling dimensions

Nominal internal/external pipe diameter (mm)	Internal diameter		Nominal length (mm)	Nominal seal height (mm)
	at first dwell (mm)	at second dwell (mm)		
150/178	178	179	180	17.0
225/265	268	269	220	25.5
300/354	356	356.5	245	32.0
375/426	429	429	321	32.5
450/512	514	514	390	36.9
600/680	686	686	675	49.0

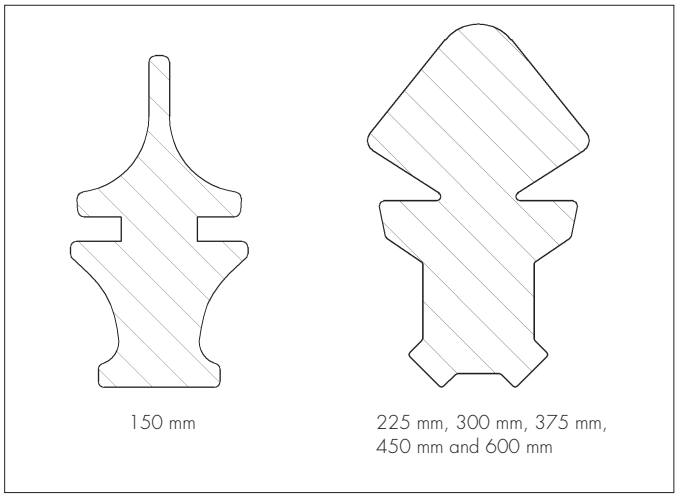
(1) Tapered along coupling length.

Figure 2 Couplings



1.5 Each coupling requires two rubber seals which are manufactured to BS EN 681-1 : 1996 (see Figure 3). The seals must be fitted in accordance with the installation instructions to ensure a watertight joint.

Figure 3 Seals

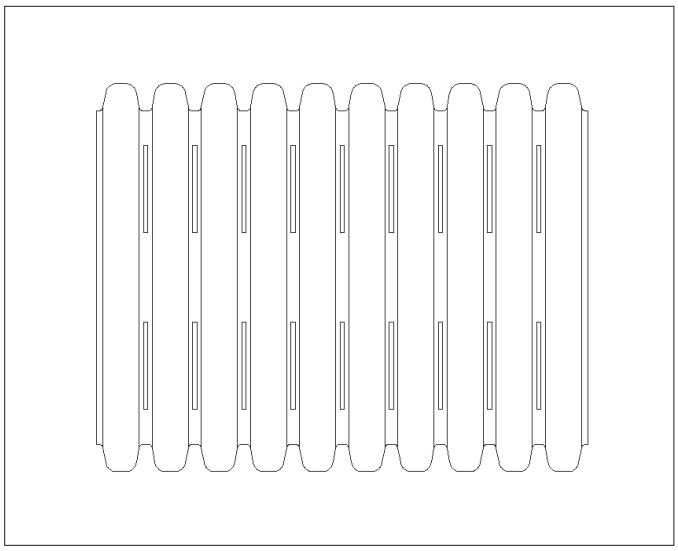


1.6 Pipes can be supplied either slotted or unslotted. Slotted pipe is available with the slots in the dwell between corrugations equally spaced around the circumference (see Table 4 and Figure 4).

Table 4 Slotted pipe details

Internal pipe diameter (nominal) (mm)	No of slots per alternate dwell	No of dwells per metre	Slot length (mm)	Slot width (mm)	Permeable area (minimum) ($mm^2 \cdot m^{-1}$)
150	4	51	15 to 20	2.0 to 2.5	6120
225	4	39	15 to 30	2.0 to 2.5	4680
300	4	32	20 to 40	2.0 to 2.5	5120
375	3	25	42 to 85	2.7 to 3.3	4263
450	3	20	48 to 85	2.8 to 3.5	4024
600	3	15	76 to 106	2.9 to 3.5	4942

Figure 4 Details of slots (optional)



1.7 Continuous quality control is exercised during manufacture. Checks include:

Pipes

- dimensional accuracy
- impact resistance
- short-term stiffness

Couplings

- dimensional accuracy/visual check.

1.8 A label bearing the BBA identification mark is attached to each pipe length and fitting or to each pack of pipes.

2 Delivery and site handling

2.1 Handling, storage and transportation should be in accordance with BS 5955-6 : 1980.

2.2 When long-term storage is envisaged, JFC CorriPipe twinwall slotted and unslotted pipes and couplings should be protected from direct sunlight. If protection cannot be provided, consideration must be given to the effects of daily exposure to direct sunlight:

- up to 3 months — negligible UV degradation but possible extreme surface temperatures of up to 80°C may cause some localised distortion
- 3 months to 12 months — may have significant effect on the impact resistance and physical properties
- over 12 months — damage will occur unless protection provided.

2.3 The manufacturer has the option of adding chemicals to provide enhanced UV stability on request.

2.4 Pipes are generally delivered in prepacked bundles and should be retained in their packaging until installation.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on JFC CorriPipe Twinwall 150 mm, 225 mm, 300 mm, 375 mm, 450 mm and 600 mm Diameter High-Density Polyethylene Filter and Carrier Pipes and Couplings.

Design Considerations

3 General

JFC CorriPipe Twinwall 150 mm, 225 mm, 300 mm, 375 mm, 450 mm and 600 mm Diameter High-Density Polyethylene Filter and Carrier Pipes and Couplings comply with the requirements of the Highways Agency (HA) *Manual of Contract Documents for Highway Works* (MCHW), Volume 1, Clause 518.5 for pipe, Clause 518.6 for couplings and Clause 518.7 for the system, and is suitable for use in highways for the collection and disposal of surface and sub-surface water.

4 Practicability of installation

The pipes are installed using traditional drain-laying methods in accordance with HA requirements and the MCHW, Volume 1, Clauses 503, 505, 518.7 and 518.8. Due to the lightweight nature of the pipe material, handling and jointing are easily performed.

5 Strength

5.1 The pipes have a ring stiffness in excess of 6 $kN \cdot m^{-2}$, a creep ratio of less than 4 and adequate resistance to static loads.

5.2 The pipes have adequate resistance to impact loads to which they may be subjected during installation and in service.

6 Performance of joints

6.1 Joints on filter pipes made from pipe and couplings without the rubber seals are not partially watertight as defined in the MCHW, Volume 1, Clause 504.3.

6.2 Correctly made, the joints constructed from pipe and couplings with rubber seals remain watertight when subjected to deflection and distortion, and comply with the MCHW, Volume 1, Clauses 504.3 and 518.7 (see section 14).

7 Water infiltration

The slot area for the pipes exceeds the minimum requirement of 1000 mm^2 per metre length as given in the MCHW, Volume 1, Clause 518.3 (see Table 3).

8 Flow characteristics

8.1 The pipes will have normal flow characteristics associated with thermoplastics pipes.

8.2 Full-bore velocities are available from the *Tables for the Hydraulic Design of Pipes, Sewers and Channels*, Volume 2, 8th Edition, by H R Wallingford and D I H Barr. Appropriate values are based on the Colebrook-White equation. An appropriate value of roughness coefficient should be selected when designing the drainage system. For new pipes, a value of 0.006 is applicable, but for designs a value of 0.6 is generally used.

9 Maintenance

9.1 The slots are designed to restrict the ingress of silt into the drains.

9.2 Access to the system for cleaning should be provided by conventional methods.

9.3 The system can be rodded using flexible drain rods. In common with other standard plastic drainage systems, toothed root cutters and rods with metal ferrules, as used with some mechanical clearing systems, could damage the pipes and couplings and should not be used.

9.4 Tests indicate that the pipes have adequate resistance to cleansing using pressure jetting equipment (see section 13.1). It is recommended that low-pressure, high-volume systems are utilised in accordance with MCHW, Clause 520.

10 Durability

In the opinion of the BBA, the material from which the pipes and couplings are manufactured will not significantly deteriorate and the anticipated life of the system will be in excess of 50 years.

Installation

11 General

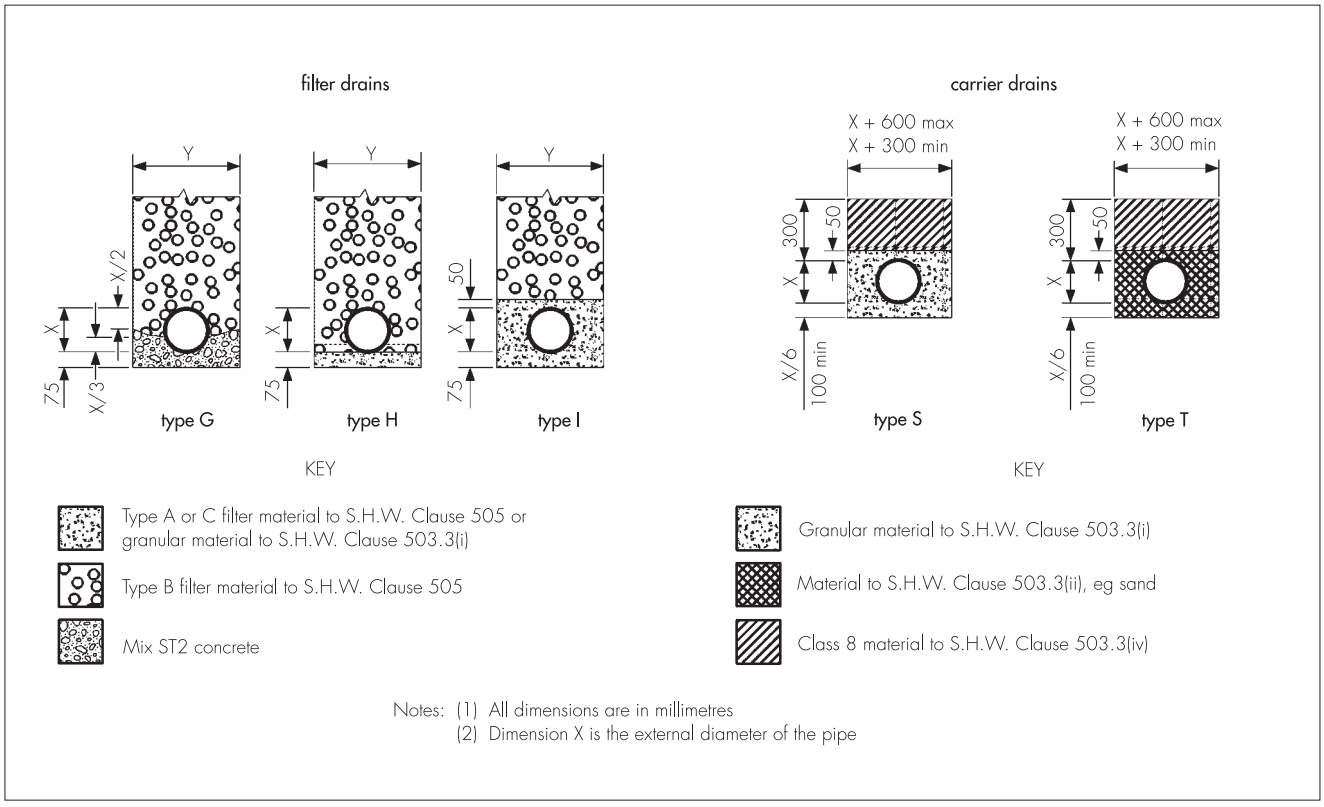
11.1 JFC CorriPipe Twinwall 150 mm, 225 mm, 300 mm, 375 mm, 450 mm and 600 mm Diameter High-Density Polyethylene Filter and Carrier Pipes and Couplings must be installed in accordance with HA requirements and the MCHW, Volume 1, Clauses 503, 505, 518.7 and 518.8.

11.2 The pipes and couplings must be protected against damage from site construction traffic.

12 Procedures

12.1 For typical laying, trench and backfilling specification details, reference should be made to Figure 5 and the MCHW, Volume 3, Drawings No F1 (Type T and S) and No F2 (Type G, H and I).

Figure 5 Installation details



12.2 Pipes are cut easily using conventional hand tools, and should be cut square between the corrugations.

12.3 For a watertight joint, the pipe ends and coupling should be cleaned and the rubber seal fitted externally in the first or second dwell. The seal and inside of the coupling should be lubricated and the pipe pushed fully home to the central register either by hand, or using a lever if necessary.

12.4 Care should be taken during backfill to maintain the line and level of the pipeline. If necessary, the pipe should be restrained to prevent uplift.

13 Tests

13.1 Tests were carried out on the pipe in accordance with the MCHW, Volume 1, Clause 518.5 to determine:

- ring stiffness to BS EN ISO 9969 : 1995
- creep ratio to BS EN ISO 9967 : 1995
- longitudinal bending to the MCHW, Volume 1, Clause 518.11
- rodding resistance to the MCHW, Volume 1, Clause 518.12
- impact resistance at 0°C and 23°C to BS EN 1411 : 1996 with a striker of 1.0 kg mass and 25 mm diameter conical head
- water jetting WRc method.

13.2 Tests were carried out on the system to establish:

- leaktightness of joint to BS EN 1277 : 2003, Method 4, Conditions A, B and C
- insertion force (ease of jointing).

13.3 Tests were carried out to establish the dimensional accuracy of the pipe, coupling and ring seal.

14 Investigations

14.1 An examination was made of data in relation to the effect of the production tolerances on the performance of the products.

14.2 An evaluation of existing data was made to assess material properties, chemical resistance and durability.

14.3 Calculations were carried out to determine slot area.

14.4 The manufacturing process was examined, including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

Bibliography

BS 5955-6 : 1980 *Plastics pipework (thermoplastics materials) — Code of practice for the installation of unplasticized PVC pipework for gravity drains and sewers*

BS EN 681-1 : 1996 *Elastomeric seals — Material requirements for pipe joint seals used in water and drainage applications — Vulcanized rubber*

BS EN 763 : 1995 *Plastics piping and ducting systems — Injection-moulded thermoplastics fittings — Test method for visually assessing effects of heating*

BS EN 1277 : 2003 *Plastics piping systems — Thermoplastics piping systems for buried non-pressure applications — Test methods for leaktightness of elastomeric sealing ring type joints*

BS EN 1411 : 1996 *Plastics piping and ducting systems — Thermoplastics pipes — Determination of resistance to external blows by the staircase method*

BS EN ISO 9967 : 1995 *Thermoplastics pipes — Determination of creep ratio*

BS EN ISO 9969 : 1995 *Thermoplastics pipes — Determination of ring stiffness*

EN 638 : 1994 *Plastics piping and ducting systems — Thermoplastics pipes — Determination of tensile properties*

EN 728 : 1997 *Plastics piping and ducting systems — Polyolefin pipes and fittings — Determination of oxidation induction time*

ISO 527-2 : 1993 *Plastics — Determination of tensile properties — Test conditions for moulding and extrusion plastics*

ISO 1133 : 1997 *Plastics — Determination of the melt mass-flow rate (MFR) and the melt volume-flow rate (MVR) of thermoplastics*

ISO 1183-3 : 1999 *Plastics — Methods for determining the density of non-cellular plastics — Gas pyknometer method*

ISO 4440-1 : 1994 *Thermoplastics pipes and fittings — Determination of melt mass-flow rate — Test method*

ISO 4451 : 1980 *Polyethylene (PE) pipes and fittings — Determination of reference density of uncoloured and black polyethylenes*

ISO 12091 : 1995 *Structural wall thermoplastics pipes — Oven test*

Manual of Contract Documents for Highway Works, Volume 1 Specification for Highway Works, August 1998 (as amended)

Manual of Contract Documents for Highway Works, Volume 2 Notes for Guidance on the Specification for Highway Works, August 1998 (as amended)

Manual of Contract Documents for Highway Works, Volume 3 Highway Construction Details, March 1998 (as amended)

15 Conditions

15.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is issued only to the company, firm, organisation or person named on the front page — no other company, firm, organisation or person may hold or claim that this Certificate has been issued to them
- is valid only within the UK
- has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective
- is copyright of the BBA
- is subject to English Law.

15.2 Publications, documents, specifications, legislation, regulations, standards and the like referenced in this Certificate are those that were current and/or deemed relevant by the BBA at the date of issue or reissue of this Certificate.

15.3 This Certificate will remain valid for an unlimited period provided that the product/system and its manufacture and/or fabrication, including all related and relevant parts and processes thereof:

- are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA
- continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine
- are reviewed by the BBA as and when it considers appropriate
- remain in accordance with the requirements of Highway Authorities' Product Approval Scheme.

15.4 The BBA has used due skill, care and diligence in preparing this Certificate, but no warranty is provided.

15.5 In issuing this Certificate, the BBA is not responsible and is excluded from any liability to any company, firm, organisation or person, for any matters arising directly or indirectly from:

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- any loss or damage, including personal injury, howsoever caused by the product/system, including its manufacture, supply, installation, use, maintenance and removal.

15.6 Any information relating to the manufacture, supply, installation, use, maintenance and removal of this product/system which is contained or referred to in this Certificate is the minimum required to be met when the product/system is manufactured, supplied, installed, used, maintained and removed. It does not purport in any way to restate the requirements of the Health and Safety at Work etc. Act 1974, or of any other statutory, common law or other duty which may exist at the date of issue or reissue of this Certificate; nor is conformity with such information to be taken as satisfying the requirements of the 1974 Act or of any statutory, common law or other duty of care.

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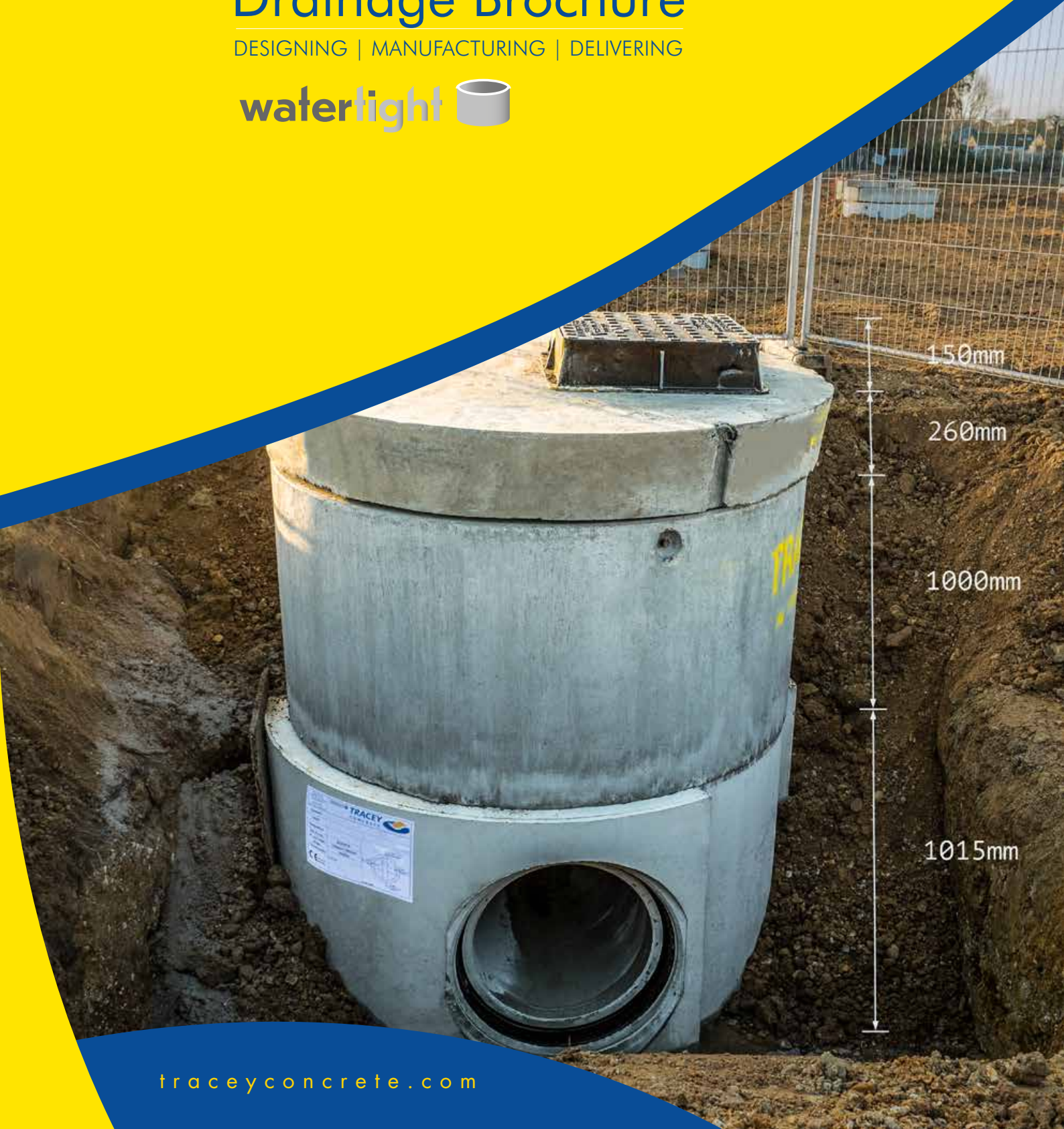
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TRACEY
CONCRETE

Drainage Brochure

DESIGNING | MANUFACTURING | DELIVERING

watertight



traceyconcrete.com

TRACEY CONCRETE

Tracey Concrete is one of the largest precast concrete manufacturers in the UK and Ireland.

Tracey Concrete's success has been built on the consistent quality of our products, efficient delivery and outstanding customer service. With our vast experience and expertise in the construction industry we have been able to design and supply precast concrete products for some of the biggest projects in the UK and Ireland.

Our products comply with all necessary certifications and are accredited with the most up to date British and European standards, with the relevant products being BSI kitemarked and CE marked.

WE SPECIALISE IN

- Precast Concrete Drainage Systems
- Precast Tunnelling Systems
- Cable Trough Systems
- Agricultural Precast
- Precast Fencing
- Ready-mix and Liquid Screed Concrete
- Bespoke Precast Concrete Systems
- Bio Klenze™ Sewage Treatment Systems
- Quarry Products

bsi. ISO 9001:2015 Quality Management | ISO 14001:2015 Environmental Management | OHSAS 18001 Occupational Health and Safety Management

CE

bsi. UKAS MANAGEMENT SYSTEMS 0003



Tracey Concrete's Precast Drainage Factory - Enniskillen

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Our Story

Tracey's began as a family-run contracting business in the early 1960's installing watermains throughout Northern Ireland. In the 1970's, Tracey Concrete Ltd was formed as a readymix concrete supplier to the public.

Over the years, the company expanded into new product ranges manufacturing precast concrete cills & lintels and agricultural cattle slats. In the 1990's, the business expanded into precast drainage product's manufacturing concrete pipes and manhole rings becoming a leading precast drainage supplier in Ireland.

In 2003, Tracey Concrete entered the UK market supplying projects in England, Scotland and Wales. Tracey Concrete are now a leading supplier of Precast Drainage and Tunnelling throughout the UK and Ireland.



Tracey Readymix Lorry 1970's



Tracey Concrete's Belcoo Quarry



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SPIGOT & SOCKET PIPES
DN225 -2100

Tracey Concrete offers a wide selection of Spigot & Socket Pipes in a range of diameters and lengths to meet any project specifications. Manufactured to British Standard BS EN 1916 & BS 5911-1 and BSI Kitemarked.











SPIGOT & SOCKET PIPES / DN225 - 2100

Size Internal Dia	mm	225	300	375	450	525	600	675	750	900	1050	1200	1350	1500	1800	2100
Barrel Dia	mm	331	405	485	580	675	780	855	940	1100	1280	1470	1650	1830	2180	2480
Socket Dia	mm	445	540	650	730	805	920	1015	1090	1290	1370	1660	1820	2000	2290	2590
Effective Length	mm	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500
Overall Length	mm	2595	2600	2595	2595	2610	2600	2600	2632	2632	2620	2640	2650	2640	2650	2645
Approx Weight	KG	280	430	580	760	930	1230	1370	1745	2190	2730	3980	4745	5755	7600	9210
To suit Manhole	mm	1050	1200	1350	1350	1500	1500	1500	1800	1800	2100	2100	2400	2400	2700	3000
Maximum Deflection	°	2	2	2	2	2	2	2	1	1	1	1	0.5	0.5	0.5	0.5
Reinforced	Y/N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
Lifting Anchor	-	-	-	-	-	-	-	-	-	-	-	2x7.5T	2x7.5T	2x10T	2x10T	2x10T
Integrated Joint	Y/N	N	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	N	N	N	N	N
Lamell Joint	Y/N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Spigot & Socket pipe sizes DN1200 & above are manufactured with 2No lifting anchors for spherical 10T lifting Shackles

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ROCKER PIPES DN225 - 2100



ROCKER PIPES / DN225 - 2100

Size Internal Dia	mm	225	300	375	450	525	600	675	750	900	1050	1200	1350	1500	1800	2100
Effective Length	mm	600	600	600	600	600	600	820	1000	1230	1245	1180	1310	1290	1300	1330
Approx Weight	KG	79	120	159	270	332	438	485	913	1133	1421	2290	2614	3117	4158	5137

SPIGOT BUTT END PIPES DN225 - 2100



SPIGOT BUTT END PIPES / DN225 - 2100

Size Internal Dia	mm	225	300	375	450	525	600	675	750	900	1050	1200	1350	1500	1800	2100
Effective Length	mm	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250
Approx Weight	KG	140	215	290	380	465	615	685	873	1095	1365	1990	2373	2878	3800	4605

Lengths may vary depending on availability

SOCKET BUTT END PIPES DN225 - 2100



SOCKET BUTT END PIPES / DN225 - 2100

Size Internal Dia	mm	225	300	375	450	525	600	675	750	900	1050	1200	1350	1500	1800	2100
Effective Length	mm	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250
Approx Weight	KG	140	215	290	380	465	615	685	873	1095	1365	1990	2373	2878	3800	4605

Lengths may vary depending on availability

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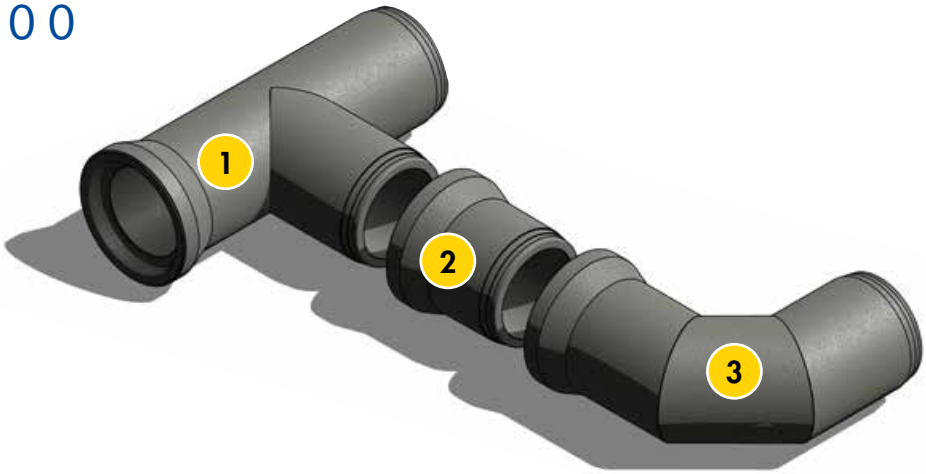
DOUBLE SPIGOT PIPE DN225 - 900



DOUBLE SPIGOT PIPE / DN225 - 900

Size Internal Dia	mm	225	300	375	450	525	600	675	750	900	1050	1200	1350	1500	1800	2100
Effective Length	mm	495	570	530	730	820	825	820	1245	1245	-	-	-	-	-	-
Approx Weight	KG	55	80	95	184	283	349	415	757	924	-	-	-	-	-	-

JUNCTIONS* DN225 - 2100



JUNCTIONS / DN225 - 2100

1 Tumbling Bay
2 Special Length Pipe
3 90 Degree Bend

* Note - Only made to order*

BENDS* DN225 - 2100

BENDS / DN225 - 2100

Common Angles
11.25 °
22.5 °
45 °
90 °



* Note - Only made to order*
* Other angles available on request*

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JUNCTION SEALS

Junction seals to suit 100mm & 150mm pipe connections can be fitted to all sizes of our concrete pipe.

Seals are supplied to suit branches made from solid wall PVC, rib sewer, twin-wall surface drainage, su-persleeve clay & densleeve clay.

Junction Seals can be fitted to a full length pipe or rock-er pipes in positions to suit site requirements.

Junctions to suit other pipe sizes and types are available on request.



150mm Twinwall



Forsheda 910
202 x 16mm

150mm Solid Wall PVC



Forsheda 910
190 x 20mm

150mm Ultra - Rib



Forsheda F-910
202 x 20mm

150mm Densleeve



Forsheda 910
217 x 20mm

150mm Super Sleeve



Forsheda 911-7
Uni Junction DN 167

150mm Super Sleeve



DS LKR
150 / 202







Lubricant



Step 1

Before assembly, inspect the pipes and ensure socket and spigot are free from gravel or dirt. Use a damp cloth to wipe the seal clean.

Step 2

Using **ONLY TRACEY CONCRETE** supplied lubricant apply it to the spigot end of the pipe. See our website for number of tubs of lubricant required per diameter of pipe. www.traceyconcrete.com/pipes



Step 3

Ensure the lubricant is evenly applied all around the spigot end. Lubrication is easier with the pipe suspended off the ground. Dry jointing can lead to damage of the seal and pipe.

Step 4

Centre the pipes in position then push the spigot into the socket end. Inspect pipes after installation to ensure assembly is complete. Air tests can then be carried out regularly using inflatable stoppers.



Important Jointing Information

The integral pipe-seal jointing system used in Tracey Concrete's Spigot & Socket Pipes requires the use of an approved proprietary lubricant, which is available for supply with all pipe orders from Tracey Concrete sales team. Failure to use the approved proprietary lubricant in accordance with the instructions provided by the pipe-seal manufacturer and Tracey Concrete may give rise to problems with pipe jointing and seal performance and invalidate any warranty, implied or otherwise. Tracey Concrete accepts no responsibility whatsoever for problems or loss of performance arising from any such failure.

DRY WEATHER FLOW PIPES DN900 - 2100

Dry weather flow channels are cast into the spigot & socket pipe during factory production as an off-site solution. Insufficient flow velocities during dry weather flow can increase retention time in pipes and if channels are not designed correctly can lead to undesirable sedimentation of solid particles.



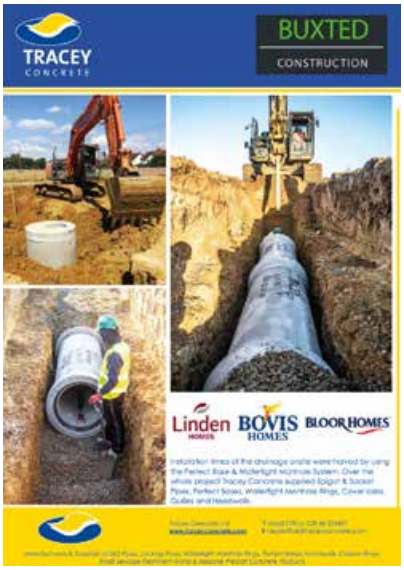


*Only manufactured to order

Case Studies

S&S Pipes



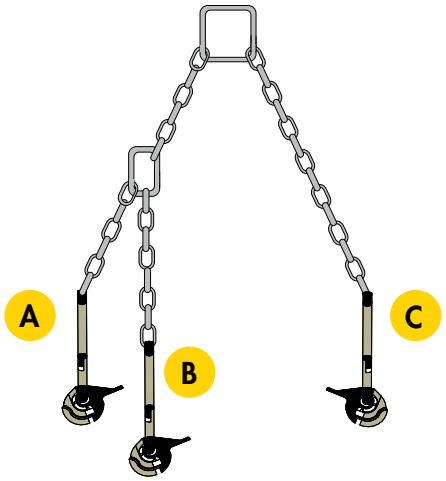




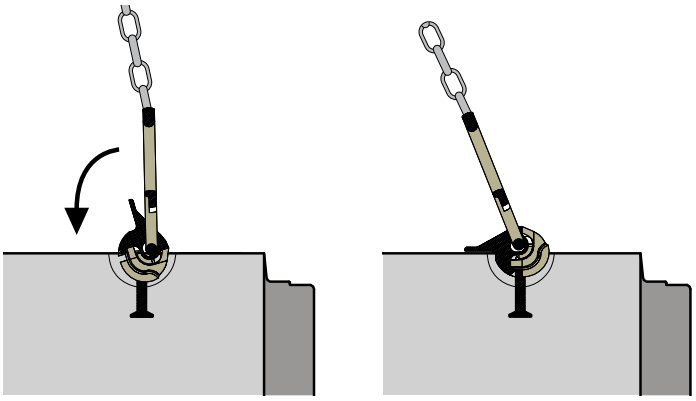
Tracey Concrete's pipes from DN1200 and upwards should be handled using our spherical lift anchor system. 10T lifting anchors are cast into the pipe during manufacture to suit a spherical lift shackle that hooks to the anchor to lift the pipe. All lifting equipment is available from Tracey Concrete.

Firstly lift the new pipe into place using equal length chains (A & C) as shown below. Then to join the pipes together fit the longer chain (B) to the pipe already in place, then hook the shorter length chain (A) onto the new pipe in the arrangement shown below. Lift the chains vertically and the new pipe will then join into the pipe already in place.

THE CHAIN SET

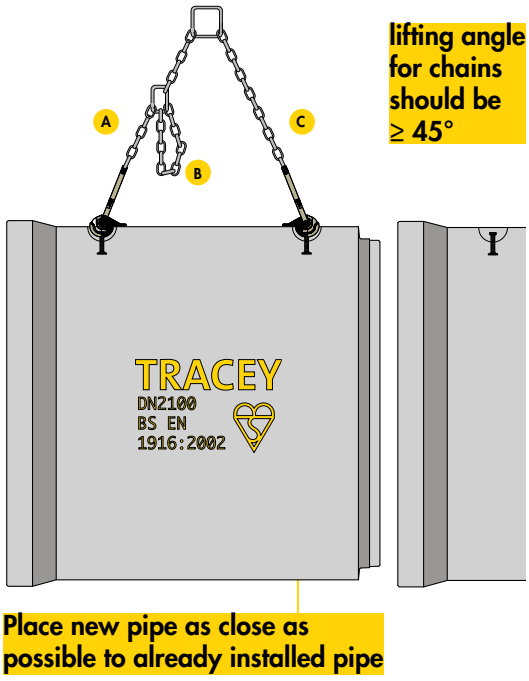


FITTING THE SHACKLE

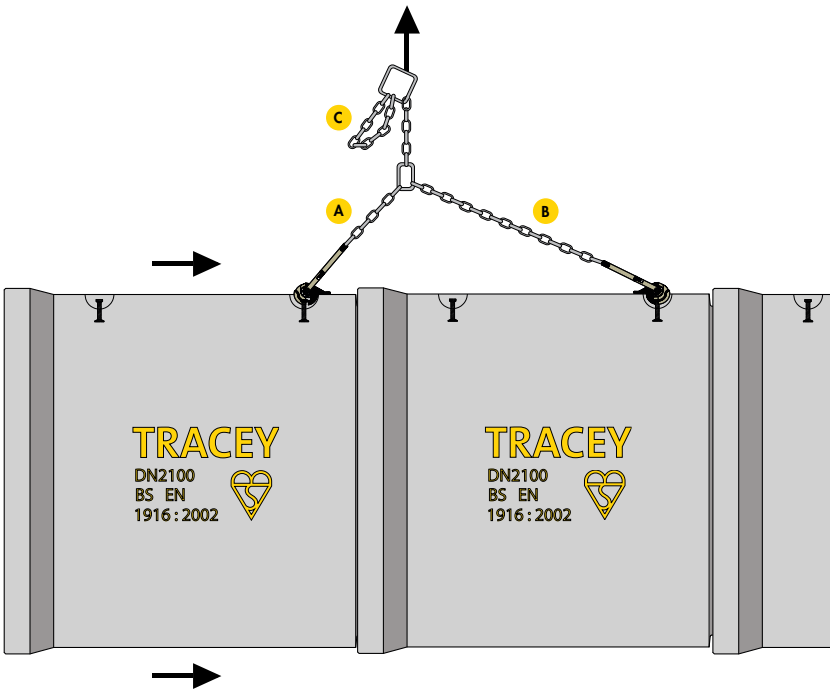


POSITION SHACKLE THEN ENGAGE

LIFTING & HANDLING



JOINTING PIPES



PERFECT BASE™
DN1200, 1500, 1800 & 2100

The Tracey Concrete Perfect Base™ is a custom-made watertight monolithic benched concrete base.

The Perfect Base™ allows Tracey Concrete to manufacture any practical channel inlet/outlet configuration. Inlets are possible at every angle from 90 degrees to 270 degrees from outlet.

The extra flexibility of the Perfect Base™ therefore allows for bespoke base design.

All Perfect bases™ are individual, custom-made to exact site requirements.

Tracey Concrete's large production facilities allow for swift manufacture & delivery to site just days after order.







- Fast Installation
- Safe Installation
- Economical
- Available in DN1200,1500,1800 & 2100mm
- Any Inlet/Outlet Angle
- Complete Take-off Service
- Wide Wall - No concrete surround required
- No on-site benching needed
- Less exposure to silica dust - No cutting inlets/rings
- BSI Kitemarked

PERFECT BASE™
DN1200, 1500, 1800 & 2100

Perfect Base™ – The Future of Manhole Construction

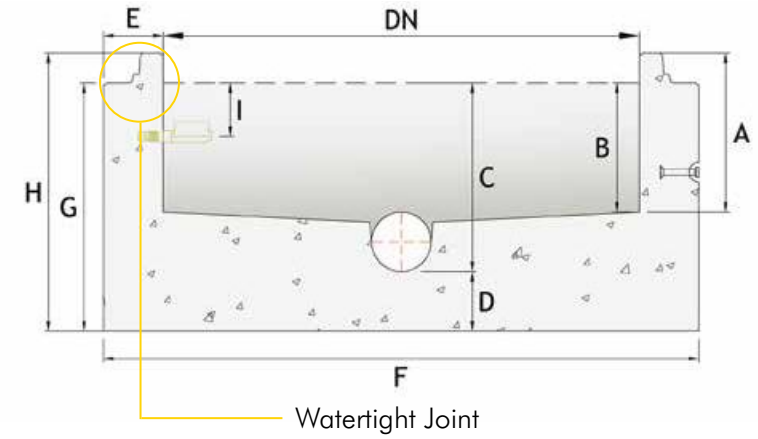
- **Every Angle:**
  Each Perfect Base™ can be manufactured with **limitless channel configurations**
- **Safer Installation:**
  Reduced working time in confined spaces/excavation
- **Watertight System:**
  The combination of a thicker wall and rubber joint ensures a watertight structure
- **Efficiency:**
  Installation times significantly shorter than traditional methods
- **Design Life:**
  120 years
- **Quality:**
  Complies with BS EN 1917 and BS 5911-3
  Accepted by major water companies and is included in Sewers for Adoption
- **Custom Connections:**
  Manufactured with integrated couplers to suit any pipe type
- **Take-off Service:**
  Bases manufactured to CAD site drawings
- **Simple Installation:**
  Certified lifting shackles can be provided for safe and easy installation
- **Low Carbon Footprint:**
  40-45% more environmentally friendly than traditional methods
- **Access:**
  Double steps or ladder rungs available
- **Custom Design:**
  Available with custom inlet/outlet & crown/invert configuration



DN1200 PERFECT BASE™ SPECIFICATIONS

DN1200 Perfect Base is the ideal solution for housing projects. The flexible design works well with small diameter pipe.

DN 1200 is the most common size of manhole ring. The table below gives the diameter & weight of the Base depending on the size required.



PERFECT BASE / DN1200

Inlet/Outlet Diameter	A	B	C	D	E	F	G	H	I	Approx Weight (KG)
100	400	325	475	150	150	1500	625	700	125	1710
100	300	225	375	150	150	1500	525	600	125	1550
100	200	125	275	150	150	1500	425	500	125	1400
100	100	25	175	150	150	1500	325	400	125	1250
150	400	325	475	150	150	1500	625	700	125	1710
150	300	225	375	150	150	1500	525	600	125	1550
150	200	125	275	150	150	1500	425	500	125	1400
150	100	25	175	150	150	1500	325	400	125	1250
225	400	325	575	150	150	1500	725	800	125	2020
225	300	225	475	150	150	1500	625	700	125	1870
225	200	125	375	150	150	1500	525	600	125	1710
300	400	325	625	150	150	1500	775	850	125	2150
300	300	225	525	150	150	1500	675	750	125	2000
300	400	325	625	150	190	1580	775	850	125	2450
300	300	225	525	150	190	1580	675	750	125	2240
375	400	325	625	150	190	1580	775	850	125	2550
375	300	225	525	150	190	1580	675	750	125	2750
450	400	325	625	150	260	1720	775	850	125	3450
450	300	225	525	150	260	1720	675	750	125	3750

Dimensions may vary depending on type of pipe used. Core Height (A) can be adjusted in **50mm intervals**



DN1200 WATERTIGHT MANHOLE RINGS & SLABS

WATERTIGHT MANHOLE RINGS / DN1200

Internal Dia	Depths				Wall Thickness	Overall Dia	Circum	Approx Weight/m	Type of Joint	Lifting Shackle	Step Heights
mm	250mm	500mm	750mm	1000mm	mm	mm	mm	KG	-	-	-
1200	✔	✔	✔	✔	130	1460	4712	1350	Watertight	3 x 2.5T	250mm

Tracey Concrete wateright manhole rings are manufactured with a wateright joint which is a superior seal to a tongue & groove joint. The 130mm thick wall eliminates the need for a concrete surround, creating an impermeable chamber.



3No **2.5T** Spherical lift shackles are required to lift DN1200 wateright manhole rings and Perfect Base

*Note - Different sizes of spherical lifters are required for each diameter of base



Cast in lifting Anchor

WATERTIGHT MANHOLE COVER SLABS / DN1200

To Suit Internal Dia	Overall Dia	Effective Depth	Approx Weight	Standard Openings Available				
mm	mm	mm	KG	**600 SQ**	**675 SQ**	**600 RD**	**750 SQ**	**750 x 600**
1200	1554	230	720	**E**	**E**	**E/C**	**E**	**E**

Bespoke openings can be manufactured on request
C = Central Opening E = Eccentric Opening

Tracey Concrete watertight cover slab also has a watertight joint which provides a wateright seal between the cover slab and top MH ring completing the watertight manhole chamber.



3No lifting loops are cast into the cover slab for lifting. A set of equal length 3 leg chains with hooks is recommended

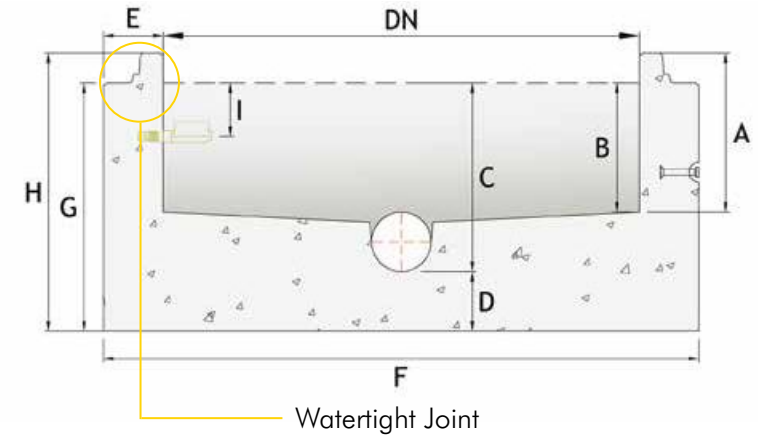


Cast in lifting loop

DN1500 PERFECT BASE™ SPECIFICATIONS

DN1500 Perfect Base is the ideal solution for housing projects. They are typically designed for any type of 375-675 diameter pipes.

The height of DN1500 Perfect Base can be adjusted to suit your specified onsite ground levels. The table below shows the range of heights that can be achieved for each pipe diameter.



PERFECT BASE / DN1500

Inlet/Outlet Diameter	A	B	C	D	E	F	G	H	I	Approx Weight (KG)
375	500	415	815	200	230	1960	1015	1100	175	5000
375	400	315	715	200	230	1960	915	1000	175	4700
375	300	215	615	200	230	1960	815	900	175	4400
450	500	415	915	200	230	1960	1115	1200	175	5390
450	400	315	815	200	230	1960	1015	1100	175	5090
450	300	215	715	200	230	1960	915	1000	175	4790
450	200	115	615	200	230	1960	815	900	175	4490
525	500	415	915	200	230	1960	1115	1200	175	5390
525	400	315	815	200	230	1960	1015	1100	175	5090
525	300	215	715	200	230	1960	915	1000	175	4790
600	500	415	915	200	230	1960	1115	1200	175	5390
600	400	315	815	200	230	1960	1015	1100	175	5090
675	900	815	1315	200	320	2140	1515	1600	175	8050
675	800	715	1215	200	320	2140	1415	1500	175	7600

Dimensions may vary depending on type of pipe used. Core Height (A) can be adjusted in 50mm intervals



DN1500 WATERTIGHT MANHOLE RINGS & SLABS

WATERTIGHT MANHOLE RINGS / DN1500

Internal Dia	Depths				Wall Thickness	Overall Dia	Circum	Approx Weight/m	Type of Joint	Lifting Shackle	Step Heights
mm	250mm	500mm	750mm	1000mm	mm	mm	mm	KG	-	-	mm
1500	✔	✔	✔	✔	150	1800	5655	1925	Watertight	3 x 5T	250

1500 watertight manhole rings are manufactured with a watertight joint and 130mm thick wall eliminating the need for a concrete surround thus saving time and money.



3No **5T** Spherical lift shackles are required to lift DN1500 watertight manhole rings and Perfect Base

*Note - Different sizes of spherical lifters are required for each diameter of base



Lifting shackle mid lift

WATERTIGHT MANHOLE COVER SLABS / DN1500

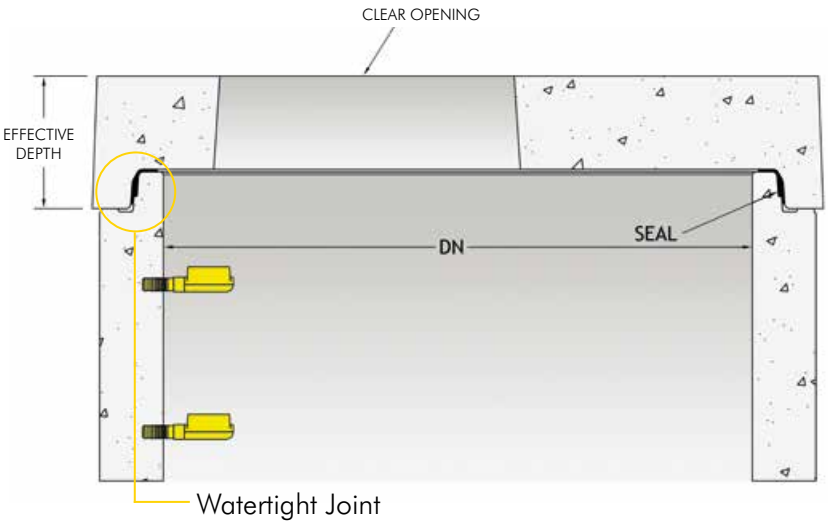
To Suit Internal Dia	Overall Dia	Effective Depth	Approx Weight	Standard Openings Available					
mm	mm	mm	KG	**600 SQ**	**675 SQ**	**600 RD**	**750 SQ**	**1200 x 675**	**750 x 600**
1500	1900	260	1205	**E**	**E**	**E/C**	**E**	**E**	**E**

Bespoke openings can be manufactured on request
C = Central Opening E = Eccentric Opening

Tracey Concrete watertight cover slab also has a watertight joint which provides a wateright seal between the cover slab and top MH ring completing the watertight manhole chamber.

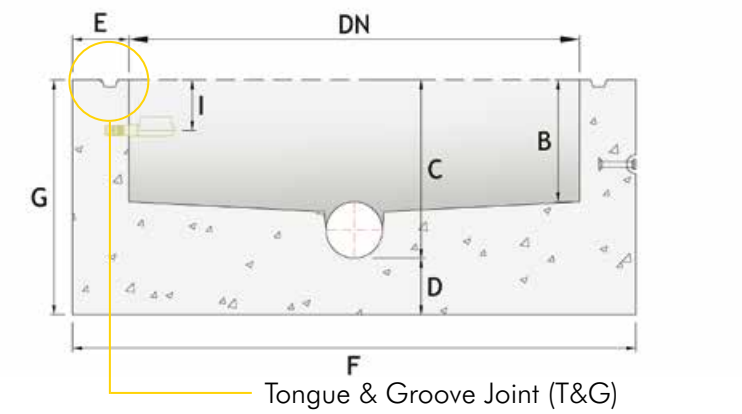


3No lifting loops are cast into the cover slab for lifting. A set of equal length 3 leg chains with hooks is recommended



DN1800 PERFECT BASE™ SPECIFICATIONS

DN1800 is used for larger diameter storm drainage typically for any pipe material ranging from 675-900mm diameter. DN1800 Perfect Base can also be used in precast concrete attenuation systems.



PERFECT BASE / DN1800

Inlet/Outlet Diameter	B	C	D	E	F	G	I	Approx Weight (KG)
675	900	1400	200	300	2400	1600	125	10180
675	800	1300	200	300	2400	1500	125	9700
675	700	1200	200	300	2400	1400	125	9230
675	600	1100	200	300	2400	1300	125	8750
750	900	1400	200	300	2400	1600	125	9970
750	800	1300	200	300	2400	1500	125	9490
750	700	1200	200	300	2400	1400	125	9020
750	600	1100	200	300	2400	1300	125	8540
900	900	1400	200	300	2400	1600	125	9780
900	800	1300	200	300	2400	1500	125	9310
900	700	1200	200	300	2400	1400	125	8830
1050	900	1400	200	300	2400	1600	125	8900

Dimensions may vary depending on type of pipe used. Note: DN1800 Base only available in T&G option
Smaller diameter pipe may be used with smaller core heights.

Top Tip - reducers can be installed where possible to reduce the weight



DN1800 MANHOLE RINGS & SLABS

MANHOLE RINGS / DN1800

Internal Dia	Depths				Wall Thickness	Overall Dia	Circum	Approx Weight/m	Type of Joint	Lifting Hole	Step Heights
mm	250mm	500mm	750mm	1000mm	mm	mm	mm	KG	-	-	-
1800	-	✔	✔	✔	125	2050	6050	1800	T&G	3 x 50mm	250mm

Tracey Concrete 1800mm manhole rings are manufactured with a T&G joint. The 125mm thick wall eliminates the need for a concrete surround. The chamber is sealed using 120mm x 12mm x 6m conseal jointing bitumen strip.





3No 38mm lifting pins are required to lift DN1800 manhole rings. A waterpoof grout will be required to seal each lift hole after install. 3No **10T** Spherical lift shackles to lift Perfect Base

*Note - Different sizes of spherical lifters are required for each diameter of base



Conseal jointing strip

MANHOLE COVER SLABS / DN1800

To Suit Internal Dia	Overall Dia	Effective Depth	Approx Weight	Standard Openings Available						
mm	mm	mm	KG	**600 SQ**	**675 SQ**	**750 SQ**	**1200 x 675**	**750 x 600**	**2No 600SQ**	**2No 675SQ**
1800	2050	200	1425	**E**	**E**	**E**	**E**	**E**	**12'O Clock & 6'O Clock**	**12'O Clock & 6'O Clock**

Bespoke openings can be manufactured on request
C = Central Opening E = Eccentric Opening

Tracey Concrete precast cover slabs come with standard openings as per the table above. Cover slabs with bespoke openings, davit sockets or special finishes can be manufactured on request. Reducing slabs and landings slabs can also be made on request.





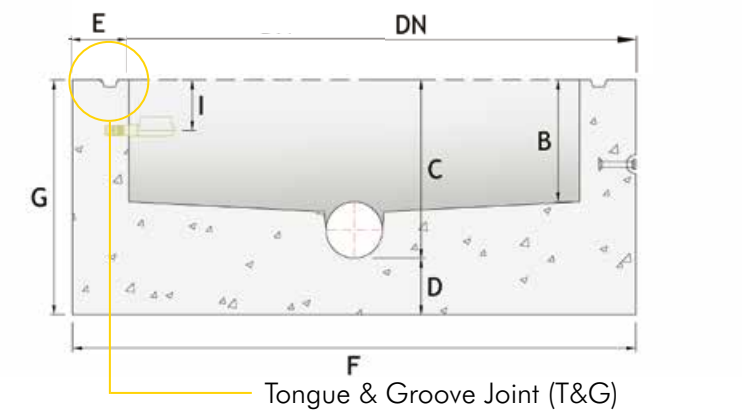
3No lifting loops are cast into the cover slab for lifting. A set of equal length 3 leg chains with hooks is recommended



Cast in lifting loops

DN2100 PERFECT BASE™ SPECIFICATIONS

DN2100 is used for lager diameter storm drainage typically for any pipe material ranging from 675-900mm diameter. DN2100 Perfect Base can also be used in Precast Concrete attenuation systems



PERFECT BASE / DN2100

Inlet/Outlet Diameter	B	C	D	E	F	G	I	Approx Weight (KG)
675	900	1400	200	300	2400	1600	125	10180
675	800	1300	200	300	2400	1500	125	9700
675	700	1200	200	300	2400	1400	125	9230
675	600	1100	200	300	2400	1300	125	8750
750	900	1400	200	300	2400	1600	125	9970
750	800	1300	200	300	2400	1500	125	9490
750	700	1200	200	300	2400	1400	125	9020
750	600	1100	200	300	2400	1300	125	8540
900	900	1400	200	300	2400	1600	125	9780
900	800	1300	200	300	2400	1500	125	9310
900	700	1200	200	300	2400	1400	125	8830
1050	900	1400	200	300	2400	1600	125	8900

Dimensions may vary depending on type of pipe used. Note: DN1800 Base only available in T&G Option
Smaller diameter pipe may be used with smaller core heights.

Top Tip - reducers can be installed where possible to reduce the weight



DN2100 MANHOLE RINGS & SLABS

MANHOLE RINGS / DN2100

Internal Dia	Depths				Wall Thickness	Overall Dia	Circum	Approx Weight/m	Type of Joint	Lifting Hole	Step Heights
mm	250mm	500mm	750mm	1000mm	mm	mm	mm	KG	-	-	-
2100	-	✔	✔	✔	140	2380	7050	2400	T&G	3 x 50mm	250mm

Tracey Concrete DN2100 manhole rings are manufactured with a T&G joint. The 140mm thick wall eliminates the need for a concrete surround, creating an impermeable chamber.



3No 38mm lifting pins are required to lift DN2100 manhole rings. A waterpoof grout will be required to seal each lift hole after install. 3No **10T** Spherical lift shackles to lift Perfect Base

*Note - Different sizes of spherical lifters are required for each diameter of base



Conseal jointing strip

MANHOLE COVER SLABS / DN2100

To Suit Internal Dia	Overall Dia	Effective Depth	Approx Weight	Standard Openings Available						
mm	mm	mm	KG	**600 SQ**	**675 SQ**	**750 SQ**	**1200 x 675**	**750 x 600**	**2No 600SQ**	**2No 675SQ**
2100	2375	200	1990	**E**	**E**	**E**	**E**	**E**	**12'O Clock & 6'O Clock**	**12'O Clock & 6'O Clock**

Bespoke openings can be manufactured on request
C = Central Opening E = Eccentric Opening

DN2100 Cover slabs come also in a range of standard openings shown in the table above. Cover slabs with bespoke openings, davit sockets or special finishes can be manufactured on request. Reducing slabs and landings slabs can also be made on request.



3No lifting loops are cast into the cover slab for lifting. A set of equal length 3 leg chains with hooks is recommended



Rocker Pipe being installed

STANDARD MANHOLE RINGS DN900 - 4000

Tracey Concrete manufactures a wide range of Manhole Rings in accordance with BS EN 1917, BS 5911-3, BS 5911-4. Manhole Rings are BSI Kitemarked.

MANHOLE RINGS / DN900 - 4000

Internal Dia	Depths				Wall Thickness	Overall Dia	Circum	Approx Weight/m	Type of Joint	Lifting Hole	Step Heights
mm	250mm	500mm	750mm	1000mm	mm	mm	mm	KG	-	-	-
900	✔	✔	✔	✔	70	1040	3050	520	Rebate	3 x 50mm	250mm
1050	✔	✔	✔	✔	85	1220	3550	700	Rebate	3 x 50mm	250mm
1200	✔	✔	✔	✔	100	1400	4050	1050	T&G	3 x 50mm	250mm
1350	✔	✔	✔	✔	100	1550	4550	1100	T&G	3 x 50mm	250mm
1500	-	✔	✔	✔	115	1730	5030	1300	T&G	3 x 50mm	250mm
1800	-	✔	✔	✔	125	2050	6050	1800	T&G	3 x 50mm	250mm
2100	-	✔	✔	✔	140	2380	7050	2400	T&G	3 x 50mm	250mm
2400	-	✔	✔	✔	150	2700	8050	2900	T&G	3 x 50mm	250mm
2700	-	✔	✔	✔	150	3000	9050	3300	T&G	3 x 50mm	250mm
3000	-	✔	✔	✔	180	3360	10000	4500	T&G	4 x 50mm	250mm
3600	-	✔	✔	✔	200	4000	11950	6000	T&G	4 x 50mm	250mm
***4000**	-	✔	✔	✔	200	4400	13200	6600	T&G	3 x RD24	250mm



OPTIONS AVAILABLE

- Pre-fitted double steps/ladder steps
- Sealant strip in various sizes
- Base cast in option
- Cored holes in various sizes

* DN4000 manhole ring is manufactured in two halves
* DN3600 & DN4000 are outside the scope of the British Standard (Non-Kitemark but comply with all relevant provisions of the European Standard)
All manhole rings are manufactured to ±25mm tolerance

STANDARD COVER SLABS DN900 - 4000

Tracey Concrete manufactures a wide range of Cover Slabs in accordance with BS EN 1917, BS 5911-3. DN3600 & 4000 Cover Slabs are generally designed in accordance with BS EN 1992-1-1.

COVER SLABS / DN900 - 4000

To Suit Internal Dia	Overall Dia	Effective Depth	Approx Weight	Standard Openings Available We Stock							
mm	mm	mm	KG	600 RD	675 SQ	600 SQ	750 SQ	1200 x 675	750 x 600	2No 675 SQ	2No 600 SQ
900	1275	150	310	-	E	E	-	-	-	-	-
1050	1280	160	335	E	E	E	C*	-	E	-	-
1200	1465	160	495	E	E	E/C	C	-	E	-	-
1350	1630	160	650	E	E	E	C	E	E	-	-
1500	1765	160	800	E	E	E/C	E	E	E	-	-
1800	2050	200	1425	E	E	E	E	E	E	12'O Clock & 6'O Clock	12'O Clock & 6'O Clock
2100	2375	200	1990	E	E	E	E	E	E	12'O Clock & 6'O Clock	12'O Clock & 6'O Clock
2400	2780	225	3160	E	E	E	E	E	E	12'O Clock & 6'O Clock	12'O Clock & 6'O Clock
2700	3005	225	3735	E	E	E	E	E	E	12'O Clock & 6'O Clock	12'O Clock & 6'O Clock
3000	3400	300	6470	E	E	E	E	E	E	12'O Clock & 6'O Clock	12'O Clock & 6'O Clock-
3600	4000	300	9085	E	E	E	E	E	E	-	-
****4000**	4500	300	11590	E	E	E	E	E	E	-	-

Bespoke openings can be manufactured on request (including double openings)
C = Central Opening E = Eccentric Opening



OPTIONS AVAILABLE

- Special slabs & opening sizes on request
- Full drawing designs and calculations provided
- Reducing Slabs and landing slabs available
- Davitt sockets available on request

Larger and bespoke slabs DN2100 - 4000 are manufactured hexagonal
*DN1050 Cover Slabs are avaiable in 750Sq in 1465 overall Dia
**4000 slabs are manufactured in 2 pieces

ALL PIPE TYPES - CAST IN

Using our Perfect Base system of casting collars to suit the pipe type specified on the project results in a much more efficient install. No 3rd party adaptors are required and ground-workers can be assured of a sealed joint. We can install any collar to suit such as concrete, twin-wall, PVC, sewer, clay & cast iron.



Tracey Concrete can supply both:
SN8 - Pipe for foul & SN4 - Pipe for storm

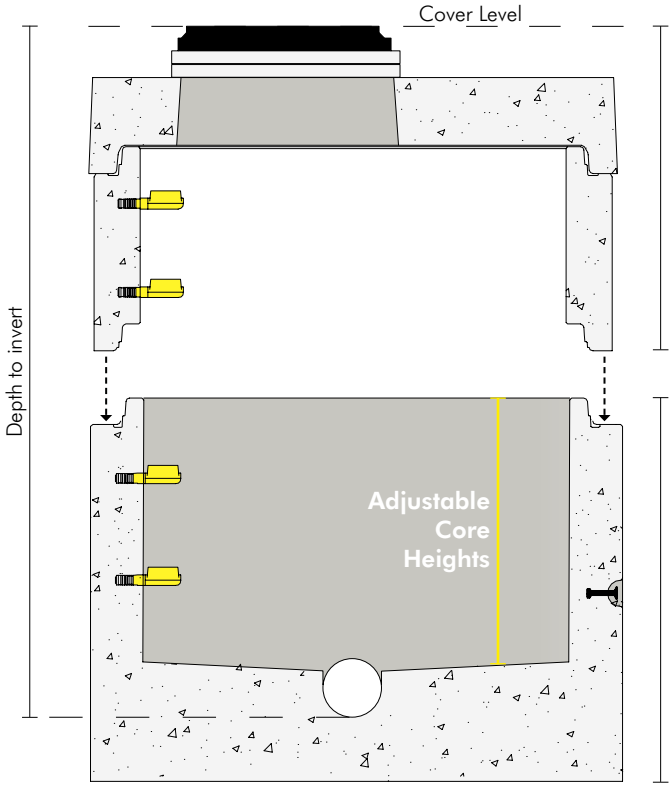
See below some of the sample images during installation on-site exhibiting the wide range of pipes spec we have supplied with our Perfect Base System.

- Any Pipe type cast in
- The exact seal from the manufacturer
- No wasted time with make shift adaptors
- Exact pipe as used on-site
- Pipeline fall built into base at inlet & outlet
- Multiple pipe types per base

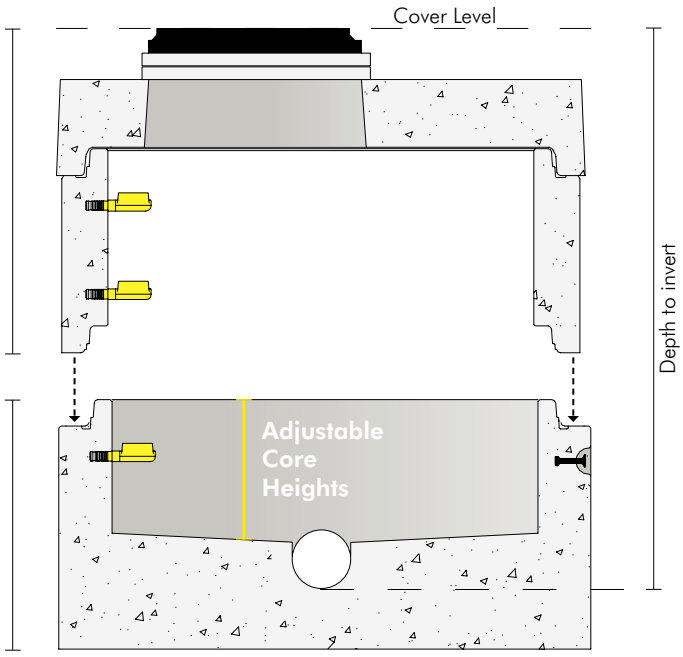


ADJUSTABLE BASE HEIGHTS

Tracey Concrete can adjust the core height of each base to ensure cover level is met easily on-site.
During the drainage take off our engineers will adjust the core height in intervals of **50mm** to suit each individual manhole chamber therefore no cutting of rings onsite is required.



Same Perfect Base™ - Different core heights



The example above shows 2 chambers with different depths to invert level by adjusting the core height, the cover level is met in each base.

Tracey Concrete engineers design each individual manhole chamber to reach the desired cover level.

This is a great advantage over traditional systems as no cutting of manhole chambers is required on-site.

This off site solution is safer as there is no cutting and no exposure to silica dust. In certain shallow manhole chambers, the perfect base can be designed and manufactured without need for a manhole ring.

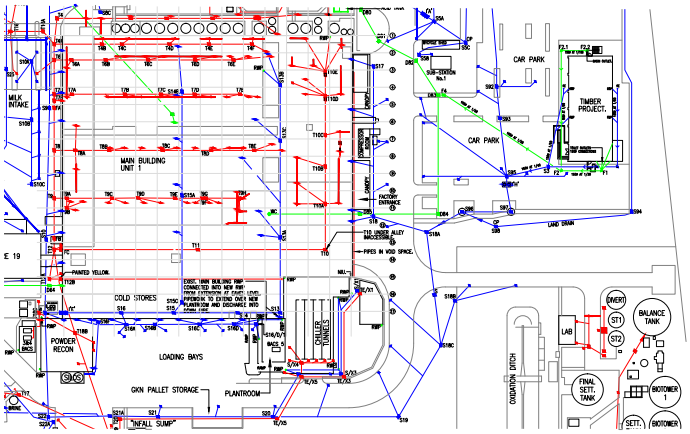


HOW IT WORKS - TAKE OFF

Our team of engineers will complete a full drainage take off from your project's AutoCAD / PDF drawings. To build the base digitally for manufacture they require the following information:

- Pipe type
- Inlet & Outlet angles
- Cover level
- Invert level
- Cover slab openings
- Seating Slabs

All the bases are exported to PDF where we can send it back to you for approval.



Autocad drawings

TRACEY CONCRETE

TRACEY JOB No.	DATE	CUSTOMER NAME	DELIVERY ADDRESS	PIPE CODES
TCC1205	04/03/2019	Sisk	Centre Parcs	
ALLOWANCE FOR STEEL COVER			150	

Manhole	No. Of Outlets	No. Of Inlets	Cover Level	Invert Level	Depth to Invert	M/H Size	Core Height	Pipe Size	Depth for Rings - SS and lid	No. of Seats	M/H Rings 230	500	750	1000	Total	Height Diff	Ladder Required	Nr of step/ ladder rungs
F27	1	2	54.050	49.119	4.931	1200	300	150	3986	2				4	4000	-14	Y	16
F28	1	1	52.050	48.424	3.626	1200	250	150	2731	2			1	2	2750	-19	Y	11
F30	1	2	51.200	47.968	3.232	1200	350	150	2237	2		1	1	1	2250	-13	N	9
F31	1	2	50.300	47.522	2.778	1200	400	150	1733	2		1	1	1	1750	-17	N	7
F44	1	2	50.200	47.099	3.101	1200	200	150	2256	2		1	1	1	2250	6	N	9
F45	1	1	50.100	47.024	3.076	1200	200	150	2231	2		1	1	1	2250	-19	N	9
F46	1	1	50.050	46.979	3.071	1200	200	150	2226	2		1	1	1	2250	-24	N	9
F47	1	1	49.750	46.843	2.907	1200	250	150	2012	2				2	2000	12	N	8
F48	1	1	49.600	46.772	2.828	1200	200	150	1983	2				2	2000	-17	N	8
F49	1	1	49.480	46.684	2.796	1200	400	150	1751	2			1	1	1750	1	N	7
F50	1	3	50.050	47.820	2.230	1200	350	150	1235	2		1	1	1	1250	-15	N	5
F51	1	1	49.700	47.261	2.439	1200	300	150	1494	2			1	1	1500	-6	N	6
F52	1	2	49.300	46.718	2.582	1200	200	150	1737	2			1	1	1750	-13	N	7
F53	1	2	49.150	46.579	2.571	1200	400	150	1526	2		1	1	1	1500	26	N	6
F54	1	1	49.100	46.516	2.584	1200	200	150	1739	2			1	1	1750	-11	N	7
F56	1	2	48.200	45.697	2.503	1200	250	225	1508	2		1	1	1	1500	8	N	6
F69			48.800	46.160	2.640	1200		150	1745	3			1	1	1750	-5	N	7
F70	1	2	48.300	45.851	2.449	1200	200	225	1504	2		1	1	1	1500	4	N	6
F71	1	2	48.250	45.486	2.764	1200	250	225	1769	2			1	1	1750	19	N	7
F1	1	3	49.850	47.730	2.120	1200	200	150	1275	2		1	1		1250	25	N	5
F2	1	1	49.450	47.211	2.239	1200	350	150	1244	2		1	1		1250	-6	N	5
F3	1	3	49.500	47.420	2.080	1200	200	150	1235	2		1	1		1250	-15	N	5
F4	1	2	49.300	46.721	2.579	1200	200	150	1734	2			1	1	1750	-16	N	7
F5	1	1	48.400	45.959	2.441	1200	300	150	1496	2		1	1	1	1500	-4	N	6
F6	1	1	48.150	45.579	2.571	1200	200	150	1726	2			1	1	1750	-24	N	7
F72			48.000	45.404	2.596	1200		150	1776	2			1	1	1750	26	N	7
F73	1	1	49.550	48.166	1.384	1200	250	150	489	2		1			500	-11	N	2
F74	1	1	49.100	47.585	1.515	1200	350	150	520	2		1			500	20	N	2
S27	1	2	54.000	49.642	4.358	1500	600	525	2783	2			1	2	2750	33	Y	11
S28	1	1	52.000	48.846	3.154	1500	600	525	1504	3		1	1	1	1500	-4	N	6
S30	1	2	51.150	48.402	2.748	1500	700	525	998	3				1	1000	-2	N	4
S31	1	1	50.300	47.898	2.402	1500	700	600	727	2			1		750	-21	N	3
S44	1	2	50.200	47.550	2.650	1500	700	600	975	2				1	1000	-25	N	4

Takeoff Table

PDF APPROVAL - ORDER

Customer: VolkerFitzpatrick
Order: Hertfordshire
Date of Order: 07/05/21

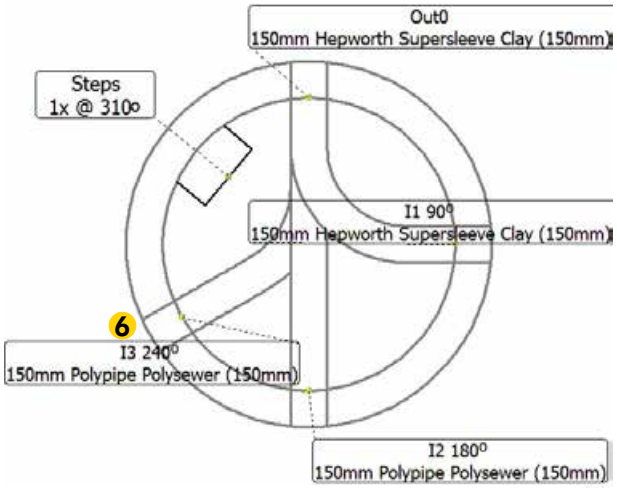
PERFECT BASE watertight

TRACEY CONCRETE

Designation: FW2

1. DN / Core Height: 1200mm /475mm
2. Weight: 1669 KG
3. Spigot Type: Watertight
4. Pipe Type: Shown on base diagram
5. Chamber Buildup: -1No 1200 x 1000 wt ring -1No1200 Slab 675sq - 2No Seating Slabs 675sq

1. Check diameter ✔
2. Check weight - machine onsite capable of this lift? ✔
3. Check spigot/ joint type ✔
4. Check pipe type ✔
5. Check build up of the chamber ✔
6. Check inlet locations and sizes ✔



Approved for Production Yes ✔ No ☐
Sign & Dated John Smith - 08/05/2021
Customer O/N 12302-12 Internal O/N 1012340

All approved perfect bases will be invoiced no later than 30 days after production, regardless of delivery status.
Please request a copy of our Terms and conditions for full details

The PDF will contain all the Perfect Bases from the take-off showing the layout of each base before production. We recommend that the contractor have their engineer proof each base with his drainage plans before signing off for manufacture.

PRODUCTION

The customers bases are then put into production on the agreed lead time. Using recycled polystyrene we cut the angles for each individual base, which form the channels, inlets & outlets. Within 24 hours the bases are stripped from the mould and put into a curing area. The bases are picked by our loading team when ready for despatch.

Top Tip- Provide us with the dates and order you require your bases so we can have your Priority bases onsite.

Watch how Perfect Bases are made via this QR code





DELIVERY TO SITE

Our despatch co - ordinator will contact you to let you know when your delivery will arrive. You will also receive a text message and email notification.

Please see lifting equipment on our website All lifting equipment for can be supplied by Tracey Concrete.
Please let our team know of any site specific requirements: opening times, site contacts and site traffic plans.





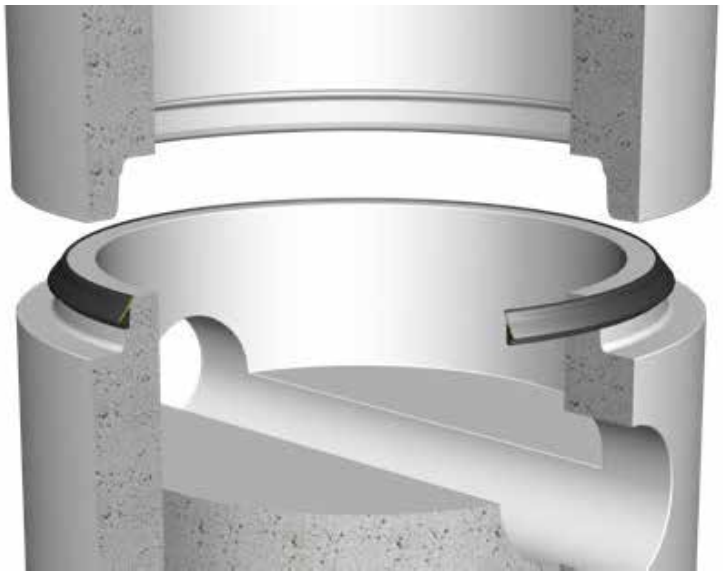
THE SEAL - STANDARD & LOAD BEARING

Our **Standard Seal** is the Trelleborg 118, designed as a sliding seal to which lubricant has been applied between the sliding skin and the body of the seal. The tip of the skin is folded over and glued to the body of the seal to ensure the lubricant stays in place. Link to data sheet shorturl.at/xIV27

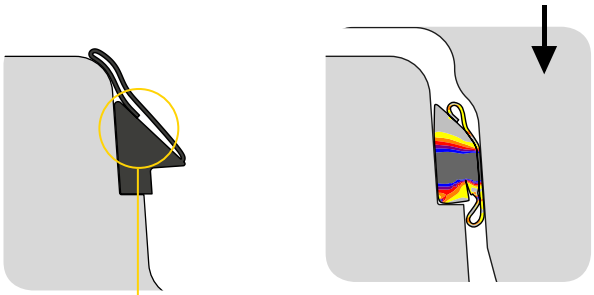
During installation, the adhesive joint releases allowing the lubricated skin to slide over the body of the seal.

This design permits installation with very low force, as there is no friction between rubber and concrete. The special design of the joint and seal make the system easy to centre during jointing.

- Installation with very low force
- Pre Lubricated seal for manhole system
- Easy to centre during jointing
- Water tested 0.5 bar



The flat side of the seal sits on the shoulder of the ring. When the next ring is installed slides down and seals the joint.



The Load Bearing Seal is the Trelleborg 171 which has been designed to provide optimized contact and sealing pressure. This ensures superb joint security. The pre-lubricated seal ensures jointing force is minimized at all combinations of joint tolerance.

- Load distribution prevents concrete contact
- Facilitates minimal jointing force

Link to data sheet shorturl.at/eGORU



Standard Seal



Load Bearing Seal

QUALITY & TESTING

Material & aggregate testing is essential to produce a high quality precast concrete product. At Tracey Concrete we carry out numerous tests on our materials every day to ensure they are of the highest quality. As a manufacturer we are constantly striving to improve our products to ensure they are of industry leading standard.



Slump test - Test moisture content of drycast concrete



Flow test - Test moisture of self compacting concrete



Concrete cubes - curing process before testing



Cube crush - Strength test after 14 & 28 days



3No watertight seals



A sample watertight test carried out at our production facility.
On the left you can see the complete chamber and on the right an image of the top of the cover slab showing the chamber full with water.

PERFECT BASE INSTALLATION GUIDE

Introduction

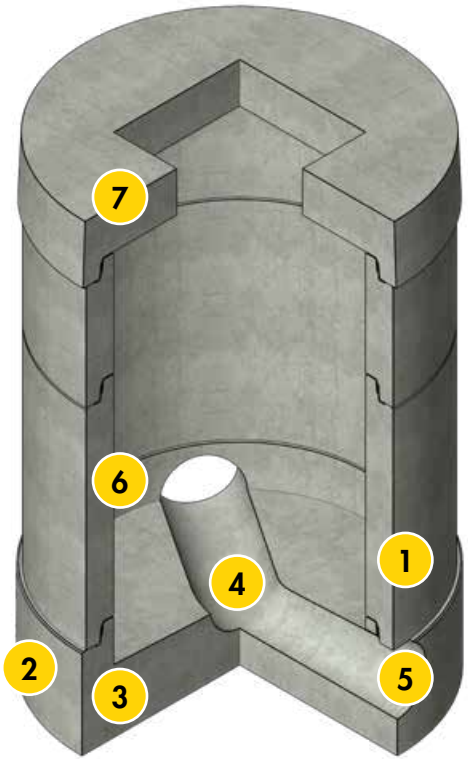
This guide offers advice on how to install the Tracey Concrete Perfect Base system incorporating a watertight elastomeric seal known as a 'Perfect sealed manhole' system. The system provides a manhole whereby all joints and connections have elastomeric seals enabling a watertight manhole to be constructed quickly and easily with the minimum of site work.



Manholes are consequently installed in a similar manner to pipes requiring a different technique to traditional manhole construction

The wall thickness being over **125mm**, means that the installed manhole does not require a concrete surround unless specified by the client.

The Perfect Base complies with ISEN 1917:2002 and IS420 and is kite marked to BS EN 1917 and BS 5911-3 and the 1200 diameter Perfect manhole is CE marked Components



Components

A Perfect Base system will typically comprise of a combination of the following standard elements. Perfect Base units shall comprise of the following:

1. Chamber unit depth dependant on manhole diameter and channel diameter
2. The base depth varies to obtain correct overall height
3. Integral base to give a watertight unit
4. Channel and benching pre-formed to exact requirements
5. Formed holes for jointing to inlet/outlet pipes and seals
6. Shaft unit with spigot and socket joint with the seal fitted
7. Watertight Cover slab with specified opening

*The integrated ladder system is also available with the sealed manhole system Cover Slab
**Manholes & Base can be supplied with or without double steps

Off-loading and lifting

All Tracey Concrete Perfect Bases are manufactured with spherical lift head anchors cast in. The lift head shackle should be fitted in accordance with the manufacturers recommendations with the extended tab pointed in the direction of the lift. Both 2.5, 5 & 10 tonne lift head shackles can be supplied by Tracey Concrete

We recommend that each shackle should be lifted with a suitably rated duplex web sling or chain. Each Base has 3 lifting anchors cast in so 3No Shackles are required for lifting & installation.





lifting angle for chains should be ≥ 45°



Top Tip - The perfect sticker informs you of what you require to complete manhole

Assembly

Normal considerations should be taken into account when assessing the suitability of the formation. In good ground conditions manhole can be built off either;

- Minimum 150mm pipe granular bedding material being 5-20 graded, 14, 20, 40mm single size suitably compacted to provide a level base.

- 150mm GEN 1(C8/10) concrete. Base unit should be placed whilst concrete is wet so it can be set level otherwise a levelling screed of 15-20 mm sand cement will be required to prevent point loading on the base unit
Note: In poor or wet ground conditions a concrete pad is advised. Normally a granular bedding is recommended where the safe ground bearing pressure >200kN/m2



Top Tip - Clean inlets and outlet of any debris

PERFECT BASE INSTALLATION GUIDE

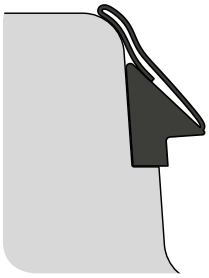
Seal Installation

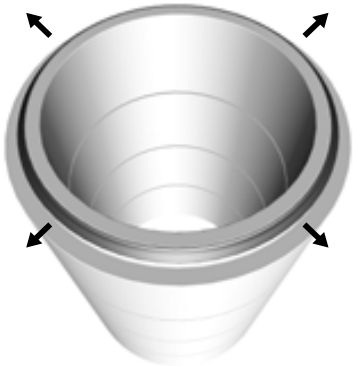
The seal is ideally positioned on the base unit before it is in the excavation in the following manner

1. Stretch the seal onto the spigot of the manhole and position it against the shoulder. Make sure the load distributor (the circular part) is located on the upper surface of the spigot

2. Check the internally lubricated skin is correctly positioned and sitting against the rest shoulder

3. Equalise the stretch in the seal by lifting at several points





Note: External lubrication is not required







Shaft Construction

Once the bedding has been prepared, the base unit can be positioned. It is advisable to lay the pipeline up to and including the rocker pipe on the downstream side. A short length of pipe should then be inserted into the outlet pipe seal on the base unit. This acts as the 'butt' pipe
Note: The butt pipe is not strictly required as the joint within the manhole wall acts as a flexible joint

The unit can then be jointed with the rocker pipe as it is finally positioned in the excavation. A final level check should be carried out.

Top Tips
-The perfect sticker has all information to complete manhole
-Install/ fit the Rubber Seals in advance - 2 men
-Clean inlets and outlet of any debris
-Store lifting shackles & seals in a safe place
-Install/ fit rocker or double spigot before lifting into trench

Backfilling

The base unit can be backfilled with a granular pipe bedding around the pipes and suitable material around the shaft. The remainder of the shaft can then be constructed by centring the upper manhole section, and lowering into place. The design of the joint encourages 'self-centring'. For ease of installing it advisable to backfill the shaft as it is built. This provides ease of access to unhook the lift clutches and to guide the units into position.

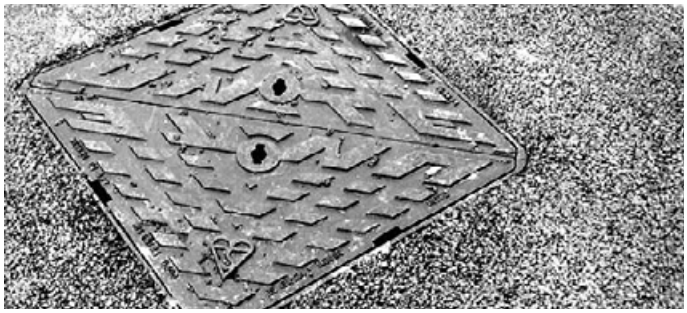
A joint gap between 10-20mm should be obtained after jointing, this gap may reduce as the shaft is constructed dependant on the depth to the minimum 10mm. The cover slab can be laid again using the lifting system. The slab may need slight vertical downward pressure to seal the unit as the self-weight may not always be sufficient.











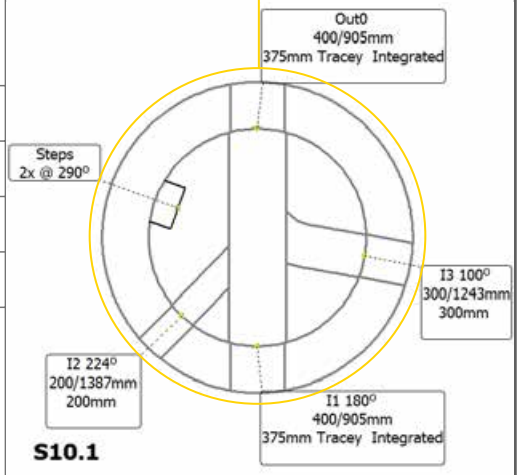
THE PERFECT STICKER

Each Perfect Base is labelled with a bespoke sticker showing important information for installation. All installation details on the sticker on the base. From the take off we state on the sticker what products are required to get to cover level.

Unique Base code to match plans

Base layout shows channels & inlets/outlets

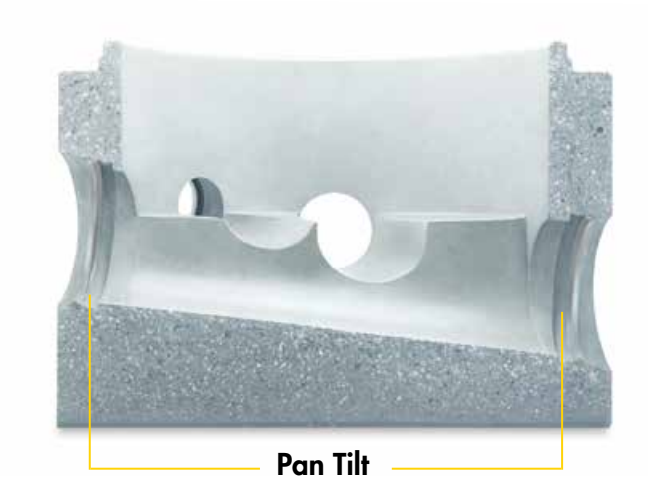
Tracey Concrete Limited Old Rossorry, Sligo Road BT74 7LF-Enniskillen, Co. Fermanagh www.traceyconcrete.com headoffice@traceyconcrete.com www.perfectsystem.eu Tel. 028 6632 6437 Fax. 028 6632 4908	PERFECT BASE watertight TRACEY CONCRETE
Customer:	VolkerFitzpatrick
Order:	Hertfordshire
Designation:	S10.1
Date of order:	04/03/2019
DN / height:	1500mm / 915mm
Weight:	5843kg
Concrete quality:	
CE EN 1917 EN 206-1	Remark: NOTE: LIFTING HOOK SET @ 60 DEG MINIMUM. W/T JOINT. 225mm smooth wall sewer. 375mm Tracey Concrete Pipe. ADD: -1No 1500x1000 WT -1No 1500x500 WT -1No 1500 C/S WT -2No 600 SEATING SLABS -1No 600 H/D LID



Products required to reach cover level

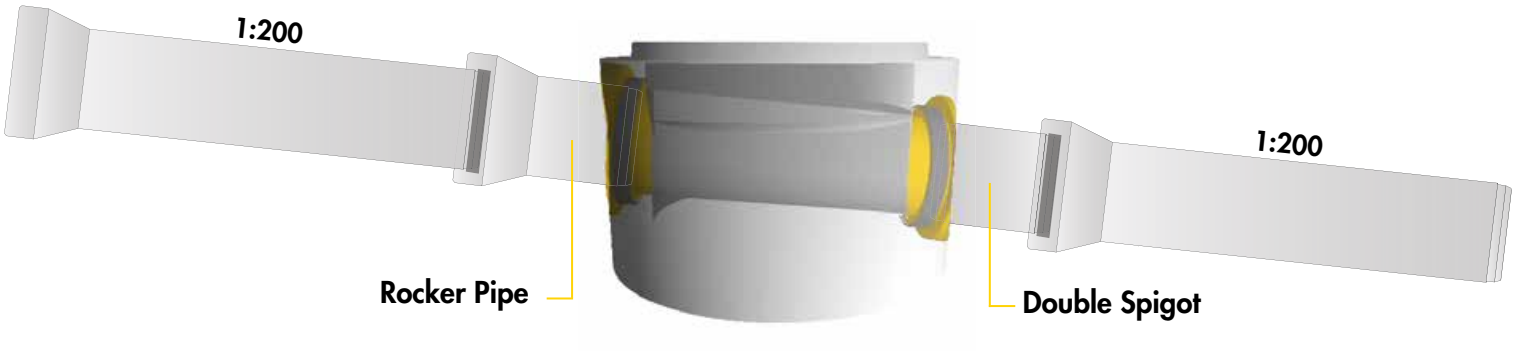


ANY FALL OPTIONS - PAN TILT



With the Perfect Base system we design and manufacture the gradient of the pipe into the base by adjusting the pan tilt of the inlets/outlet.

This simplifies installation when connecting the rocker pipes or double spigots pipes to the base they are set at the correct fall. E.g. matching the gradient of the pipeline specified on the project and leaving pipe installation easier.



PERFECT BASE VS TRADITIONAL

With the Perfect Base there is no wasted time spent laying pipes, to form channels, no part load of readymix to form insitu base and no need to concrete jacket the chamber.

Simply drop in the Perfect Base, fit pipes to inlets & outlet and complete installation by fitting manhole rings and slab. This process saves significant amount of time and is much safer.

Traditional



Perfect Base



CONCRETE PIPE CONNECTION OPTIONS

When connecting the Perfect Base with precast concrete pipe there are some different options. A double spigot pipe & rocker pipe can be used with the same sealing system as in the pipe.

Another option is to use butt end spigot & socket pipe which is a pipe cut at the end with no joint. This method can be used on-site to ensure there is no creepage in the pipeline and causing a manhole to be out of position. To seal butt pipes a Forsheda 910 seal is cast into the base with no joint.



Rocker Pipe being connected to a Perfect Base™



Double Spigot Pipe connected into a Perfect Base™



Double Spigot
DN225 - 1050



Rocker Pipe
DN225 - 2100

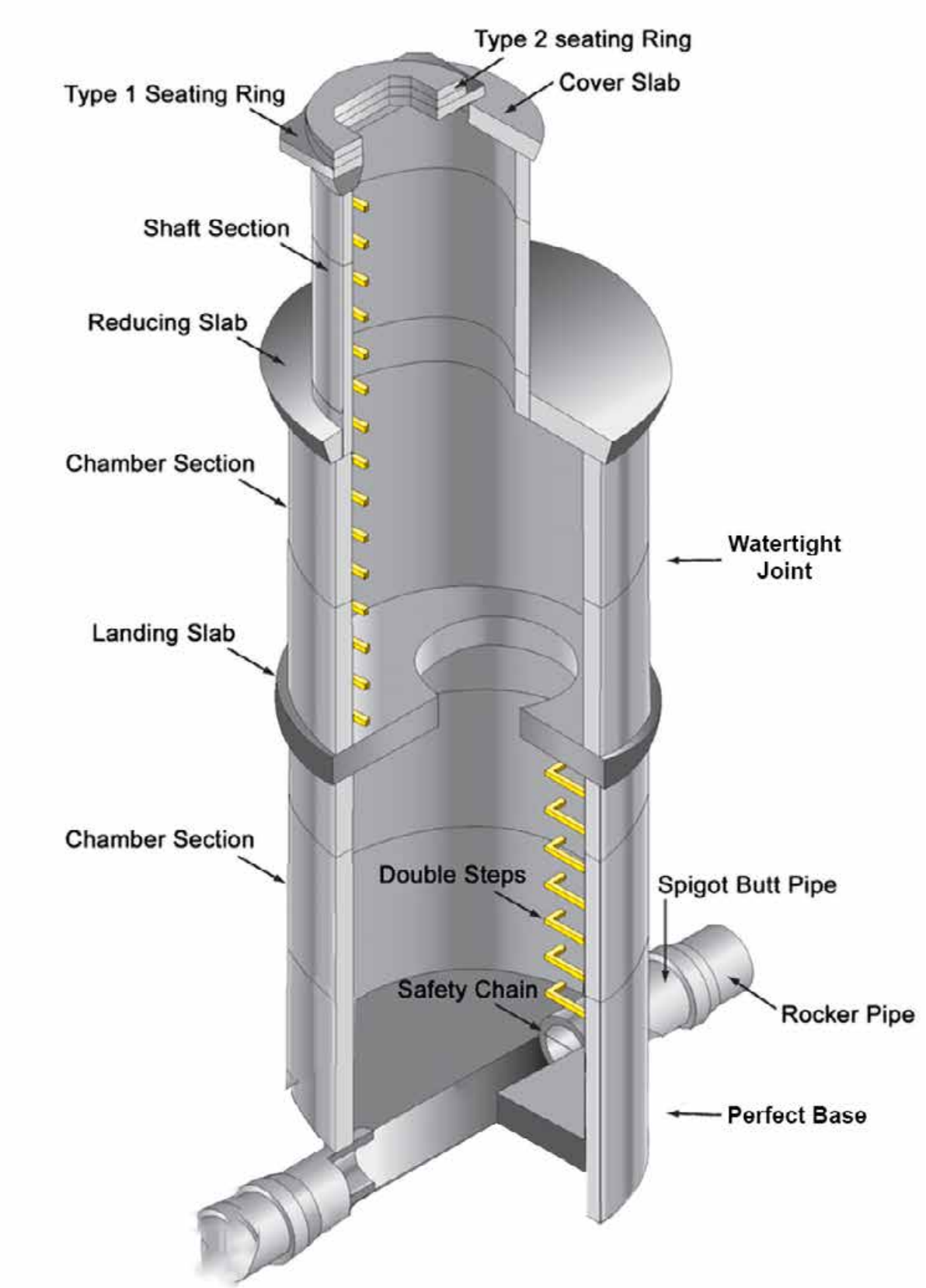


Spigot Butt Pipe
DN225 - 2100



Socket Butt Pipe
DN225 - 2100

COMPLETE WATERTIGHT CHAMBER



CATCHPITS
DN900 - 3000

A Catchpit is an empty chamber with an inlet pipe and an outlet pipe set at a level above the floor of the pit. Any sediment carried by the system settles within the Catchpit, from where it can be periodically pumped out or removed.

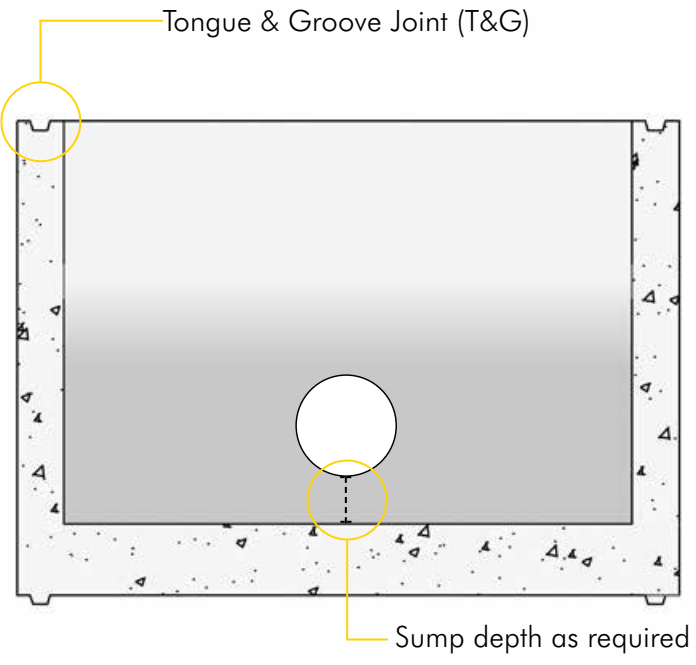
CATCHPITS / DN900 - 3000

Internal Dia*	Depths**	Wall Thickness	Overall Dia	Circum	Approx Weight/m	Type of Joint	Lifting
mm	mm	mm	mm	mm	KG	-	-
900	1000 | 1250 | 1500 | 2000	70	1040	3050	775	Rebate	Lifting Loops cast in
1050	1000 | 1250 | 1500 | 2000	85	1220	3550	1025	Rebate	Lifting Loops cast in
1200	1000 | 1250 | 1500 | 2000	100	1400	4050	1500	T&G	Lifting Loops cast in
1350	1000 | 1250 | 1500 | 2000	100	1550	4550	1650	T&G	Lifting Loops cast in
1500	1000 | 1250 | 1500 | 2000	115	1730	5030	2200	T&G	Lifting Loops cast in
1800	1000 | 1250 | 1500 | 2000	125	2050	6050	3100	T&G	Lifting Loops cast in
2100	1000 | 1250 | 1500 | 2000	140	2380	7050	5000	T&G	Lifting Loops cast in
2400	1000 | 1250 | 1500 | 2000	150	2700	8050	6100	T&G	Lifting Loops cast in
2700	1000 | 1250 | 1500 | 2000	150	3000	9050	8170	T&G	Lifting Loops cast in
3000	1000 | 1250 | 1500 | 2000	180	3360	10000	11775	T&G	Lifting Loops cast in

*Bespoke Catchpits can be made up to sizes of DN3600mm

**Bespoke Catchpits can be made height of up to 2.5m





WATERTIGHT CATCHPITS DN 1200 & 1500

A Watertight Catchpit is similar to a standard Catchpit but is manufactured with a wider wall and is sealed with a watertight rubber seal. No concrete surround is required on-site as the chamber can be backfilled after completion saving time and costs on-site.

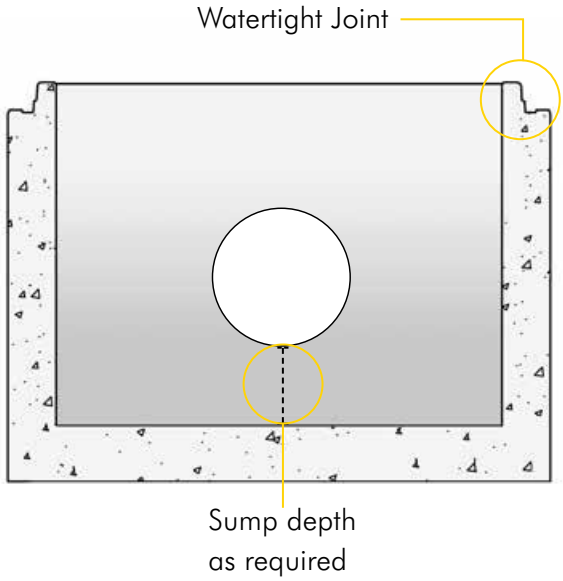
WATERTIGHT CATCHPITS / DN1200 - 1500

Internal Dia	Depths*	Wall Thickness	Overall Dia	Circum	Approx Weight	Type of Joint	Lifting
mm	mm	mm	mm	mm	KG	-	-
1200	1000 | 1250 | 1500 | 2000	130	1460	4712	1780	Watertight	3 x 2.5T Shackles
1500	1000 | 1250 | 1500 | 2000	150	1800	5655	2825	Watertight	Lifting Loops cast in

*Bespoke Catchpits can be made height of up to 2.5m

ADVANTAGES

- Complete watertight chamber
- Off-site solution
- Simple & fast installation
- Can be fitted with any type of pipe
- Reduced time in confined spaces
- Low carbon footprint





FLOW CONTROL CHAMBERS DN1200 - 4000

A Flow Control Chamber combines an integral base and side walls with option for inlet and outlet openings/ connections. A Flow Control Chamber can be used for a silt-trap, valve chamber and can be used as a flow rate controller (requires installation of a vortex or orifice valve unit). Tracey Concrete can offer supply of a vortex or orifice valve device. The vortex or orifice valve is designed to limit storm water outflow to a specific discharge rate. Sizes are available between 1–80 l/s depending on head height.

Hydro-Valve fits the following manhole types:

Chamber Size	DN1050	DN1200	DN1350	DN1500	DN1800	DN2100	2400
Flat back *	✔				✔	✔	✔
Curved back		✔	✔	✔			

*Flat back requires shuttered wall on the inside of the chamber

The unit is self activating with no need for an external power source and comes with a certified flow rate. At low flow rates, water entering through the inlet passes through the vortex chamber to the outlet with no restriction. As flow rate increases, water enters through the inlet with enough energy to create a vortex in the vortex chamber, which results in a considerable pressure drop between the inlet and the outlet restricting the flow to the allowable discharge. The vortex or hydro valve flow control operates automatically with no moving parts and no external power source. A typical application of this valve is to control the flow from storm water attenuation tanks, preventing downstream flooding during periods of heavy rainfall



Flat shuttered wall



Curved wall hydrovalve

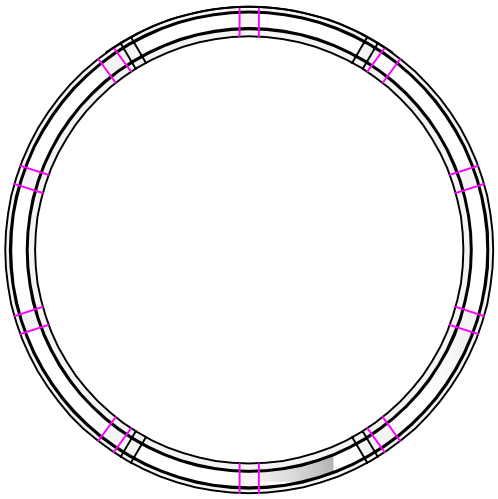
t.028 6632 6437

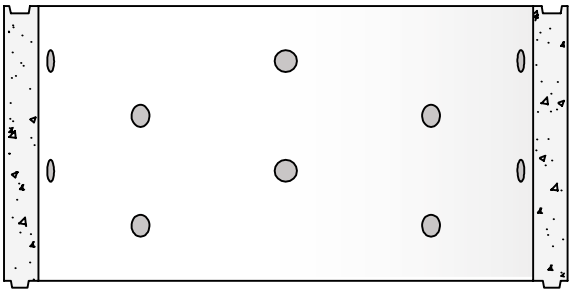
SOAKAWAY CHAMBERS/PERFORATED RINGS DN900 - 4000

Soakaways are a key component for Sustainable Urban Drainage Systems (SuDS). Soakaways provide a simple way of dealing with storm water locally, by encouraging ground water recharge whilst reducing the impact on the existing storm water network.

SOAKAWAY CHAMBERS / DN900 - 4000

Size DN	Depths | Number of holes		
mm	500mm	750mm	1000mm
900	5	7	9
1050	6	8	11
1200	6	9	12
1350	7	11	14
1500	8	12	15
1800	9	14	18
2100	11	16	21
2400	12	18	24
2700	14	21	27
3000	15	23	27
3600	18	27	36
4000	20	30	40





Tracey Concrete produce soakaways in depths of 500mm, 750mm and 1000mm, each containing the correct amount of Ø80mm holes to provide a minimum area of permeation of 50,000mm^2/m of nominal diameter per metre of height complying to BS EN 1917:2002 and BS5911-3.



HEADWALLS
DN150 - 2100

Designed in accordance with Eurocode 2 & Eurocode 7 we manufacture a wide range of precast concrete Headwalls in various sizes to suit any type of pipe connecting into open water areas including collection ponds and rivers. Concrete headwalls can preserve the surrounding environment by reducing erosion at the outfall connection.

HEADWALLS / DN150 - 2100

Sizes	Openings (mm)	To Suit Pipe Sizes (mm)	Wall Thickness (mm)	Approx Weight (KG)	Lifting Equipment
Small	190 - 640	150 - 450	100 & 150	1500	4No RD24 Lifting Loops
Medium	640 - 990	450 - 750	150	2460	4No RD24 Lifting Loops
Large	640 - 1320	450 - 1050	150	3460	4No RD30 Lifting Loops
X Large (2 Pieces)	1320 - 1900	1050 - 1350	250	Part A: 6000 Part B: 6000	3No 10T Shackles
XX Large (2 Pieces)	1510 - 2500	1200 - 2100	250	Part A: 8000 Part B: 8000	3No 10T Shackles

Weights of headwall may vary depending on opening size
PDF and DWG drawings are available to download from www.traceyconcrete.com

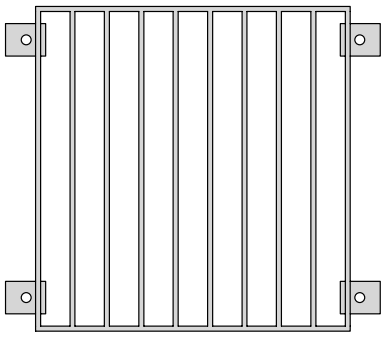
OPTIONS AVAILABLE

- Hand railings, gratings, flap valves and weir walls
- Special toe pieces
- Bespoke Headwalls manufactured on request
- Water proofing on request
- Box culvert headwalls
- Full drawing designs and calculations provided

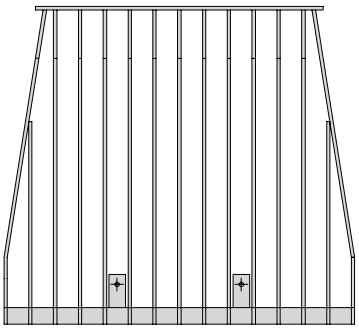
ADVANTAGES

- Simple & fast installation
- 120 year design life
- No on-site shuttering required
- Complete off-site solution
- No part-load charges for readymix concrete
- Prevents soil erosion

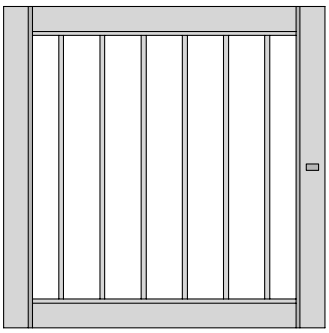




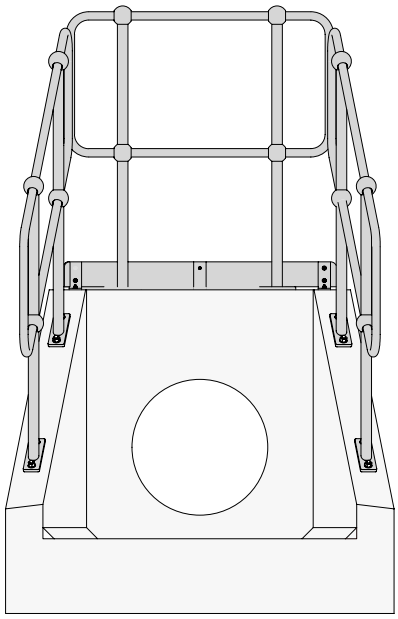
Standard Grate



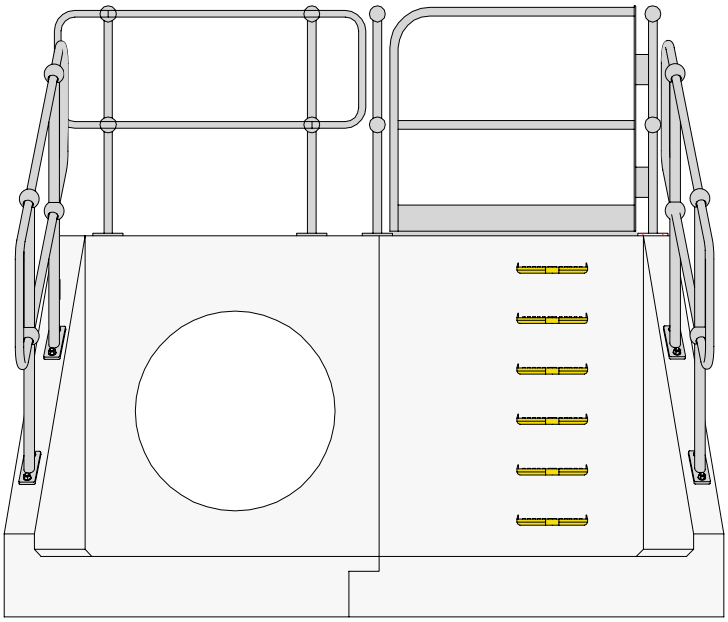
Cranked Grate



Hinged Grate



Handrails



Rungs fitted, handrails & gate on double headwall

Tracey Concrete Sewers for Adoption precast headwalls should be used when part of a Section 104 Agreement and the sewers are to be adopted once completed by the local Water Company. The materials used and installation must comply with the 'Sewers for Adoption' guidelines. Adjustable options to meet SFA:

- Backwall heights
- Single or multiple pipe openings
- Specifiable pipe invert levels



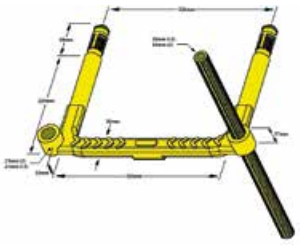
Precast Steps

HEADWALLS

CAST IN LADDERS & STEPS

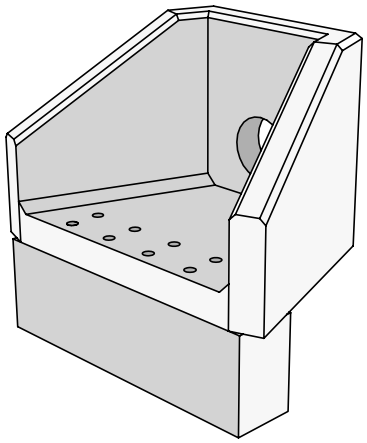
Tracey Concrete can cast in Ladder steps to headwalls for safe access. The rungs meet the relevant requirements for both steps and ladders and can be used with or without the stringers. The incorporation of the rung in the manhole automatically takes account of variation in depth to design.
Manufactured to BS EN 14396: 2004





EXTENDED TOE PIECES 250 | 500 | 750 | 1000

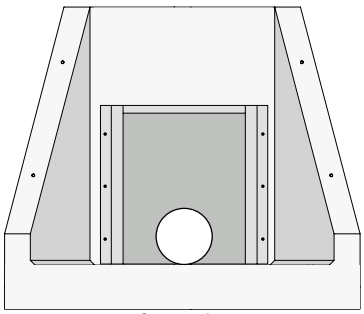
Extended headwall toe pieces are designed to secure the headwall in position for challenging ground conditions.
We can design and manufacture any specified design of a toe piece. Standard lengths are 250mm, 500mm, 750mm and 1000mm.



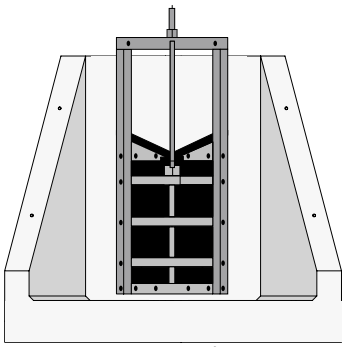


ORIFICE PLATES, PENSTOCKS & FLAP VALVES

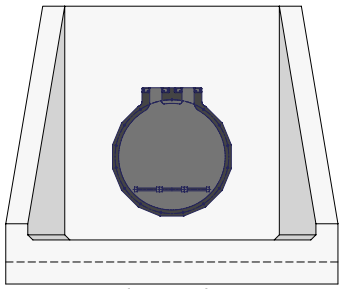
Tracey Concrete can supply and fit the full range of Orifice plates, Penstocks & Flap Valves. Contact our sales team for more details



Orifice plate



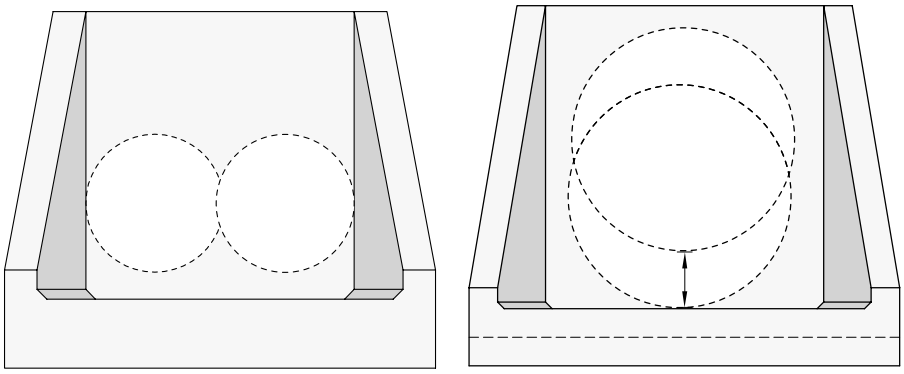
Penstock



Flap Valve

ADJUSTABLE OPENING POSITIONS & SPECIFIABLE PIPE INVERT LEVELS

Tracey Concrete can produce headwalls with adjustable opening positions and specifiable pipe invert levels. If you require a bespoke headwall opening please submit a drawing to our technical team to produce.





BAFFLE BLOCKS

Tracey Concrete manufacture concrete headwalls with precast baffle blocks on the spillway. We factory fit the baffle blocks to our precast headwalls ensuring they fit properly every time and reducing installation time on site. Baffle blocks slow down the flow of water discharging from the pipe across the spillway of the headwall before entering the watercourse.

BITUMEN COATING

Tracey Concrete can produce headwalls with a bitumen paint coat for added waterproofing. The bitumen extends the life of the headwall weatherproofing properties.

The headwall is coated after production under factory conditions and can be installed on arrival to site saving time.

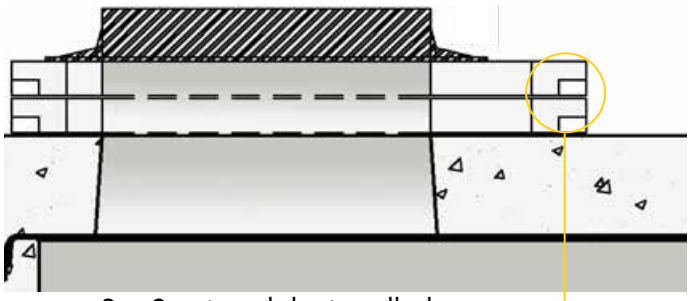


SEATING SLABS & LOTHIAN SLABS

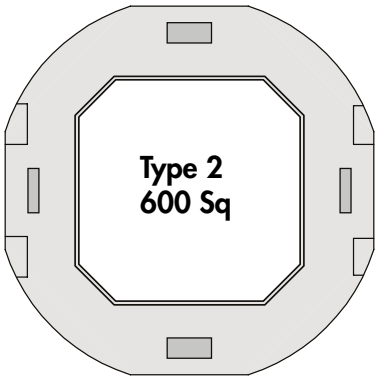
Seating Slabs are designed to be fitted on top of the cover slabs and gullies. By fitting our seating slabs the steel cover can quickly be brought up to the cover level required without the need for time to be spent on brickwork. Seating Slabs are manufactured to requirements of BS EN 1917, BS 5911-3.

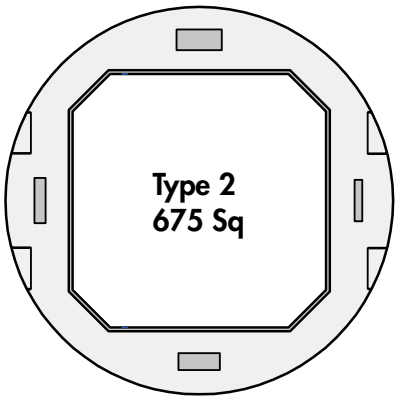
SEATING & LOTHIAN SLABS

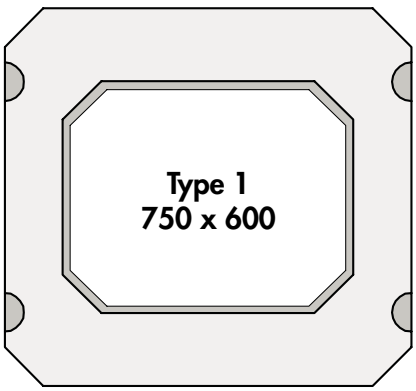
Opening	Depth	Weight	Dimensions
mm	mm	KG	mm
Type 2 600 Square	65	80	1000 Round
Type 2 675 Square	65	70	1050 Round
Type 1 600 Round	65	115	1050 x 975
Type 1 675 Round	65	105	1050 x 975
Type 1 1200 x 675	65	135	1575 x 1050
Type 1 600 Square	65	105	1050 x 975
Type 1 750 x 600	65	86	1050 x 975
Type 1 750 x 750	65	85	1050 x 975
***Lothian Slab - 675 Square**	150	292	1155 x 1155

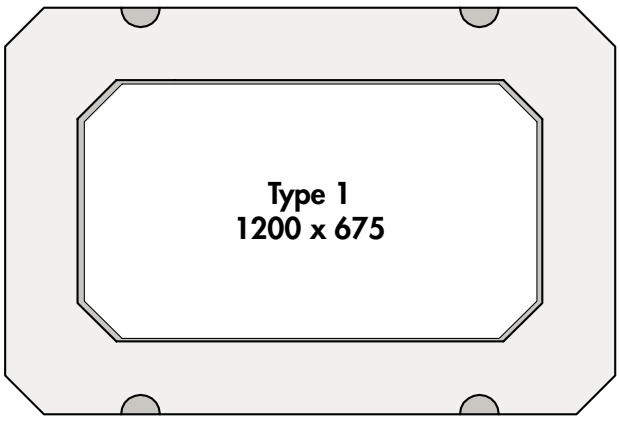


2 x Seating slabs installed









ADVANTAGES

- Designed to replace engineering bricks
- Simple & fast installation
- Compressive strength equal to Class B engineering brick
- More cost effective than brickwork

MANHOLE ACCESSORIES

STEPS & LADDER STEPS

Steps can be supplied fitted or loose in all our manhole products. Manufactured to EN 13101: 2002 Type D Class 1and BS EN 13101. Made with an outer grip to ensure safe movements when inspection is required.

Ladder Steps can also be supplied fitted or loose in all of our manhole products. Manufactured to BS EN 13101. Supplied with rolls of stringer and red caps upon request for manholes deeper than 3m.

A hand-held entry pole system is also available, allowing safer access to the fitted steps of the manhole chamber.

Modular Manhole Ladder can be supplied as an alternative to ladder steps. The Modular ladder system has been fully tested to BS 14396 by Lloyds British PLC and is CE marked.

*Installation spec available at www.traceyconcrete.com



Steps Fitted



Ladder Steps with Stringer







JOINTING STRIP & CONSEAL

A wide range of jointing strips (elastomeric joint-seal) are available for all sizes of manhole rings made to spec EN681.

Easily installed jointing strip is designed to seal standard manhole chambers fast and efficiently.

Sizes Available	To Suit Manhole Sizes
22mm x 22mm x 4.5m	DN900 - 1500mm
22mm x 44mm x 4.5m	DN1800 - 2400mm
12mm x 120mm x 6m	DN2700 - 4000mm

PRIMER - 5L

Primer is used for priming the joints of precast concrete manholes, inspection chambers prior to the applications of jointing strip.

GULLIES & GULLY SEATING SLABS 375 & 450

Road Gullies are manufactured to BS 5911-6 and are BSI Kitemarked. Gullies are supplied with a seal to suit plastic (Forsheda 207 x 20.5) or densleeve (Forsheda 201 x 13).

TRAPPED & UNTRAPPED GULLIES / 375 & 450

Type	Size (A)	Depth (B)	Approx Weight	Outlet
Trapped / Untrapped	mm	mm	KG	mm
Untrapped	375	750	180	150
Trapped	375	750	200	150
Trapped	450	750	250	150
Trapped	450	900	285	150
Trapped	450	1050	290	150
Gully Seating Slab	750 x 650	100	80	450
Horseshoe Seating Slab	650 x 600	100	44	450

ADVANTAGES

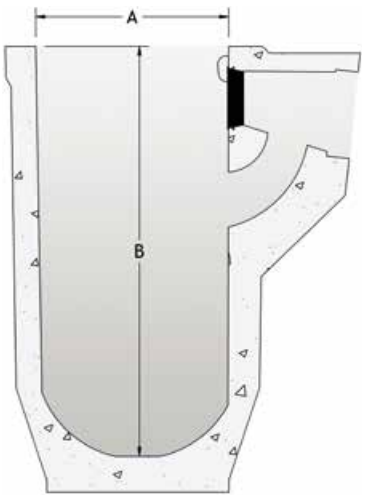
- Seal cast in to prevent onsite damage
- Rodding eye closure recessed into concrete
- Light weight design for lower carbon footprint
- Eliminates discharge of oil
- Gully grating and cover available



Gully Seating Slab

Horseshoe Gully Seating Slab



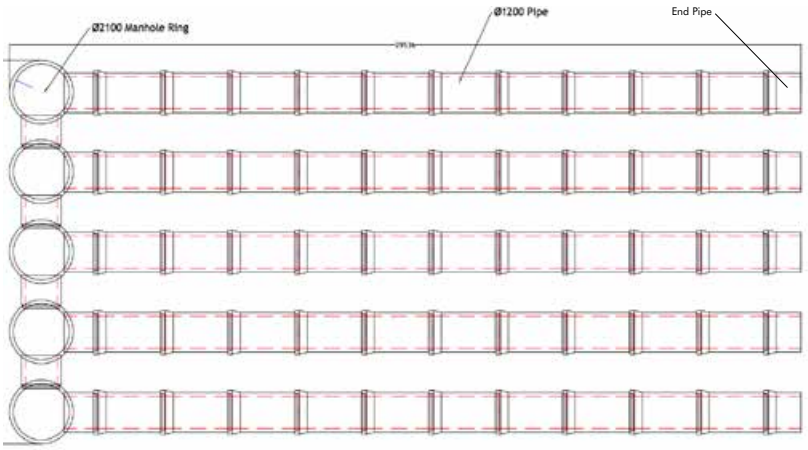


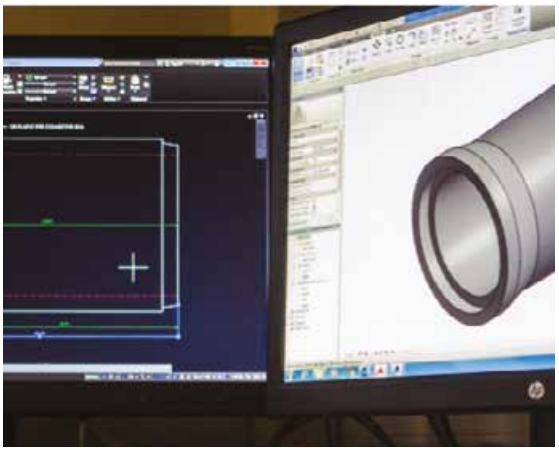
Trapped 450 x 900 Gully



PRECAST ATTENUATION SYSTEMS

Tracey Concrete manufacture and design attenuation water storage systems using our S&S Pipe range offering superior strength than other options on the market. Designed to suit the clients specifications we can manufacture each bespoke system to suit any capacity and area.





Our concrete attenuation systems can include bespoke products such as stop end bends, side entry manholes and spigot and socket end wall pipes. These products can either be engineered into an on-line sewer pipe system or utilised off-line as single or multiple stormwater holding tanks.

Internal Pipe ø	**mm**	DN900	DN1050	DN1200	DN1350	DN1500	DN1800	DN2100
Capacity	**m³**	1.59	2.16	2.83	3.58	4.42	6.36	8.65

ADVANTAGES

- Systems can be designed to suit the application
- No need for fabrication onsite or external contractors
- Can be installed under roads and car parks
- Long term solution



PRODUCT LIFTING EQUIPMENT

All precast concrete products manufactured by Tracey Concrete are designed to be offloaded & installed safely when using the specified equipment - see table below. If you require the correct lifting equipment, please contact our sales department.

Please ensure all lifting equipment is ordered with or is on-site ready for when the products are delivered.

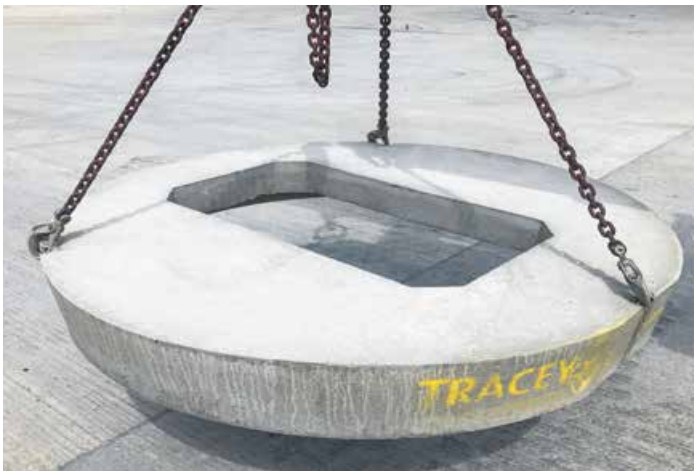












This table is subject to change, if you have any questions regarding the lifting of our products please contact us.
Please note it is the contractors responsibility to ensure all lifts are safe and compliant with legal requirements.

PRODUCT LIFTING EQUIPMENT

Product	Lifters	Details
		Spigot & Socket Pipe Spherical Lift Shackles DN1200+ - 2No 10T
		Manhole Ring 38mm Lifting Pins DN900 - 2700 3No 38mm DN3000 - 3600 4No 38mm
		Perfect Base™ Spherical Lift Shackles DN1200 - 3No 2.5T DN1500 - 3No 5T DN1800/2100- 3No 7.5-10T
		Manhole Cover Slab Cast in Loops See page 25 for Product Weights
		Headwall Small - Medium - 4No RD24 Large - 4No RD30 XL - XXL - 3No 10T Spherical Lift Shackles
		Watertight Manhole Ring Spherical Lift Shackles DN1200 - 3No 2.5T DN1500 - 3No 5T
		Catchpit Cast in Loops See Page 40-41 for Product Weights

Certified lifting equipment is available for all our precast products.
Please download our lifting guides at www.traceyconcrete.com or email headoffice@traceyconcrete.com for a copy.

MEET OUR UK TEAM



John Nabbs
National Sales Manager
Mob: 07867 317144
Email:john@traceyconcrete.com



Leon Montgomery
Area Sales (South)
Mob: 07769 2015959
Email:leon@traceyconcrete.com



Chris Reader
Area Sales (North)
Mob: 07867 317239
Email:chris.r@traceyconcrete.com



Martin Corrigan
UK Sales Manager
Mob: 07795 836823
Email:martin@traceyconcrete.com



Lorna Keaney
UK Internal Sales
Phone: 028 66326437
Email:lorna@traceyconcrete.com



Nathan Jones
UK Internal Sales
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Email:nathan@traceyconcrete.com



Ciaran Smith
UK Internal Sales
Phone: 028 66326437
Email:ciaran.smith@traceyconcrete.com



Jonathan Tracey
UK Internal Sales
Phone: 028 66326437
Email: jonathan@traceyconcrete.com

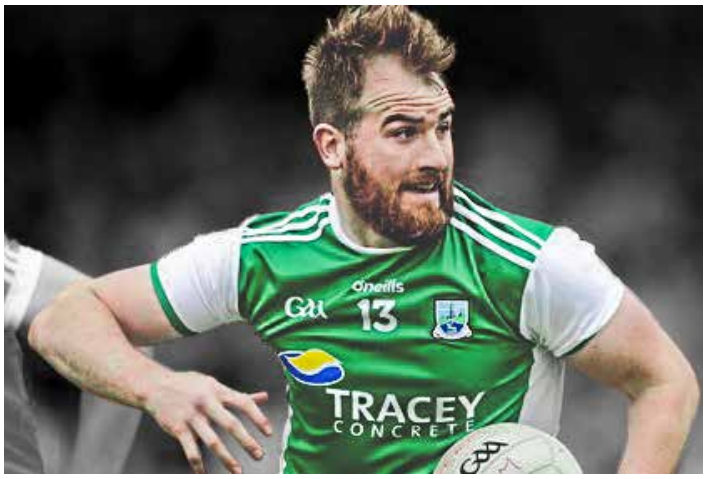


Joanna Fikiel
UK Internal Sales
Phone: 028 66326437
Email: joanna@traceyconcrete.com

UK Despatch Team Phone: 028 66326437 Option 1, Option 2, Option 2 Email:despatch@traceyconcrete.com

SPONSORSHIP

Tracey Concrete have been the main sponsor of Fermanagh GAA since 1991 which is the longest in GAA History. We at Tracey Concrete understand the importance of supporting community based organisations. We also sponsor our local Rugby Club at youth level - Enniskillen RFC



CHARITY WORK

Marie Curie is our chosen charity. We take part in the Lady Of The Lake Festival each year to raise funds for Marie Curie. In 2019 we raised £5,250.00





Our National Sales Manager John Nabbs at the top of Croagh Patrick in aid of Stand Up to Cancer.

CORONA VIRUS - COVID 19

During the Corona Virus - Covid 19 Pandemic Tracey Concrete donated over 300No FP3 Masks and PPE to our local hospitals and nursing homes. All our employees who continued to work through this time have access to masks, gloves, visors and at a social distance of over 2m. Our procedures were reviewed and changed to suit the requirements set out by the government.

Coronavirus
COVID-19

Coronavirus
COVID-19
Public Health
Advice





Tracey Concrete Limited
Old Rossorry, Sligo Road
Enniskillen, Co. Fermanagh
BT74 7LF

Belcoo Quarry
Greenahoe Road, Belcoo
Co. Fermanagh
BT93 5HD

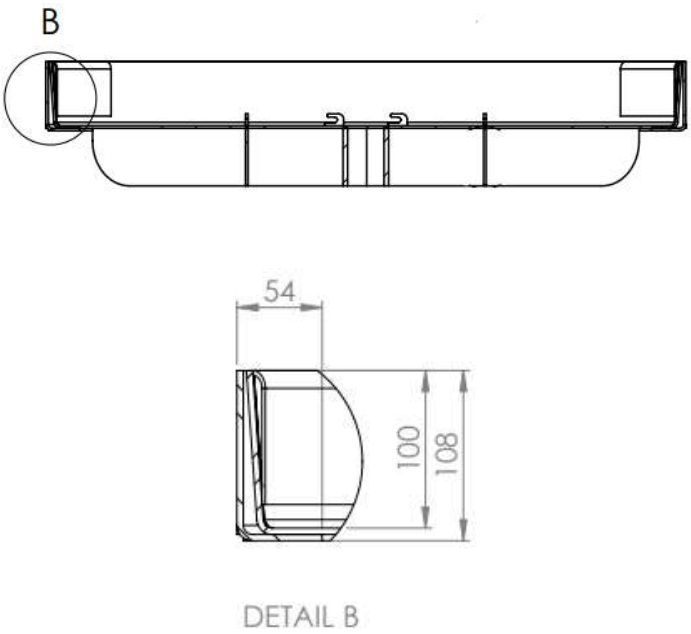
TELEPHONE
028 6632 6437
EMAIL
headoffice@traceyconcrete.com
traceyconcrete.com

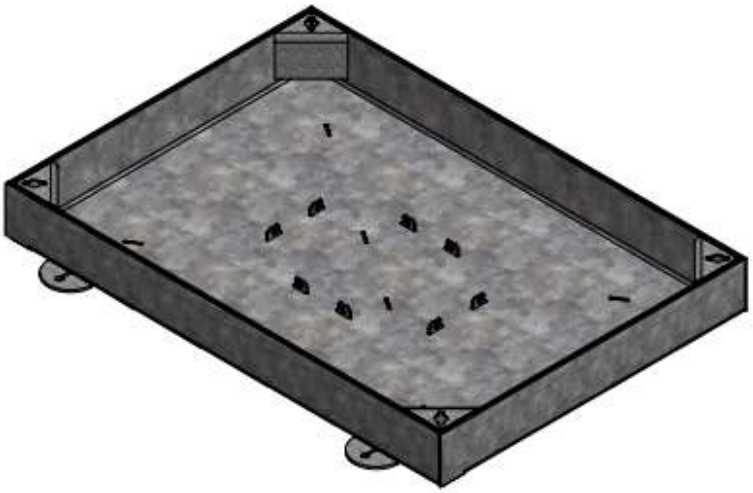
CE

bsi. ISO 9001:2015 Quality Management | ISO 14001:2015 Environmental Management | OHSAS 18001 Occupational Health and Safety Management

Product Datasheet

BPSPS – Single Recessed Deep Infill for Block Infill





Frame Sizes and Spec:

- o/a Top of Frame = c/o + 108mm.
- 50mm Build in Lugs on Longest Sides.
- 108mm o/a Frame Depth.
- 100mm Tray Depth.
- Recommended Rebate = W-120mm D-120mm.
- Plain Seated (Unsealed)
- BS Lifting Points.
- Deep Recessed for Block Infill.
- Loadings Available – FACTA AA (5tonne GLVW), AAA (10tonne), B (25tonne), D (44tonne)
- Galvanising certified to BS EN ISO 1461.

Extra Options:

- Security Locking (TorxPin Screws).
- Cap Head Locking Screws.
- Threaded Lifting Points.
- Single Neoprene Seal.
- Double Neoprene Seal and Locked.
- Stainless Steel Edge or Brass Edge.
- Full Stainless Steel Grades 304 or 316.
- Shallower Tray Depths.
- Square to Round Opening.

Sizes:

- Popular c/o Sizes – 300x300, 450x450, 600x450, 600x600, 675x675, 750x600, 750x750, 900x600.
- Any Special Size Available on Request. 1 Part Recommended Upto 0.6m2 Only.

Date: Wednesday 08 May 2024
Our Ref: 36227T/MW/MW

Ruby Civil Engineering
69A Church Street
Littleborough
Lancashire
England
OL15 8AB

WHGood Automation

Head Office
W H Good Automation Ltd
Carrs Industrial Estate
Haslingden
Rossendale
Lancashire
BB4 5JT

t 01706 216667
f 01706 216681
instruments@whgood.co.uk
www.whgood.co.uk

For the attention of: John Huyton

Dear John

T 07917 055 576 F

Re: FlowCERT Non Contact Flow Monitor

We thank you for your enquiry and have pleasure in forwarding our quotation for your consideration and approval as detailed below:

Item 001:

Type:	FlowCERT Non-contact Open Channel Flowmeter
Quantity:	1
Pt No:	1521115211XX-X0P
Product Details:	FlowCERT controller, wall mounted (IP65) includes five alarm/control relays 2x isolated 4-20mA output, RS485 interface card for velocity input / Modbus (switchable) and onboard data logging (using UltraLog). 1 x 4-20mA Input. Includes standard, calculations for a wide range of flumes and weirs. FlowCERT performs a fully implemented calculation to BS3680, and 32-point linearization is also included. Power supply: 115-230V a.c. + 5% / -10% 50/60 Hz,d.c. 18 - 36V
Project Price:	**£[redacted] each net**

Item 002:

Type:	Ultrasonic Level Transducer dB6
Quantity:	1
Pt No:	DB06030000000-BP
Product Details:	dB6 ultrasonic transducer, 6m range, IP68, c/w 30m cable. II 2 G D, Ex mb IIC T6 Gb, Ex mb IIIC T85°C Db, Ta = -40°C to +75°C
Project Price:	**£[redacted] each net**

Item 003:

Type:	MicroFlow Velocity Sensor
Quantity:	1
Pt No:	DRFS030000000SBP
Product Details:	MicroFlow non-contacting microwave liquid velocity sensor (facilitates Q=Kv calculations in open channels). IP68, 30m cable, velocity range 0.2 - 6m/s, RS485 Modbus output, supplied with USB lead. Supply 10 -28Vd.c. ATEX [Ex] II 2 G D, Ex mb IIC T4 Gb, Ex mb IIIC T135°C Db, (Ta= -20°C to +60°C)
Project Price:	**£[redacted] each net**

Item 004:

Type:	45 Deg. Bracket for MicroFlow and dB Tx

W H Good Automation Ltd is part of the W H Good Group of companies. Registered in England no. 2289519. Registered office as above.

Quantity:	1
Pt No:	DBA0008MF
Product details:	Bracket for mounting a dB series transducer with 45° angle for mounting MicroFlow unit.
Project Price:	**£[redacted] each net**

Carriage & packing £[redacted] per consignment within the UK.

Delivery

Expected 10 Working Days from Receipt of an Official Order.

"Delivery dates shown are an approximation based on availability at the time of quotation".

Terms and Conditions

Any Purchase Order placed against this quotation shall be in accordance with our Standard Terms and Conditions of Sale (a copy of which is available upon request).

Please read this quotation in conjunction with the correct data sheets, where applicable, to clarify that the items quoted are suitable for your application.

Quotations are based on our interpretation of your requirements, and it remains your responsibility to either accept or ask for amendments to this offer. Once the amendments have been clarified, a revised quotation will be produced. Please address any queries to instruments@whgood.co.uk or by telephone on 01706 216667.

Receipt of an official order from you will be taken as confirmation that our offer is correct. All purchase orders should be sent to instruments@whgood.co.uk and clearly marked with our quotation reference.

An End User statement may be required in certain circumstances.

The prices in this quotation exclude VAT, which shall be added at the prevailing rate on the date of invoice.

Any delivery dates stated are estimated at the time of quotation, however these dates may vary once an order is placed subject to manufacturing schedules.

Payment is strictly 30 days end of month, subject to credit approval. New or dormant accounts are subject to pro-forma payment terms subject to discussion with W H Good Automation Ltd.

This Quotation will remain valid for 30 days from the date of issue.

W H Good reserves the right to charge the customer for all costs incurred on amended or cancelled orders.
None of the work detailed in this quotation will commence until an official written order has been received.

All goods (excepting free issue items) shall remain the property of W H Good Automation Ltd. until paid for in full.

We trust this quotation meets with your requirements and look forward to hearing from you in the future.

Yours faithfully
P.p. WH Good Automation Ltd.

Mike Woods
Technical Sales

dB ULTRASONIC TRANSDUCERS



Technical Specifications:

The dB Transducer Series is a range of non-contacting ultrasonic transducers for level, volume, and flow measurement. Available in a variety of models and compatible with all Pulsar controllers so that you have a specific solution to suit your application requirements.

PHYSICAL: TRANSDUCER SPECIFIC

Model:	Dimensions:	Dia Face:	Weight:	Measurement Range:	Frequency:	Beam Angle:
dB3	78 (D) mm x 115 (H) mm (3.1 in x 4.5 in)	19 mm (0.7 in)	1.1 kg (2.4 lb)	125 mm to 3 m (4.9 in to 9.8 ft)	125kHz	<10°
dB6	86 (D) mm x 106 (H) mm (3.4 in x 4.2 in)	30 mm (1.2 in)	1.1 kg (2.4 lb)	300 mm to 6 m (11.8 in to 19.7 ft)	75kHz	<10°
dBS6	86 (D) mm x 106 (H) mm (3.4 in x 4.2 in)	45 mm (1.8 in)	1.1 kg (2.4 lb)	200 mm to 6 m (7.9 in to 19.7 ft)	50kHz	<10°
dB10	86 (D) mm x 106 (H) mm (3.4 in x 4.2 in)	45 mm (1.8 in)	1.1 kg (2.4 lb)	300 mm to 10 m (11.8 in to 32.8 ft)	50kHz	<10°
dB15	86 (D) mm x 122 (H) mm (3.4 in x 4.8 in)	60 mm (2.4 in)	1.2 kg (2.6 lb)	500 mm to 15 m (19.7 in to 49.2 ft)	41kHz	<8°
dB25	105 (D) mm x 142 (H) mm (4.1 in x 5.6 in)	78 mm (3.1 in)	1.4 kg (3.1 lb)	600 mm to 25 m (23.6 in to 82 ft)	30kHz	<6°
dB40	205 (D) mm x 223 (H) mm (8.1 in x 8.8 in)	160 mm (6.3 in)	6 kg (13.2 lb)	1.2 m to 40 m (3.9 ft to 131.2 ft)	20kHz	<5°

PHYSICAL: ALL TRANSDUCERS

Sensor Body Material:	Valox 357 U and syntactic foam face
Cable Lengths:	Standard = 5 m, 10 m, 20 m, or 30 m (16.4 ft, 32.8 ft, 65.6 ft, or 98.4 ft). Optional: up to 150 m (492 ft) maximum (increments of 10 m (32.8 ft) only)
Maximum Separation:	500 m (1,640 ft)
Mounting Connection:	BSP or 1" NPT

ENVIRONMENTAL

Enclosure Protection:	IP68 / NEMA 6P
Max. And Min. Temperature (Electronics):	Standard: -40° C to +90° C (-40° F to +194° F) Hazardous area versions: -40° C to +75° C (-40° F to +167° F)

APPROVALS

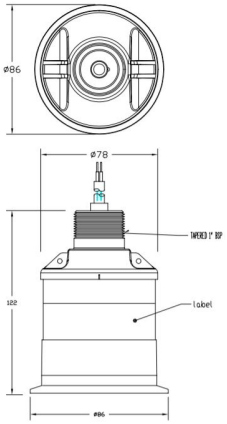
CE Approval:	2014/30/EU to EMC & 2014/34/EU ATEX Directives. Standards applied: EN 60079-0:2012+A11:2013/ EN 60079-11:2012 / EN 60079-18:2009 / EN 60079-26:2007 / EN 61326-1:2013
ATEX Approval:	Standard ATEX EEx m II T6 or optional EEx ia IIC T6. FM/FMC approval.

TRANSDUCER OPTIONS

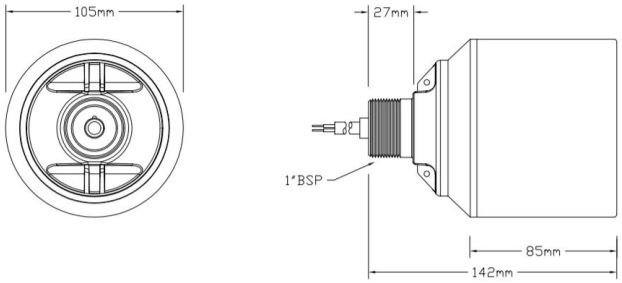
Model:	dB3	dBs6	dB6	dB10	dB15	dB25	dB40
PVDF		✓	✓	✓			
Front Threaded / PVDF	✓	✓	✓	✓			
Submergence Shield	✓	✓	✓	✓	✓	✓	
Flanged DIN/ANSI		✓	✓	✓	✓		
Foam Face		✓		✓	✓	✓	✓
Sanitary Flange		✓	✓	✓			
Intrinsically Safe of All the Above	✓	✓	✓	✓	✓	✓	✓

PERFORMANCE

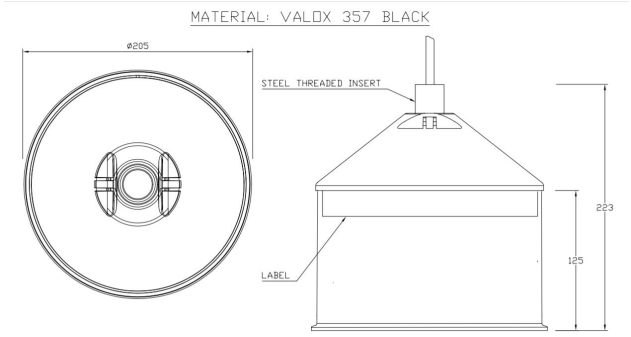
Accuracy:	0.25% or 6 mm (0.2 in) whichever is greater
Resolution:	0.01% or 2 mm (0.08 in) whichever is greater
Temp. Compensation:	Automatic, internal temperature sensor, ± 0.5 °C/°F



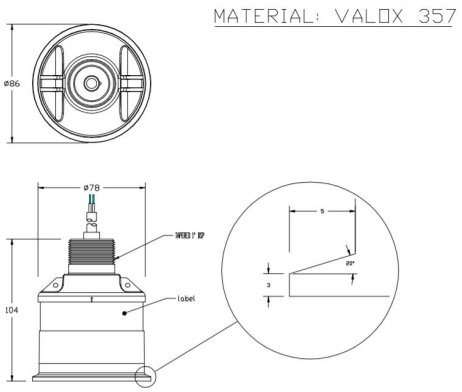
dB15 Transducer Drawing



dB25 Transducer Drawing



dB40 Transducer Drawing



dB6 & dB10 Transducer Drawing

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Rev 7.0

MICROFLOW

Technical Specifications:



MicroFlow is a non-contacting liquid flow velocity sensor that uses microwave technology to transmit short pulses that reflect off a moving surface back to the sensor and are analyzed to determine the velocity. It is designed for open channel flow applications where the channel has no existing primary measurement device (e.g. weir or flume). Can be combined with a Pulsar level transducer and controller in order to provide a complete flow measurement system.

PHYSICAL

Sensor Body Dimensions:	90 mm D x 140 mm H (3.5 in x 5.5 in)
Weight:	Nominal 1 kg (2.2 lb)
Sensor Body Material/ Description:	Valox 357
Transducer Cable Extensions:	5-core screened
Maximum Separation:	Up to 500 m (1,640 ft)
Mounting Connection:	Via 1" BSP back-mounted thread or 20 mm (0.8 in) via the supplied adaptor. Optional mounting bracket available from Pulsar
Mounting Angle:	45° optimal and mounted at the centerline of the channel with a clear uninterrupted view

ENVIRONMENTAL

Enclosure Protection:	IP68
Max. & Min. Temperature (Electronics):	-20 °C to +60 °C (-4 °F to +140 °F)
CE & Radar Approvals:	Listed in the Certificate of Conformity within the manual.
ATEX Approval:	Ex II 2 G D, Ex mb IIC T4 Gb, Ex mb IIIC T135 °C Db, Ta= -20 °C to +60 °C
FM Approval:	cFMus certified special protection (encapsulation) for Class I, II, III, Division 1, Groups A, B, C, D, E, F, G

PERFORMANCE

Velocity Range:	0.3 m/s to 6 m/s (0.98 ft/s to 19.7 ft/s)
Operational Range:	Up to 3 m H (9.8 ft)
Accuracy:	The greater of ±0.5% or 50 mm/s (2 in/s)
Optimal Installation:	Install at an angle of 45° in line with the flow. More information is provided within the manual — see the 'Locating the MicroFlow sensor' section
Max. Channel Width Per Sensor:	1.5 m (4.9 ft)
Radar:	K-Band (ISM)
Transmitter Power:	<15 dBm
Beam Width:	20° inclusive

OUTPUTS

Communication:	RS485 and Modbus RTU
Compatibility with Pulsar Controllers:	Integrates with FlowCERT or Ultimate

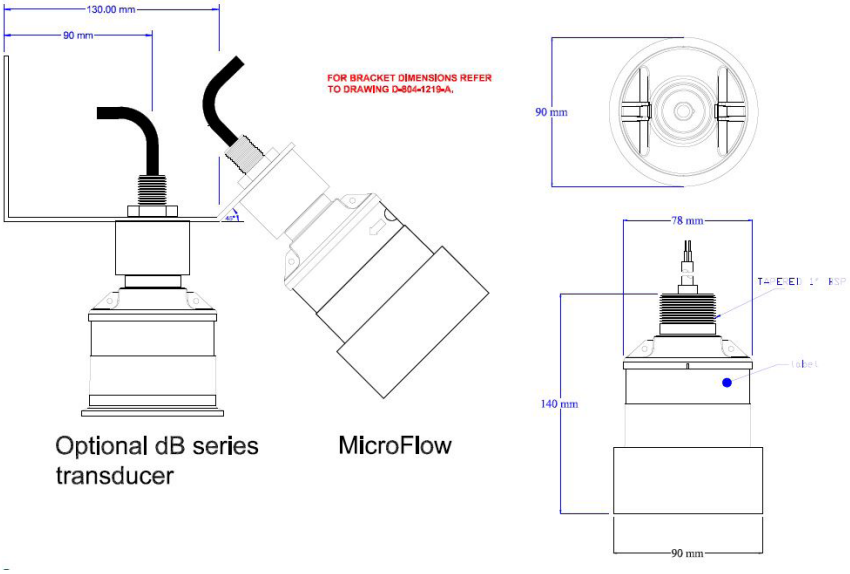
PROGRAMMING

PC Programming:	Via RS485 Modbus RTU
Programming Security:	Via passcode
Programmed Data Integrity:	Via non-volatile memory
PC Setup & Monitoring Software:	MicroFlow PC — Compatible with Windows 7/8/10

SUPPLY

Operating Voltage:	10-28 V DC
Power Consumption:	0.36 W

Also available in a 4-20mA loop powered version with ATEX Ex ia Zone 0 approval — MicroFlow-i



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FLOWCERT

Technical Specifications:



The FlowCERT open channel flow meter provides comprehensive flow monitoring with data logging and control functions for a complete range of flumes and weirs. It is compatible with a range of sensors in order to create a flow metering system to suit your application.

PHYSICAL

Mounting Option:	**Standard Wall Mount:**
Controller Body Dimensions:	235 mm x 184 mm x 120 mm (9.3 in x 7.2 in x 4.7 in)
Weight:	Nominal 1 kg (2.2 lb)
Enclosure Material/ Description:	Polycarbonate, flame resistant to UL94-5V
Cable Entry Detail:	10 cable entry knock outs, 5 x M20, 1 x M16 underside, x 18 mm (0.7 in) dia (PG11) at rear
Transducer Cable Extensions:	2-core screened
Maximum Separation:	Up to 1,000 m (3,280 ft)

ENVIRONMENTAL

IP Rating:	IP65 / NEMA 4X
Max. & Min. Temperature (Electronics):	-20 °C to +50 °C (-4 °F to +120 °F)
Flammable Atmosphere Approval:	For installation in non-flammable area only. Most compatible transducers suitable for flammable atmospheres. See sensor / transducer datasheet or brochure.
CE Approval:	Listed in the Certificate of Conformity within the manual

PERFORMANCE

Accuracy / Repeatability:	Dependent on application and sensor used. See sensor specification.
Resolution:	Dependent on application and sensor used. See sensor specification.
Min. & Max. Range:	0 mm to 15 m (0 in to 49.2 ft). Dependent on the sensor used.
Echo Processing:	DATEM (Digital Adaptive Tracking of Echo Movement)
Rate Response:	Fully Adjustable

OUTPUTS

Analog Outputs:	2 x isolated (floating) output (to 150 V) of 4-20mA or 0-20mA into 500 Ω (user programmable and adjustable) 1 µa resolution
Digital Output:	Full Duplex RS232
Volt Free Contacts, Number, & Rating:	5 form "C" (SPDT) rated at 5A at 115 V / 240 V AC
Display:	6 digits plus 12 character text, plus bar graph with direction indicators, remote communicator identifier, and program / run / test mode indicators

INPUTS

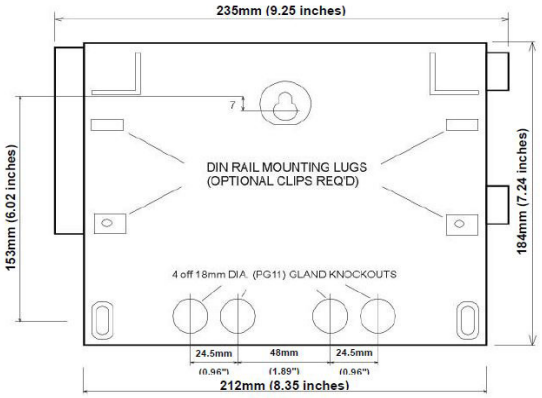
Analog Inputs:	Isolated (floating) input (to 150 V) of 4-20mA or 0-20mA into 500 Ω (user programmable and adjustable) 1 µa resolution
Velocity Input:	Via RS485 digital communications interface

PROGRAMMING

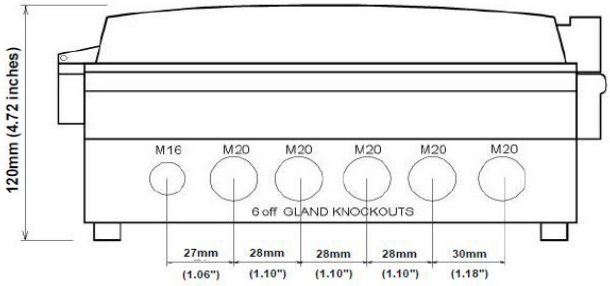
Onboard Programming:	By integral keypad
PC Programming:	Via RS232
Programming Security:	Via passcode (user selectable and adjustable)
Programmed Data Integrity:	Via non-volatile RAM, plus backup

SUPPLY

Power Supply:	115 V AC +5% / -10% 50/60 Hz, 230 V AC +5% / -10% 50/60 Hz, 22-28 V DC, 10 W maximum power (typically 6 W)
Fuses:	100mA at 230 V AC, 200mA at 115 V AC



FlowCERT Enclosure Drawing



FlowCERT Cable Entry Drawing

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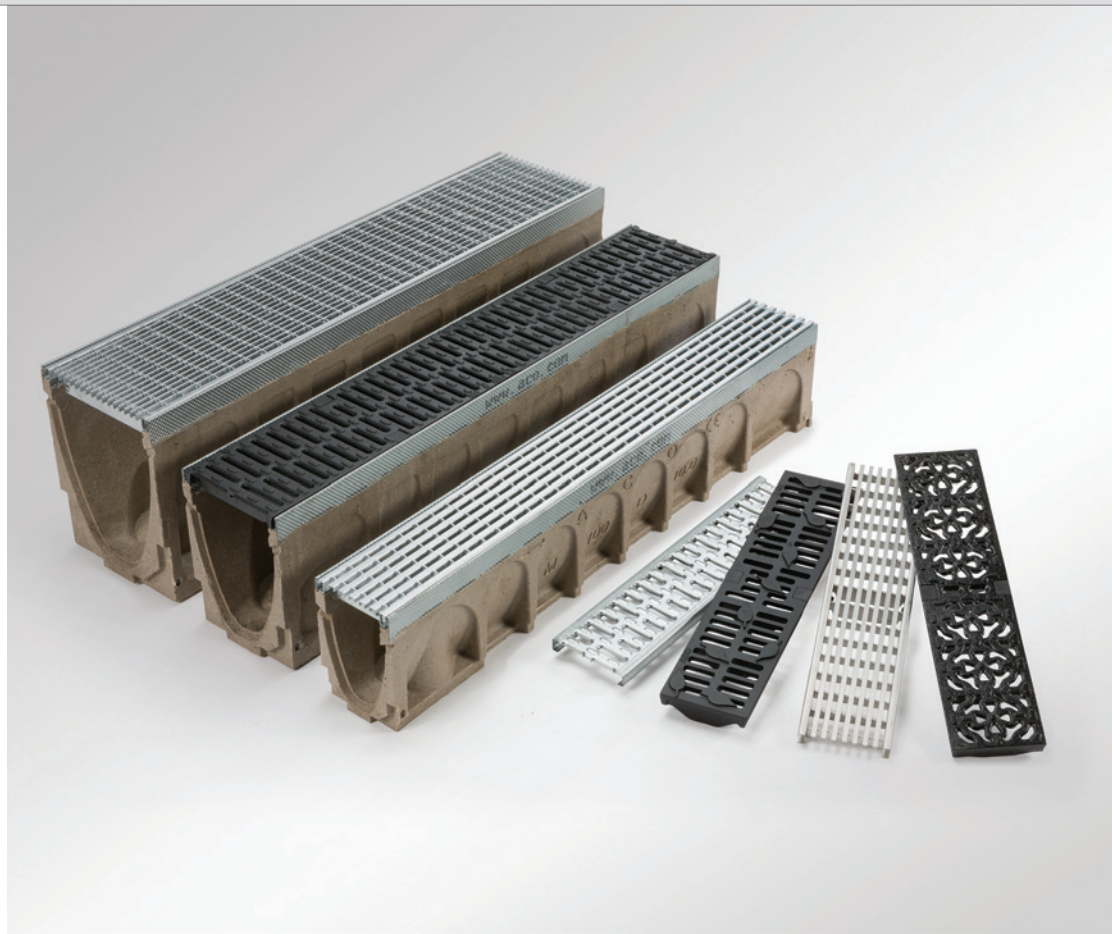
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ACO Water Management:
Civils + Infrastructure

Uniclass L2123 + L7315	EPIC J3413
CI/SfB (52.5)	

ACO MultiDrain® MD







ACO MultiDrain® MD

Medium duty channel drainage system

Introduction to the ACO Group

Throughout the world ACO branded drainage and surface water management systems are recognised for their innovative design, high quality manufacture, environmental excellence and industry leading performance.

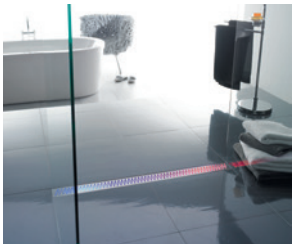
Today the ACO Group has a research and production base that reaches across four continents. This unmatched resource pioneers the development of solutions that are tailored to individual applications, meeting the need for high performance, sustainable products that deliver optimum value throughout their operational life.











ACO Technologies plc

ACO operates as ACO Technologies plc in the United Kingdom. Founded over 30 years ago, the company has grown quickly on a reputation for design innovation and customer service.

There are now 2 divisions within ACO Technologies that serve every sector of the construction industry, providing solutions for applications as diverse as rail, highways, airports, landscaping, retail, distribution centres and environmentally sensitive projects.



To help architects, designers and contractors meet the legal requirements that now tightly control the way surface water is managed, ACO has created its unique system chain that combines a 'Surface Water Management Cycle' – Collect, Clean, Hold, Release, with the service support of Train, Design, Support and Care.

These processes enable ACO to offer a combination of product and service expertise necessary for the complete and sustainable management of surface water drainage.



The ACO Group / www.aco.com

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ACO MultiDrain® MD is a trade mark of ACO Technologies plc.

Introduction to ACO MultiDrain® MD

ACO MultiDrain® MD benchmarks a new approach in the planning, delivery and installation of general purpose channel drainage systems. Designed to provide an effective solution for a wide variety of applications, ACO MultiDrain® MD system maximises functionality whilst using the minimum number of components.

What is ACO MultiDrain® MD?

ACO MultiDrain® MD channel drainage system is manufactured from Vienite®, ACO's sustainable high strength material. It is available in three widths; 100mm, 150mm and 200mm, and has a variety of depths and slopes.

The channel units are certified to BS EN 1433: 2002 Load Class D 400* and form the main components of the system.

Depending on the load class and application requirement, a wide range of gratings are available to complete the system. You can now choose from a range of traditional and discreet slot drainage gratings, solid covers and cross footpath drainage units to ensure all applications are catered for.

All gratings within the system are fitted with ACO Drainlock™, a bar-less locking device which reduces the risk of blockage and improves hydraulic capacity. The mechanism also provides for easy installation and maintenance of the system.

As standard, channels are manufactured with UltraSTEEL™ protective edge rails. The UltraSTEEL™ rails, with their unique patented design, provide optimum channel protection and improved bonding between channel sides and the surrounding pavement material.



ACO MultiDrain® MD System can provide a channel drainage solution for many applications by simply selecting the appropriate channel depth and grating type. Some of the applications that can be catered for are listed below.

- Threshold drainage
- Public landscaping
- Car parking
- Light industrial
- HGV parking
- Petrol station forecourts
- SuDS

Discreet slot drainage

Apply the ACO Brickslot grating to the channel unit to form an unobtrusive drainage system. The off-set grating can be used as a solution for threshold drainage and also against buildings eliminating difficult installations. The gratings are suitable for BS EN 1433: 2002 Load Class C 250 and D 400* applications.

ACO Brickslot gratings are available for 100mm, 150mm and 200mm wide channels, in both galvanised or stainless steel. See page 18 for further details.

Services ducts

The ACO MultiDrain® MD System includes a solid cover grating which when applied to the main channel unit provides a secure shallow trench with easy access to services and cabling.

Cross footpath drainage

Where roof drainage from down pipes is required to cross the footpath into the road gutter, a range of down pipes connectors, kerb outlets and shallow channels are available within the ACO MultiDrain® MD System range. See page 38 for further details.

This system is only available in the ACO MultiDrain® M100D System.

Threshold drainage

The ACO MultiDrain® MD System can be used to provide unobtrusive drainage around building entrances, compliant with the building regulations (England and Wales Part M, Scotland Section 4, Northern Ireland Part R). Simply select the appropriate grating to meet your aesthetic requirements.

Why choose ACO MultiDrain® MD?

Made from sustainable materials

ACO MultiDrain® MD channel elements are manufactured from Vienite®. Vienite® is ACO's new high strength sustainable material that meets environmental and sustainability targets for construction products.

Vienite® utilises high levels of post consumer recycled waste, but unlike some recycled materials does not compromise on strength or long term performance.

Vienite's high strength characteristics means the material is four times stronger than traditional concrete and has a low water absorption rate. It is also resistant to freeze thaw attack and has excellent chemical resistance.

At the end of the products operational life, Vienite® can be collected, processed and returned to production as a raw material.



System benefits

- Provides an efficient drainage solution for a wide variety of applications
- Range of constant, sloped and shallow depth channels
- Caters for a range of catchment areas
- Strong and robust channel design
- Patented UltraSTEEL™ channel edge rail for improved strength and durability
- CE Marked and BS EN 1433: 2002 certificated to Load Class D 400*
- Extensive choice of gratings and accessories for many applications
- Choice of outlet options, gullies, sumps or channel knockouts
- Unique ACO Drainlock™ grating fixing improves hydraulic capacity
- Lightweight design is simple and fast to install
- 100% recyclable
- Ideal for use against building facades or as a Part M threshold drainage solution when used with ACO MultiDrain® Brickslot grating

NEW ACO Hydraulic Design Software

Register online for our free, secure online design software:

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- Flexible catchment design
- Integrated rainfall data
- Automated product optimisation
- PDF summary documents



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*Not suitable for carriageways of public roads or motorways

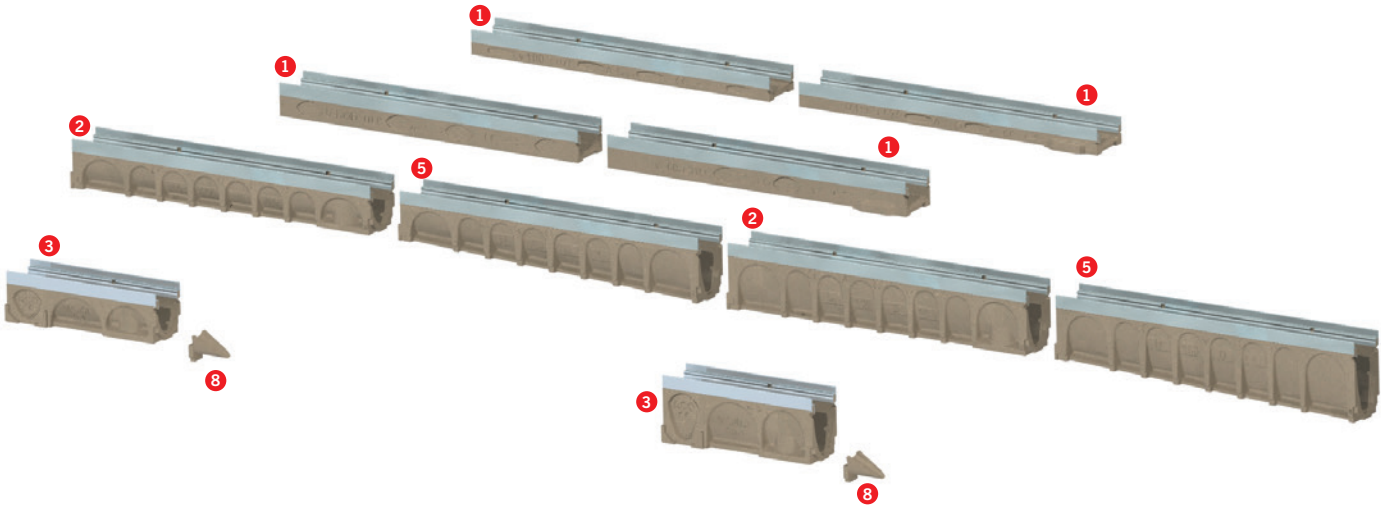
ACO MultiDrain® MD range layout

To support a wide variety of catchment depths, hydraulic capacities and applications, the system is available in three channel widths, 100mm, 150mm and 200mm and has a range of constant depths, shallow depth and sloping depth channels to suit the drainage design.

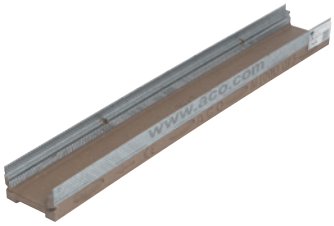
The layout below illustrates the channels and accessories available within the ACO MultiDrain® MD range and to aid product selection, a summary of the function and feature of each component is provided.

All ACO MultiDrain® MD channels can be purchased with galvanised or stainless steel edge rails.

Further details can be found on pages 13 – 37 of this brochure.



1 Shallow depth channels



- **100mm wide bore:** Four shallow channel units are available in 1m lengths with an overall depth of 75mm or 100mm.
- **150mm wide bore:** One shallow channel unit is available in 1m length with an overall depth of 100mm.
- **200mm wide bore:** One shallow channel unit is available in 1m lengths with an overall depth of 100mm.

Standard option available includes vertical cast-in TPE seal for connection to Ø110mm pipework.

2 Constant depth channels



- **100mm wide bore:** Four constant depth channel units are available in 1m lengths with overall depths ranging from 150mm to 300mm.
- **150mm wide bore:** Three constant depth channel units are available in 1m lengths with overall depths ranging from 210mm to 310mm.
- **200mm wide bore:** Three constant depth channel units are available in 1m lengths with overall depths ranging from 265mm to 365mm.

These channels include a vertical knockout for connection to Ø110mm (100mm wide bore channels) or Ø160mm (150mm and 200mm wide bore channels) pipework.

3 Constant depth channels – 0.5m



- **100mm wide bore:** Four 0.5m constant depth channel units are available with overall depths ranging from 150mm to 300mm
- **150mm wide bore:** Three 0.5m constant depth channels with overall depths ranging from 210mm to 310mm.
- **200mm wide bore:** Three 0.5m constant depth channels with overall depths ranging from 265mm to 365mm.

These channels include vertical knockout for connection to Ø110mm (100mm wide bore) or Ø160mm (150mm and 200mm wide bore) pipework and side knockout for 90° channel connections.

4 Universal sump



Each system width has one 0.5m Universal sump for connection to all channels. Outlet options for Ø110mm and Ø160mm pipes and foul air traps. Plastic silt bucket provided with each unit.

5 Sloping depth channels

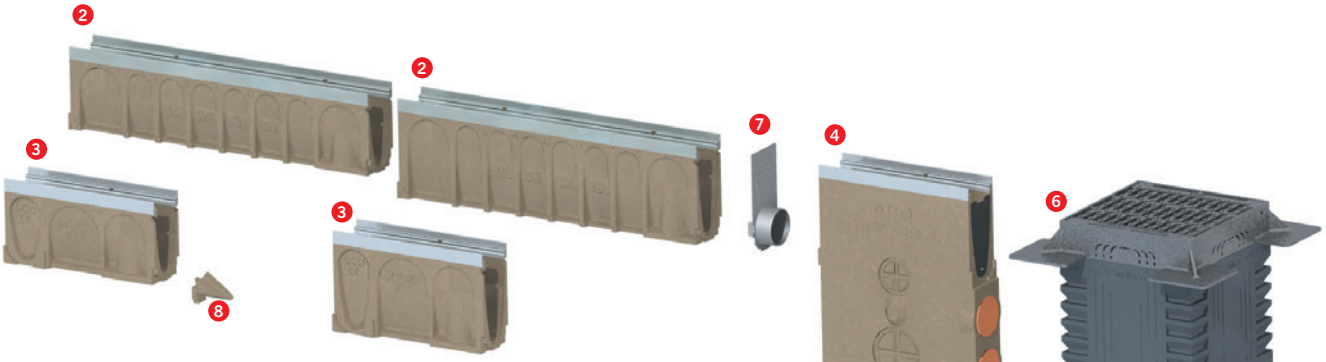


- **100mm wide bore:** Twenty 1m sloping channels with 0.5% fall in depths from 150mm to 250mm.

6 Universal gully



One Universal gully for all applications and channel widths from Load Class A 15 to D 400. Standard features include ductile cast iron cover, silt bucket and roddable foul air trap for connection to Ø160mm PVC-U pipe.



7 Multifunctional endcap



One plastic universal endcap for each channel width. Provides a closing or outlet option to Ø110mm (100mm wide bore channels) or Ø160mm (150mm and 200mm wide bore channels) pipes.

8 Step connector



A polymer concrete unit which helps provide smooth water transition between constant depth channels when used in a stepped system design. The Step connector is suitable for the 50mm step between each of the constant channel depths.

Guidance for using the ACO MultiDrain® MD parts tables

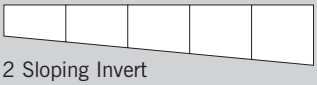
The ACO MultiDrain® MD parts tables are shown on the following pages. The product information is split down by channels widths and further by channel depth and edge rail type. This is to enable quick and simple product identification and selection.

The tables for ACO MultiDrain® MD channels list a number associated with the Invert Type. This number highlights the drainage design which can be achieved when using these channels. The key for the Invert Type is shown opposite.

Channel invert types



1 Constant Depth Invert



2 Sloping Invert

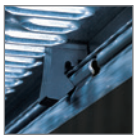


3 Stepped Invert

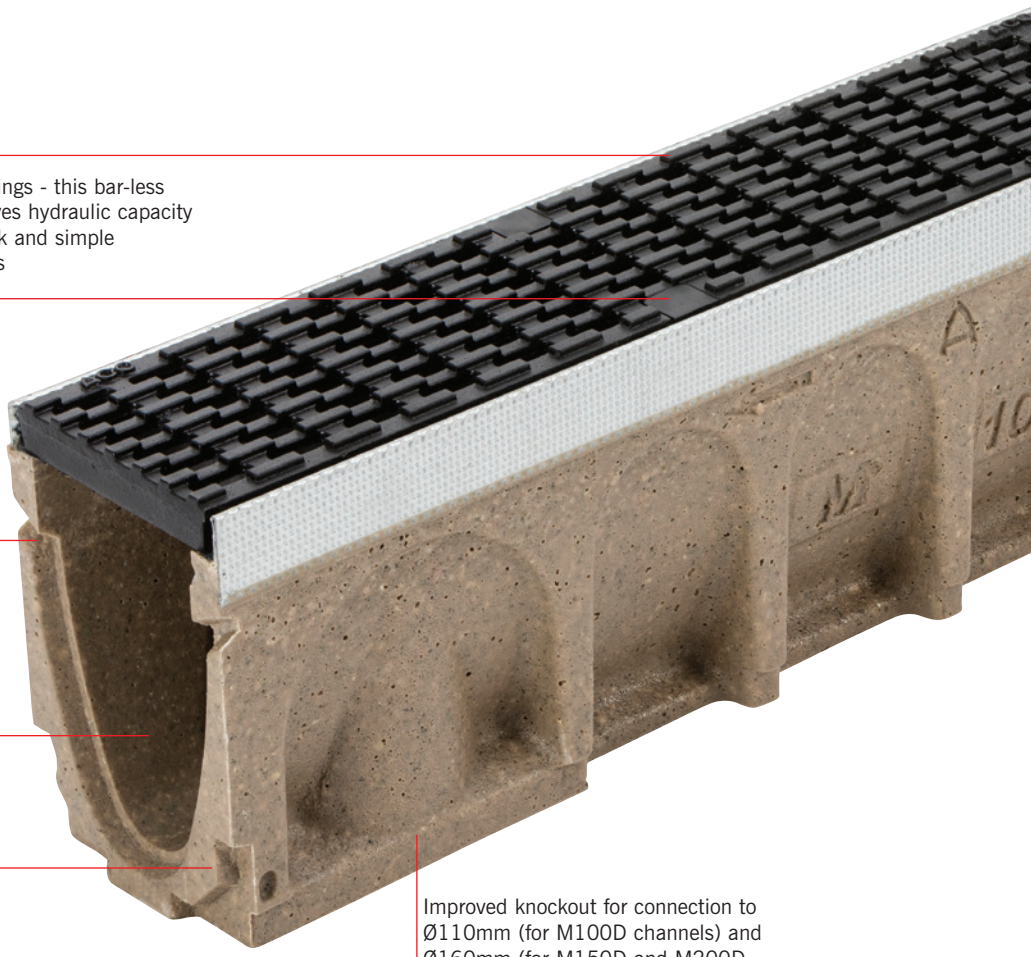
ACO MULTIDRAIN® FEATURES OVERVIEW



Anti shunt feature holds grating securely in place



ACO Drainlock™ gratings - this bar-less locking device improves hydraulic capacity and provides for quick and simple installation of gratings



Sealant groove for simple watertight installations

V shaped channel bore improves speed of water flow and promotes self cleansing

Male and female channel connections to aid fast installation.

Improved knockout for connection to Ø110mm (for M100D channels) and Ø160mm (for M150D and M200D channels) PVC-U pipes.



LOAD CLASSES

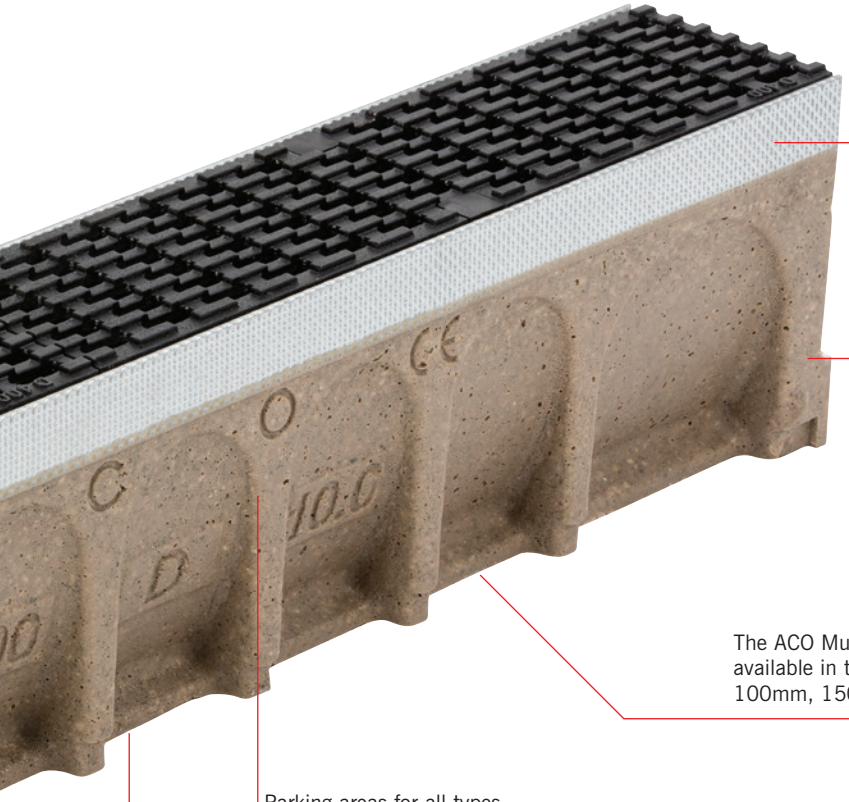
A 15
Pedestrian, cycleways, minimally trafficked areas (light domestic vehicles only).

B 125
Pedestrian precincts, light vehicles, private car parks and drives.

C 250
Parking areas, service stations (cars) and slow-moving light commercial vehicles.

D 400
Parking areas for all types of vehicles*

* Not suitable for carriageways of public roads or motorways.



Protective UltraSTEEL™ galvanised edge rails for improved strength and bonding between channel and surface materials. Also available in stainless steel.

Manufactured from Vienite®, a polymeric based recycled material, strong and lightweight design, improves stability and anchors product into concrete surround.

The ACO MultiDrain® MD system is available in three channel widths; 100mm, 150mm and 200mm.

Parking areas for all types of vehicles*

Internal channel marking for easy identification once installed.



Gratings
ACO MultiDrain® MD System has a wide variety of gratings available that include cast iron, stainless steel and plastic slotted gratings, heelguard options (including the new ATec coated heelguard grating), solid covers and brickslot gratings. See pages 10 to 12 for further details.

EXPLORE THE WORLD'S LARGEST RANGE OF GRATING STYLES

Style, aesthetics, performance and reliability are all important factors when specifying surface water management systems. Globally recognised as the no. 1 choice in managing surface water, ACO provide designers with the widest range of channel and grating styles to choose from.

By using a range of different design options including light, form, texture, material and colour, ACO's grating and channel styles can be used to complement or enhance many landscape designs.



Multi applications provided for by ACO MultiDrain® MD

The breadth of the ACO MultiDrain® grating range provides designers with a wide choice of styles to complete their surface water drainage system.

Depending on the application requirement, Architects, Designers and Planners can choose from variety of popular, long establish designs in ductile iron, high tech composites, galvanised or stainless steel materials.

For applications which require discreet drainage to blend subtly with the design of the landscape, ACO Brickslot can provide an aesthetically-pleasing finish.

Supplied as standard with ACO Drainlock™ boltless locking, the range of grating styles is available in load classes A 15 – D 400 making them the idea choice for both pedestrian and vehicular applications.

To suit a range of hydraulic requirements, these grating styles are available for use with 100mm, 150mm and 200mm wide channels.

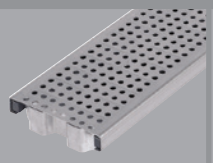
Slotted Steel

Available in Galvanised Steel.



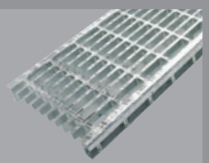
Perforated Steel

Available in Galvanised Steel.

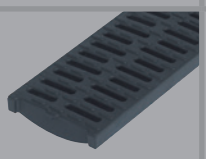


Mesh Steel

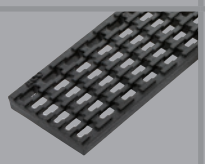
Available in Galvanised Steel.



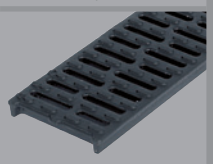
Heelguard™ Slotted Composite



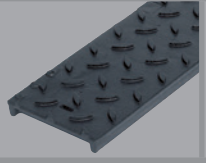
Intercept Ductile Iron D 400



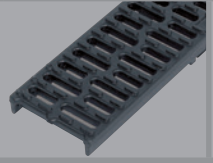
Heelguard™ Slotted Ductile Iron



Ductile Iron Solid Cover

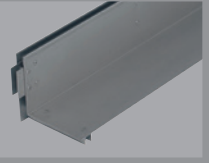


Slotted Ductile Iron



Brickslot

Available in Galvanised Steel.

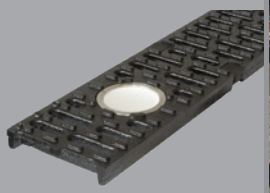


Technical information for these gratings is provided on page 15 onwards

Lighting & bespoke solutions

Lighting Solutions

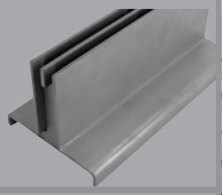
Enhance and add definition to a space - see ACO Lighting Systems brochure for details.





Bespoke Slot Solutions

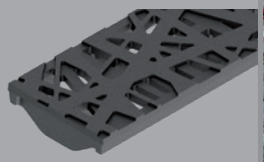
Our Brickslot gratings can be provided in a range of bespoke heights and widths. Contact our Design Services Team for details.

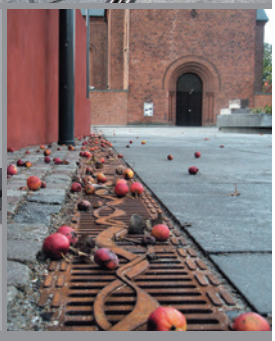




Bespoke Freestyle Solutions

Realise your own design ideas. ACO Freestyle cast iron gratings offer you individual solutions for every project. Contact our design services team for more details.





Surface + Grating Visualiser

A clever, yet easy to use software program that visualises how our range of grating designs could enhance your project.



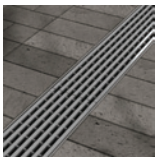
To make specification easier, the software will suggest our most suitable ranges based on the project requirements. You can then select from the available options and visualise how these may look in different surface finishes. Once a choice is made, a simple, yet detailed specification sheet provides full product information.

To launch the visualiser scan the QR code or visit www.aco.co.uk/gratingvisualiser

New grating styles

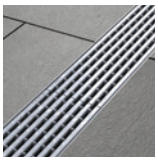
A new range of contemporary, elegant designs will add character and style to any landscape project.

Intercept Profile Stainless steel



High quality linear profile design provides a contemporary, long lasting finish to any prestigious landscaping project.

Intercept Profile Galvanised steel



High quality linear profile design provides a stylish option for those looking for an alternative to stainless steel.

Intercept Bar



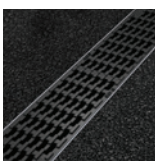
The sleek and elegant intercept bar design provides a classic, high end finish to any project.

Mosaic



The unique pattern of the Mosaic design provides an ideal finish to heritage or traditional landscapes.

Intercept



The Intercept D400 grating provides a minimalistic and widely appealing design.

Flag



The unusual character of the Flag design provides a fun alternative to traditional slotted gratings.



Surface design detail

Creating bespoke gratings

MultiDrain MD channels are compatible with a wide range of grating designs including a bespoke grating service from ACO.

Introducing the ACO Freestyle

The ACO Freestyle offering is a unique customer-led grating design solution, which gives you the freedom to create fully bespoke drainage grating designs for the external environment.

Who is Freestyle for?

Freestyle is relevant for clients who value first impressions – which starts with the approach to the building.

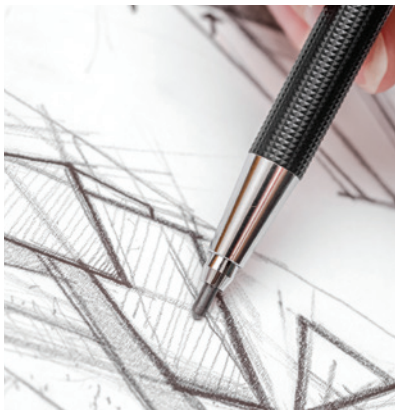
It is for clients who value something new being brought to the table and bespoke drainage gratings are something most clients have not considered. When looking at pedestrian areas with quality paving solutions, Freestyle is a complimentary and functional aesthetic solution.

Clients, who value branding opportunities, will appreciate the possibilities of incorporating their logo into the grating design.

Freestyle also works for those clients who are aiming for a traditional standing or wish to integrate into a historic setting, as the flowing forms of metal translate well when recreating Victorian grandeur.







- Inspiration can come from many different sources. Your building or landscape may naturally inspire or suggest particular designs. Alternatively you could look towards abstract shapes and patterns to inspire you.
- With customer design at the heart of the offering, ACO Freestyle begins with a design being submitted to ACO, who then create a design model from this template. Templates are available to download from the ACO website www.aco.co.uk/freestyle to help in this process.
- The Freestyle grating is overlaid on a grid design that has been tested for a Load class up to D400, which matches the load class strength of Multiline Sealin channels.
- With the option to access a number of pre-moulded designs, as well as create something completely unique, which ACO will manufacture for you, Freestyle allows greater creative control of the external landscape.



ACO. creating the future of drainage

Download your brochure + design templates: www.aco.co.uk/freestyle

ACO MultiDrain® M100D channels with UltraSTEEL™ galvanised edge rails.

ACO MultiDrain® M100D channels are manufactured from Vienite®, ACO's sustainable high strength material, which provides high chemical resistance. The channels are available in constant depth, sloping depth and shallow depth units.

ACO MultiDrain® M100D channels listed below are provided with integral galvanised steel protective edge rails.

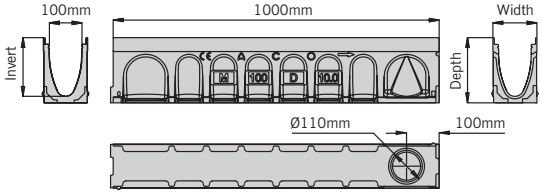
For enhanced durability these rails are manufactured from UltraSTEEL™, a unique material that has improved strength over plain steel.

The added benefit of UltraSTEEL™ is that its greater surface area improves the bond between rail and adjacent material where a sealed system is required.

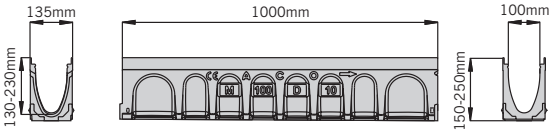
For the ACO MultiDrain® M100D range of gratings to suit these channels please refer to pages 20-23.

Constant and sloping depth channels with UltraSTEEL™ galvanised edge rails

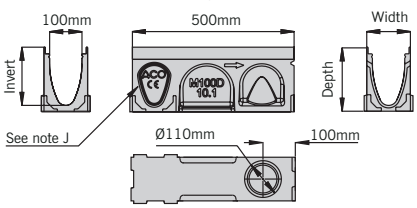
Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Invert depth (mm)	Invert Type	Weight (kg)
23075	M100D No. 075	1000	135	75	55	1	9.2
23076	M100D No. 075V	1000	135	75*	55	1	8.9
23110	M100D No. 0100	1000	135	100	80	1	11.0
23111	M100D No. 0100V	1000	135	100*	80	1	10.7
23000	M100D No. 0.0*	1000	135	150	130	1/3	12.9
23050	M100D No. 0.1J*	500	135	150	130	1/3	7.6
23001	M100D No. 1	1000	135	150/155	130/135	2	13.5
23002	M100D No. 2	1000	135	155/160	135/140	2	13.8
23003	M100D No. 3	1000	135	160/165	140/145	2	14.1
23004	M100D No. 4	1000	135	165/170	145/150	2	14.4
23005	M100D No. 5	1000	135	170/175	150/155	2	14.7
23006	M100D No. 6	1000	135	175/180	155/160	2	15.0
23007	M100D No. 7	1000	135	180/185	160/165	2	15.3
23008	M100D No. 8	1000	135	185/190	165/170	2	15.6
23009	M100D No. 9	1000	135	190/195	170/175	2	15.9
23010	M100D No.10	1000	135	195/200	175/180	2	16.2
23100	M100D No.10.0*	1000	135	200	180	1/3	15.9
23101	M100D No.10.1J*	500	135	200	180	1/3	9.2
23011	M100D No.11	1000	135	200/205	180/185	2	16.5
23012	M100D No.12	1000	135	205/210	185/190	2	16.8
23013	M100D No.13	1000	135	210/215	190/195	2	17.1
23014	M100D No.14	1000	135	215/220	195/200	2	17.4
23015	M100D No.15	1000	135	220/225	200/205	2	17.7
23016	M100D No.16	1000	135	225/230	205/210	2	18.0
23017	M100D No.17	1000	135	230/235	210/215	2	18.3
23018	M100D No.18	1000	135	235/240	215/220	2	18.6
23019	M100D No.19	1000	135	240/245	220/225	2	18.9
23020	M100D No.20	1000	135	245/250	225/230	2	19.2
23200	M100D No.20.0*	1000	135	250	230	1/3	21.8
23201	M100D No.20.1J*	500	135	250	230	1/3	10.8
23300	M100D No.30.0*	1000	135	300	280	1/3	25.4
23301	M100D No.30.1J*	500	135	300	280	1/3	12.5



M100D 1m constant depth channel 0.0 to 30.0



M100D 1m sloping depth channel



M100D 0.5m constant depth channel

Note: The constant depth channels have an improved knockout feature, see page 41 for more information.

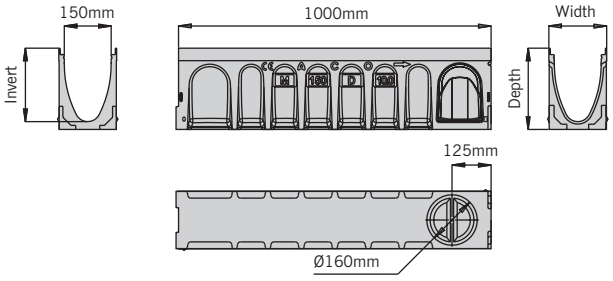
*** Indicates channels supplied with a preformed Ø110mm knockout for vertical outlet.**

J Indicates side knockout for 90° channel connection. Knockout on both sides of the channel.

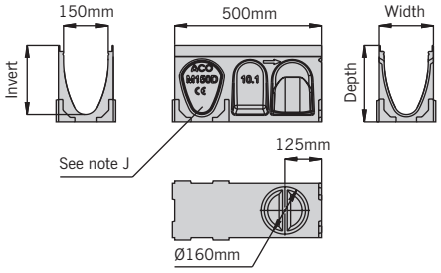
ACO MultiDrain® MD components

M150D Constant depth channels with UltraSTEEL™ galvanised edge rails

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Invert depth (mm)	Invert Type	Weight (kg)
23156	M150D No. 0100	1000	185	100	75	1	15.0
23157	M150D No. 0100V	1000	185	100	75	1	14.9
23150	M150D No. 0.0*	1000	185	210	185	1/3	23.4
23153	M150D No. 0.1J*	500	185	210	185	1/3	12.7
23151	M150D No.10.0*	1000	185	260	235	1/3	26.2
23154	M150D No. 10.1J*	500	185	260	235	1/3	14.6
23152	M150D No.20.0*	1000	185	310	285	1/3	30.3
23155	M150D No. 20.1J*	500	185	310	285	1/3	16.4



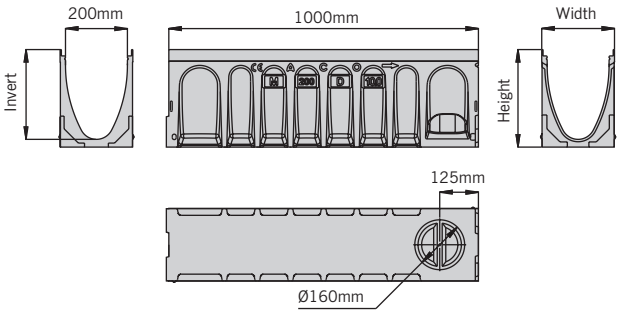
M150D 1m constant depth channel



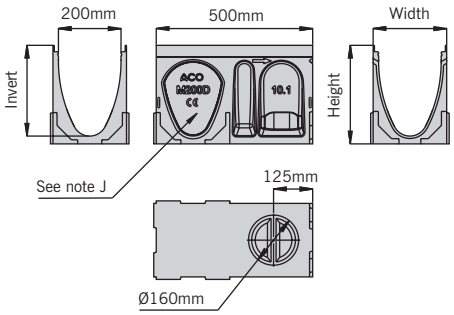
M150D 0.5m constant depth channel

M200D Constant depth channels with UltraSTEEL™ galvanised edge rails

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Invert depth (mm)	Invert Type	Weight (kg)
23216	M200D No. 0100	1000	235	100	75	1	17.5
23217	M200D No. 0100V	1000	235	100	75	1	17.0
23210	M200D No. 0.0*	1000	235	265	240	1/3	33.0
23213	M200D No. 0.1J*	500	235	265	240	1/3	17.9
23211	M200D No.10.0*	1000	235	315	290	1/3	37.4
23214	M200D No. 10.1J*	500	235	315	290	1/3	19.9
23212	M200D No.20.0*	1000	235	365	340	1/3	40.4
23215	M200D No. 20.1J*	500	235	365	340	1/3	21.9



M200D 1m constant depth channel



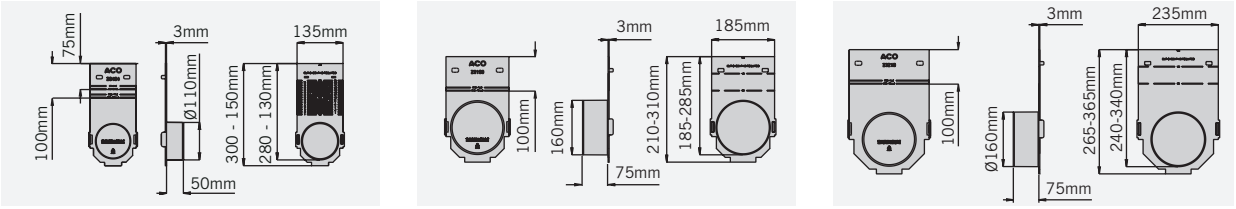
M200D 0.5m constant depth channel

Note: The constant depth channels have an improved knockout feature, see page 41 for more information.
*** Indicates channels supplied with a preformed Ø110mm knockout for vertical outlet.**
J Indicates side knockout for 90° channel connection. Knockout on both sides of the channel.
V Indicates channel with cast in TPE triple lipped seals for water tight connection. See page 41 for further information.
† 075V and 0100V channels have a depth overall around the outlet of 80mm (075V) and 105 (0100V).

These products are subject to weight and dimensional tolerances. The dimensions shown on this page are for guidance purposes only.

Multifunctional endcap (closing/inlet/outlet)

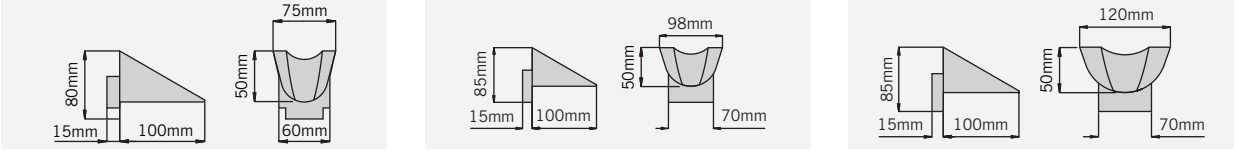
Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Invert depth (mm)	Invert Type	Weight (kg)
23404	M100D No. 306 multifunctional endcap	-	135	75/300	50	-	0.2
23159	M150D No. 306 multifunctional endcap	-	185	310/100	75	-	0.3
23219	M200D No. 306 multifunctional endcap	-	235	365/100	75	-	0.4



The multifunctional endcap can be cut down to suit all channels. See page 42 for further information.

Step connector

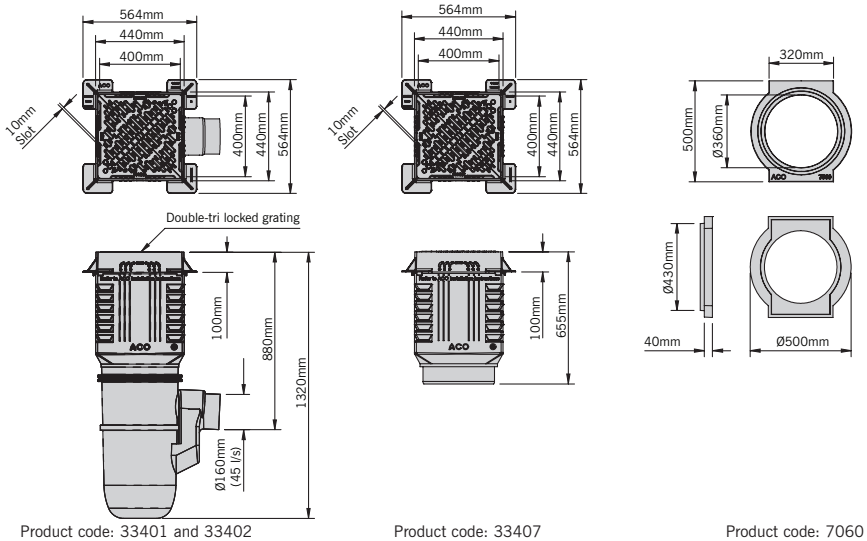
Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Invert depth (mm)	Invert Type	Weight (kg)
12601	M100D 50mm Step connector	100	75	50	-	-	0.4
13001	M150D 50mm Step connector	100	98	50	-	-	0.5
13401	M200D 50mm Step connector	100	120	50	-	-	0.6



Note: For information on the Step connector functionality see page 42.

Universal gully and components

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Invert depth (mm)	Invert Type	Weight (kg)
33401	Gully assembly and bucket 601D	440	440	1315	870	-	52.5
33402	Gully assembly no bucket 602D	440	440	1315	870	-	51.0
33407	Gully top assembly 607D	440	440	655	-	-	45.0
33605	Gully base unit 605	-	Ø375	750	310	-	4.3
33603	Gully intermediate unit 603	440	440	515	-	-	5.1
44355	Gully grating and frame 600D	400*	564††	100	-	-	40.0
7060	Gully connector 615	500	Ø500	40	-	-	7.0
33606	Bucket polyethylene 606	-	Ø275	245	-	-	1.4



Product code: 33401 and 33402 | Product code: 33407 | Product code: 7060

Note. Plain U-PVC 150mm - 160mm Supersleeve adaptor supplied with 601D, 602D and 605 assemblies.
For information on Universal gully functionality see page 43. *Clear opening size. ††Over frame size.

These products are subject to weight and dimensional tolerances. The dimensions shown on this page are for guidance purposes only.

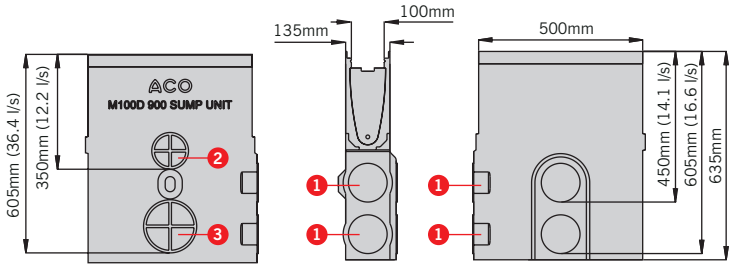
ACO MultiDrain® MD components

M100D sump unit with UltraSTEEL™ galvanised edge rails

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Invert depth (mm)	Invert Type	Weight (kg)
23410	M100D Universal sump with plastic silt bucket	500	135	635	615	-	32.8

Standard sump outlets

1. = Ø110mm outlet with triple lipped seal
2. = Ø110mm knockout
3. = Ø160mm knockout



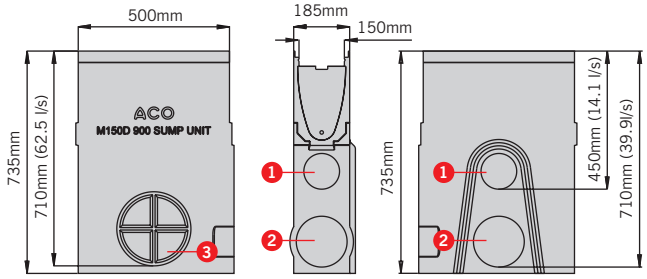
Note: Drawing shows flow through un-trapped unions. For information on the sump unit functionality see page 47.

M150D sump unit with UltraSTEEL™ galvanised edge rails

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Invert depth (mm)	Invert Type	Weight (kg)
23158	M150D Universal sump with plastic silt bucket	500	185	735	715	-	43.4

Standard sump outlets

1. = Ø110mm outlet with triple lipped seal
2. = Ø160mm outlet
3. = Ø200mm knockout



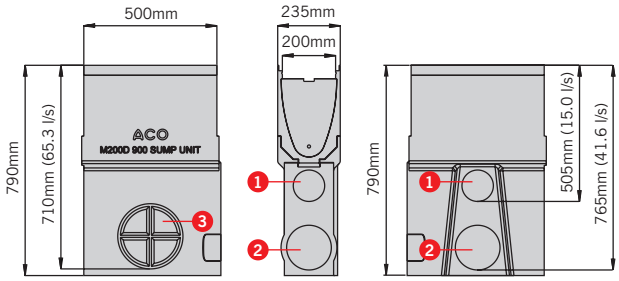
Note: Drawing shows flow through un-trapped unions. For information on the sump unit functionality see page 43.

M200D sump unit with UltraSTEEL™ galvanised edge rails

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Invert depth (mm)	Invert Type	Weight (kg)
23218	M200D Universal sump with plastic silt bucket	500	235	790	765	-	47.0

Standard sump outlets

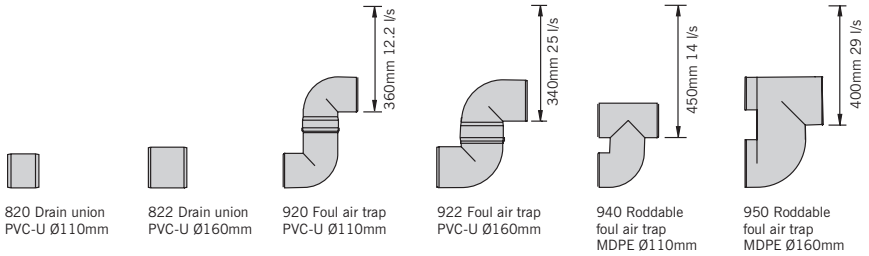
1. = Ø110mm outlet with triple lipped seal
2. = Ø160mm outlet
3. = Ø200mm knockout



Note: Drawing shows flow through un-trapped unions. For information on the sump unit functionality see page 43.

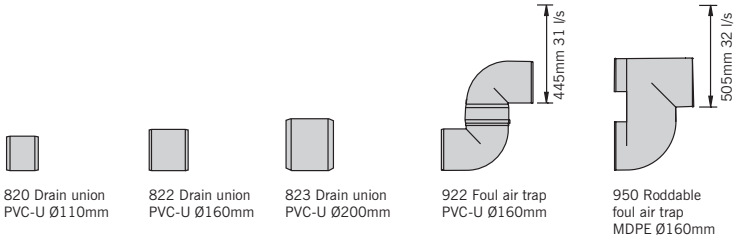
M100D Drain unions and foul air traps

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Invert depth (mm)	Invert Type	Weight (kg)
0056	820 Drain union PVC-U Ø110mm (max 16.6 l/s)	100	110	-	605	-	0.1
0058	822 Drain union PVC-U Ø160mm (max 36.4 l/s)	100	160	-	605	-	0.5
2640	920 Foul air trap PVC-U Ø110mm (max 12.2 l/s)	-	110	-	360	-	0.5
2638	922 Foul air trap PVC-U Ø160mm (max 25 l/s)	-	160	-	340	-	1.9
7931	940 Roddable foul air trap MDPE Ø110mm (max 14 l/s)	-	110	-	450	-	0.4
7932	950 Roddable foul air trap MDPE Ø160mm (max 29 l/s)	-	160	-	400	-	0.8



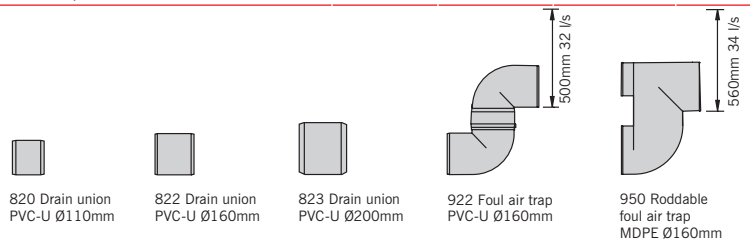
M150D Drain unions and foul air traps

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Invert depth (mm)	Invert Type	Weight (kg)
0056	820 Drain union PVC –U Ø110mm (max 14.1 l/s)	100	110	-	450	-	0.1
0058	822 Drain union PVC –U Ø160mm (max 39.9 l/s)	100	160	-	710	-	0.5
2723	823 Drain Union PVC-U Ø200mm (max 69.5 l/s)	200	200	-	710	-	0.6
2638	922 Foul air trap PVC –U Ø160mm (max 31 l/s)	-	160	-	445	-	1.9
7932	950 Roddable foul air trap MDPE Ø160mm (max 32 l/s)	-	160	-	505	-	0.8



M200D Drain unions and foul air traps

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Invert depth (mm)	Invert Type	Weight (kg)
0056	820 Drain union PVC –U Ø110mm (max 15.0 l/s)	100	110	-	505	-	0.1
0058	822 Drain union PVC –U Ø160mm (max 41.6 l/s)	100	160	-	765	-	0.5
2723	823 Drain Union PVC-U Ø200mm (max 72 l/s)	200	200	-	765	-	0.6
2638	922 Foul air trap PVC –U Ø160mm (max 32 l/s)	-	160	-	500	-	1.9
7932	950 Roddable foul air trap MDPE Ø160mm (max 34 l/s)	-	160	-	560	-	0.8



Accessories

Product code	Description	Weight (kg)
32599	Polymer concrete repair kit	1.0†



†Repair kit includes 0.5kg tin of natural colour polyester concrete repair resin, grey and black pigment, hardener paste, mixing instructions and material safety data sheets.

Problem solving drainage solutions: Discreet slot drainage



ACO MULTIDRAIN MD BRICKSLOT



- Galvanised steel
- Stainless steel
- Access units
- Load Class (C 250, D 400)

ACO MultiDrain® MD has a range of gratings to complement installations which require discreet slot drainage.

Designed with a heelguard 10mm single offset drainage inlet, or a double Twinslot inlet in either offset or central. ACO Brickslot is a subtle and unobtrusive grating which when combined with an ACO MultiDrain® MD channel, can be used as a solution to complement discreet drainage applications and is ideal for use against buildings facades.

Compatible with most paving materials, the vertical sides of the grating enable pavements to be laid directly to the unit's edge. Once installed the system is totally secure and not vulnerable to vandalism or loose grates making it a suitable for applications such as schools and playgrounds where grating removal can become a hazard.

The channel and ACO Brickslot grating together provide an unobtrusive continuous slot drainage system, with high hydraulic efficiency for fast removal of surface water. ACO Brickslot gratings are available in galvanised or stainless steel and suitable for use with the 100mm, 150mm and 200mm wide channels in the ACO MultiDrain® MD range.

The system includes an ACO Brickslot access unit to ensure easy maintenance and access to the drainage system, and is also fully compatible with the range of ACO MultiDrain® MD accessories.

The system is suitable for applications up to and including Load Class D400 (This product is not suitable for carriageways of public roads or motorways).

Applications

- Threshold drainage
- Public landscaping
- Car parking
- Light industrial
- HGV parking
- Petrol station forecourts
- SuDS

Bespoke Brickslot
ACO Bespoke Brickslot is custom designed to suit specific customer requirements for MultiDrain 100, 150 and 200 channels. To accommodate specific sites, ACO Brickslot grates can be manufactured in different heights (30mm to 200mm) and also custom slot widths and lengths (up to 1m). The Brickslot can be manufactured from mild steel with a hot dipped galvanised finish or stainless steel for increased corrosion resistance. Please contact your sales representative to discuss.

Discreet slot drainage gratings

The ACO Brickslot grating system has an access unit for easy maintenance and cleaning of the drainage system.

The access unit is positioned within the channel; it has a removable tray section which is lifted out of the frame by a lifting tool to gain access to the system.

The access unit is 0.5m in length and is available in the galvanised and stainless steel finishes and is suitable for use with any ACO MultiDrain® M100D/M100DS, M150D/M150DS and M200D/M200DS wide channels.

The unit has a heelguard 10mm off set drainage inlet, providing continuous aesthetic and drainage performance once installed with the drainage system.

The ACO Brickslot access units are sold separately to the channel units. For information on the ACO MultiDrain® M100D/M100DS, M150D/M150DS and M200D/M200DS wide channels. Please refer to pages 13/14 and 28/29.

Removal instructions.

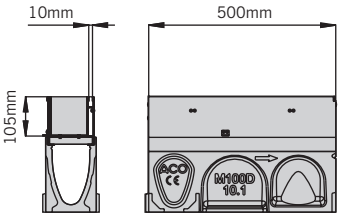
To remove the ACO Brickslot access unit tray, insert the lifting tools as shown in figure 1. Then lift the tray vertically from the frame (figure 2). Details on the lifting tools can be found on page 18.



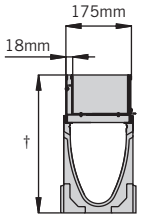
Figure 1



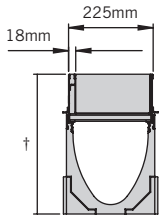
Figure 2



M100D 0.5m constant depth channel with ACO Brickslot access unit

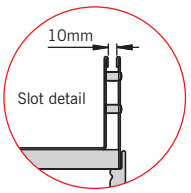


M150D 0.5m constant depth channel with ACO Brickslot access unit



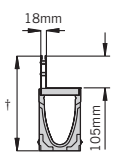
M200D 0.5m constant depth channel with ACO Brickslot access unit

ACO Brickslot is available in two styles, single brickslot and twinslot. The location of the slot is commonly positioned offset to the centre of the channel, which allows the system to be installed discretely against building façades.



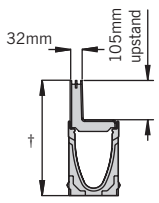
Brickslot Single - Offset



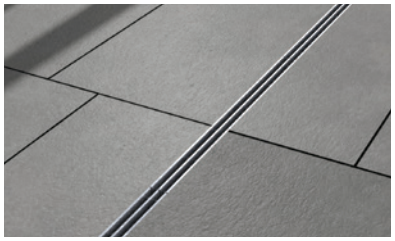


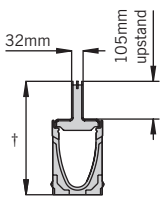
Brickslot Twinslot - Offset





Brickslot Twinslot - Central

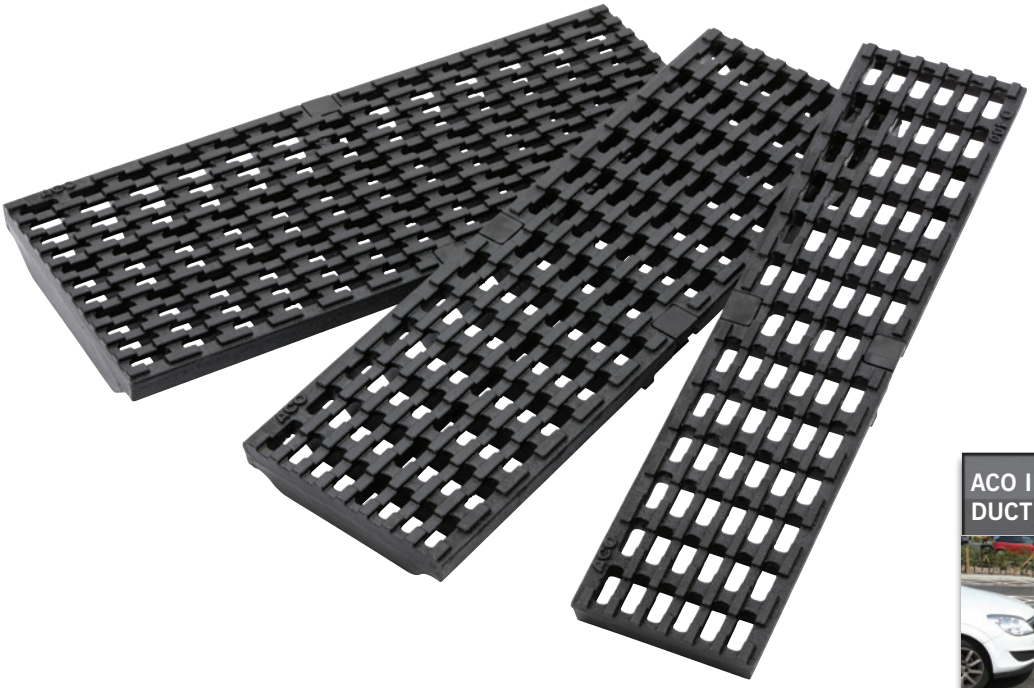




Note: 105mmrefers to the height from the top edge to the horizontal plane of the grate. For exact overall height please measure on channel. The overall depth of each channel can be found in the channel tables in this brochure.**
***Not suitable for carriageways of public roads or motorways.**

New Intercept grate:

Minimalism for maximum water interception





- Ductile iron
- Heelguard
- High water interception
- Load Class D 400

ACO MultiDrain® MD has a new range of grates which encompass the principles of minimalist design. ACO Intercept ductile iron grates have clean lines and form, and meets the minimalist mantra of “Design stripped down to only its essential elements”

This grate has been designed to have superior water interception capabilities, and whilst it is functional it also achieves the goal of wide visual appeal.

James Canney, R&D Development Manager says “During the grates’ development we focused on achieving high level aesthetics and a sleek universal appeal. The ‘less is more’ approach to minimalistic design suits drainage grates, as it is important to have properly designed inlets for water to effectively enter the channel. The Intercept design combines functionality with timeless good looks”

ACO Intercept ductile iron grates are available in three widths and compatible with MultiDrain MD/PPD and Sealin channels.

They incorporate our unique ACO Drainlock™ fixings which improves hydraulic capacity of the channel

Combined with ACO MultiDrain® MD channels the system is suitable for applications up to and including Load Class D400 (This product is not suitable for carriageways of public roads or motorways).

Applications

- Public landscaping
- Car parking
- Light industrial
- HGV parking
- SuDS

Gratings for use with ACO MultiDrain® M100D channels with UltraSTEEL™ galvanised edge rails.

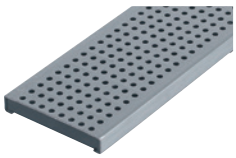
Gratings for Load Class A 15 applications

A 15

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Slot width /hole dia (mm)	Heelguard™	Intake area (mm^2/m)	Anti shunt feature	Weight (kg)
12610	Slotted galvanised steel 400DL	1000	123	21	10	Yes	25300	n/a	2.0
12611	Slotted galvanised steel 402DL	500	123	21	10	Yes	25300	n/a	1.0
12666	Perforated galvanised steel 12666DL	1000	123	21	6	Yes	16300	n/a	2.6
12667	Perforated galvanised steel 12667DL	500	123	21	6	Yes	16300	n/a	1.3



400DL / 402DL
Slotted galvanised steel



12666DL / 12667DL
Perforated galvanised steel

Gratings for Load Class B 125 applications

B 125

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Slot width /hole dia (mm)	Heelguard™	Intake area (mm^2/m)	Anti shunt feature	Weight (kg)
132555	Intercept Profile galvanised steel 132555DL 🔒	1000	123	21	29 x 8	Yes	44500	Yes	4.1
132550	Intercept Profile galvanised steel 132550DL 🔒	500	123	21	29 x 8	Yes	44500	Yes	2.0



132555DL / 132550DL
Intercept Profile galvanised steel

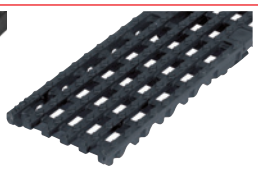
Gratings for Load Class C 250 applications

C 250

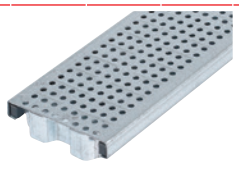
Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Slot width /hole dia (mm)	Heelguard™	Intake area (mm^2/m)	Anti shunt feature	Weight (kg)
132720	Heelguard™ composite - black 522DL	500	123	21	8	Yes	28500	Yes	1.0
12673	Intercept ductile iron 507DL* 🔒	500	123	21	31 x 12	No	40100	Yes	3.7
12614	Slotted galvanised steel 423DL	1000	123	21	10	Yes	25300	n/a	5.0
12615	Slotted galvanised steel 424DL	500	123	21	10	Yes	25300	n/a	2.5
12656	Perforated galvanised steel 12656DL	1000	123	21	6	Yes	16300	n/a	4.8
12657	Perforated galvanised steel 12657DL	500	123	21	6	Yes	16300	n/a	2.4
132880	Heelguard™ mesh galvanised steel grating 410DL 🔒	1000	123	21	29 x 9.5	Yes	80000	Yes	4.2
132881	Heelguard™ mesh galvanised steel grating 412DL 🔒	500	123	21	29 x 9.5	Yes	80000	Yes	2.1
23460	Brickslot single slot offset galvanised steel 23460	1000	123	105	10	Yes	10000	n/a	6.6
23461	Brickslot single slot offset galvanised steel 23461	500	123	105	10	Yes	10000	n/a	3.4
23462	Brickslot single slot offset access unit galvanised steel 23462	500	123	105	10	Yes	10000	n/a	6.6



522DL
Heelguard™ composite



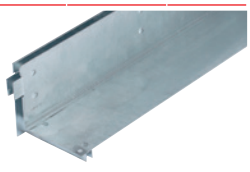
507DL
Intercept ductile iron*



12656DL / 12657DL
Perforated galvanised steel



410DL / 412DL
Mesh galvanised steel



23460 / 23461
Brickslot galvanised steel single slot

🔒 Indicates security locking available.
*Intercept ductile iron C250 grate is the original design, and differs aesthetically to the new D400 version

Gratings for use with ACO MultiDrain® M100D channels with UltraSTEEL™ galvanised edge rails.

D 400

Gratings for Load Class D 400* applications

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Slot width /hole dia (mm)	Heelguard™	Intake area (mm²/m)	Anti shunt feature	Weight (kg)
23405	Heelguard™ ductile iron 23405DL 🔒	500	123	21	8	Yes	23900	Yes	4.1
23510	Heelguard™ Intercept ductile iron 23510DL	500	123	21	10	Yes	41400	Yes	3.7
23406	Ductile iron solid cover 23406DL	500	123	21	n/a	No	n/a	Yes	4.5
23408	Slotted ductile iron 23408DL	500	123	21	12	No	35700	Yes	3.8
132042	Flag ductile iron 132042DL	500	123	21	8	Yes	30400	Yes	4.9
132043	Leaf ductile iron 132043DL	500	123	21	10	Yes	34700	Yes	4.7
132885	Heelguard™ mesh galvanised steel 132885DL 🔒	1000	123	21	28 x 8.5	Yes	69100	Yes	5.1
132886	Heelguard™ mesh galvanised steel 132886DL 🔒	500	123	21	28 x 8.5	Yes	69100	Yes	2.5
23465	Brickslot single slot offset galvanised steel 23465	1000	123	105	10	Yes	10000	n/a	6.7
23466	Brickslot single slot offset galvanised steel 23466	500	123	105	10	Yes	10000	n/a	3.4
23467	Brickslot single slot offset access unit galvanised steel 23467	500	123	105	10	Yes	10000	n/a	6.4
23480	Brickslot Twinslot offset galvanised steel	1000	123	105	10 (x2)	Yes	20000	Yes	12.9
23481	Brickslot Twinslot offset galvanised steel	500	123	105	10 (x2)	Yes	20000	Yes	6.1
23482	Brickslot Twinslot offset access unit galvanised steel	500	123	105	10 (x2)	Yes	20000	Yes	8.1
23483	Brickslot Twinslot central galvanised steel	1000	123	105	10 (x2)	Yes	20000	Yes	12.5
23484	Brickslot Twinslot central galvanised steel	500	123	105	10 (x2)	Yes	20000	Yes	7.0
23485	Twinslot central access unit galvanised steel	500	123	105	10 (x2)	Yes	20000	Yes	8.2



23405DL
Heelguard™ ductile iron



23510DL
Heelguard™ Intercept ductile iron



23406DL
Ductile iron solid cover



23408DL
Slotted ductile iron



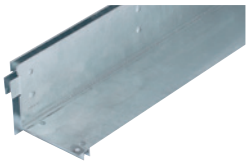
132042DL
Flag ductile iron



132043
Leaf ductile iron



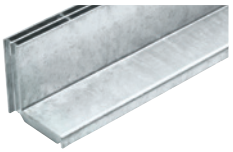
132885DL/132886DL
Heelguard™ mesh galvanised steel



23465 / 23466
Brickslot single slot galvanised steel



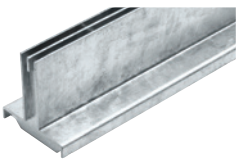
23467
Brickslot single slot access unit galvanised steel.



23480 / 23481
Brickslot Twinslot offset galvanised steel



23482
Brickslot Twinslot offset access unit galvanised steel



23483 / 23484
Brickslot Twinslot central galvanised steel



23485
Brickslot Twinslot central access galvanised steel

*Not suitable for carriageways of public roads or motorways

ACO ATec high performance finish

Gratings for Load Class D 400* applications with ACO ATec corrosion resistant coating

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Slot width /hole dia (mm)	Intake area (mm²/m)	Anti shunt feature	Weight (kg)
23409	ATec coated Heelguard™ ductile iron 23409DL 🔒	500	123	21	8	23900	Yes	4.1
23417	ATec coated Mosaic ductile iron 23417DL 🔒	500	123	21	10	28000	Yes	4.1



23409DL
Heelguard™ ductile iron



23417
Mosaic ductile iron

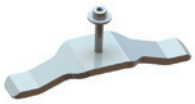
ACO ATec coating is a high performance finish that provides a superior resistance to corrosion. The electrochemically applied finish is strong and durable, making maintenance easier than on water-based surface coatings. The ATec finish also enhances long term durability in demanding environments and is particularly well suited for low trafficked areas.
Please download our ATec datasheet for more informaton.

Grating accessories

Product code	Description	For use with	Length (mm)	Width overall (mm)	Depth overall (mm)	Weight (kg)
23415	Drainlock™ security locking assembly	132720, 23405, 23409, 23417	96	20	13	0.1
445828	Drainlock™ security locking assembly Mesh C250**	132880, 132881	96	27	13	0.07
445745	Drainlock™ security locking assembly Mesh D400**	132885, 132886	96	27	13	0.06
445830	Drainlock™ security locking assembly Profile**	132555, 132550	96	27	13	0.06
23416	Drainlock™ security key	23415	75	30	3	0.01
1367	Drainlock™ grating lifting tool	all	400	150	6	0.2



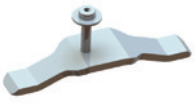
23415
Drainlock™ security locking assembly



445828
Drainlock™ security locking assembly Mesh C250*



445745
Drainlock™ security locking assembly Mesh D400*



445830
Drainlock™ security locking assembly Profile*



23416
Drainlock security key



1367
Drainlock™ grating lifting tool 835

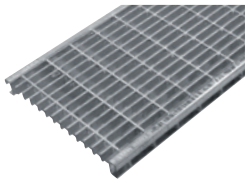
🔒 Indicates security locking available.
*Not suitable for carriageways of public roads or motorways
**Security key 23416 not compatible, allen key required
Note: 1m grates require 2pcs of Security locking assemblies and 0.5m grates require 1pc

Gratings for use with ACO MultiDrain® M150D channels with UltraSTEEL™ galvanised edge rail

Gratings for Load Class B 125 applications

B 125

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Slot width /hole dia (mm)	Heelguard™	Intake area (mm^2/m)	Anti shunt feature	Weight (kg)
133601	Heelguard™ mesh galvanised steel 133601DL 🔒	1000	173	36	29 x 10	Yes	118200	Yes	5.4
133602	Heelguard™ mesh galvanised steel 133602DL 🔒	500	173	36	29 x 10	Yes	118200	Yes	2.7
133625	Intercept-Profile galvanised steel 133625DL 🔒	1000	173	30	29 x 9	Yes	68700	Yes	5.0
133626	Intercept-Profile galvanised steel 133626DL 🔒	500	173	30	29 x 9	Yes	68700	Yes	2.5



133601DL / 133602DL
Heelguard™ mesh galvanised steel

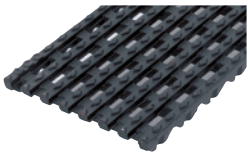


133625DL / 133626DL
Intercept-Profile galvanised steel

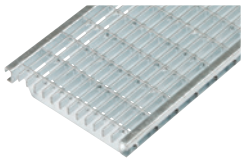
Gratings for Load Class C 250 applications

C 250

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Slot width /hole dia (mm)	Heelguard™	Intake area (mm^2/m)	Anti shunt feature	Weight (kg)
13073	Intercept ductile iron 13073DL**	500	173	21	30 x 12	No	59500	Yes	5.3
133605	Heelguard™ mesh galvanised steel 133605DL 🔒	1000	173	40	30 x 10	Yes	118200	Yes	5.8
133606	Heelguard™ mesh galvanised steel 133606DL 🔒	500	173	40	30 x 10	Yes	118200	Yes	2.8



13073DL
Intercept ductile iron**



133605DL / 133606DL
Heelguard™ mesh galvanised steel

ACO ATec high performance finish

Gratings for Load Class D 400* applications with ACO ATec corrosion resistant coating

D 400

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Slot width /hole dia (mm)	Heelguard™	Intake area (mm^2/m)	Anti shunt feature	Weight (kg)
23169	ATec coated Heelguard ductile iron 23169DL 🔒	500	173	28	8	Yes	40000	Yes	6.8



23161DL
Heelguard™ ductile iron

ACO ATec coating is a high performance finish that provides a superior resistance to corrosion. The electrochemically applied finish is strong and durable, making maintenance easier than on water-based surface coatings. The ATec finish also enhances long term durability in demanding environments and is particularly well suited for low trafficked areas.
Please download our ATec datasheet for more informaton.

🔒 Indicates security locking available.
*Not suitable for carriageways of public roads or motorways.
**Intercept ductile iron C250 grate is the original design, and differs aesthetically to the new D400 version

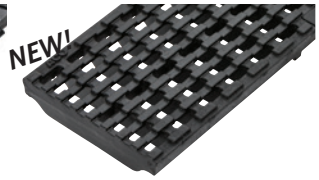
Traditional gratings for Load Class D 400* applications

D 400

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Slot width /hole dia (mm)	Heelguard™	Intake area (mm^2/m)	Anti shunt feature	Weight (kg)
23161	Heelguard™ ductile iron 23161DL	500	173	28	8	Yes	40000	Yes	6.8
23515	Heelguard™ Intercept ductile iron 23515DL	500	173	36	10	Yes	55500	Yes	6.4
23160	Solid cover ductile iron 23160DL	500	173	28	n/a	No	n/a	Yes	6.7
23164	Slotted ductile iron 23164DL	500	173	28	12	No	57664	Yes	6.4
133609	Heelguard™ mesh galvanised steel 133609DL	1000	173	46	30 x 10	Yes	103400	Yes	8.0
133610	Heelguard™ mesh galvanised steel 133610DL	500	173	46	30 x 10	Yes	103400	Yes	4.0
23175	Brickslot single slot offset galvanised steel 23175	1000	173	105	10	Yes	10000	No	7.7
23176	Brickslot single slot offset galvanised steel 23176	500	173	105	10	Yes	10000	No	3.9
23177	Brickslot single slot access unit galvanised steel 23177	500	173	105	10	Yes	10000	No	7.0



23161DL
Heelguard™ ductile iron



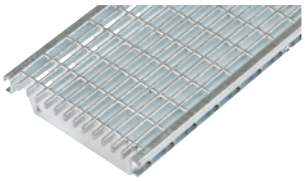
23515
Intercept ductile iron



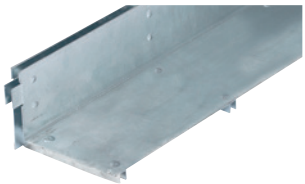
23160DL
Solid cover ductile iron



23164DL
Slotted ductile iron



133609DL / 133610DL
Heelguard™ mesh galvanised steel



23175 / 23176
Brickslot single slot galvanised steel



23177
Brickslot single slot access unit galvanised steel

ACO can manufacture Brickslot grates in a wide range of sizes for specific site requirements. Twinslot grates (as seen in the M100D section) can also be manufactured for use with M150D channels. For more information please contact your sales representative.

Grating accessories

Product code	Description	For use with	Length (mm)	Width overall (mm)	Depth overall (mm)	Weight (kg)
23165	Drainlock™ security locking assembly	23161, 23169	146	20	13	0.1
445831	Drainlock™ security locking assembly Mesh**	133601, 133602, 133605, 133606, 133609, 133610	146	27	13	0.1
445833	Drainlock™ security locking assembly Profile**	133625, 133626	146	27	13	0.1
23416	Drainlock™ security key	23165	75	30	3	0.01
1367	Drainlock™ grating ifting tool	all	400	150	6	0.2

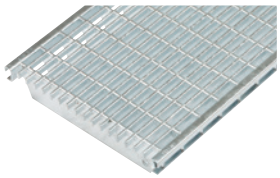
***Not suitable for carriageways of public roads or motorways.**
****Security key 23416 not compatible, allen key required.**
Note: 1m grates require 2pcs of Security locking assemblies and 0.5m grates require 1pc

Gratings for use with ACO MultiDrain® M200D channels with galvanised edge rails

Gratings for Load Class B 125 applications

B 125

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Slot width /hole dia (mm)	Heelguard™	Intake area (mm²/m)	Anti shunt feature	Weight (kg)
133613	Heelguard™ mesh galvanised steel 133613DL 🔒	1000	223	40	29 x 10	Yes	157500	Yes	7.2
133614	Heelguard™ mesh galvanised steel 133614DL 🔒	500	223	40	29 x 10	Yes	157500	Yes	3.6
133629	Intercept-Profile galvanised steel 133629DL 🔒	1000	223	39	29 x 8	Yes	84600	Yes	7.4
133630	Intercept-Profile galvanised steel 133630DL 🔒	500	223	39	29 x 8	Yes	84600	Yes	3.6



133613DL / 133614DL
Heelguard™ mesh galvanised steel

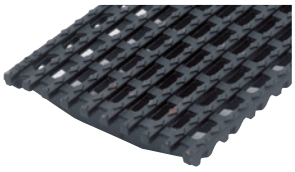


133629DL / 133630DL
Intercept-Profile galvanised steel

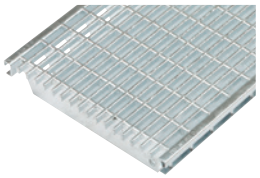
Gratings for Load Class C 250 applications

C 250

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Slot width /hole dia (mm)	Heelguard™	Intake area (mm²/m)	Anti shunt feature	Weight (kg)
13473	Intercept ductile iron 13473DL**	500	223	35	30 x 14	No	90500	Yes	7.5
133617	Heelguard™ mesh galvanised steel 133617DL 🔒	1000	223	46	30 x 10	Yes	137700	Yes	10.7
133618	Heelguard™ mesh galvanised steel 133618DL 🔒	500	223	46	30 x 10	Yes	137700	Yes	5.2



13473DL
Intercept ductile iron**



133617DL / 133618DL
Heelguard™ mesh galvanised steel

ACO ATec high performance finish

Gratings for Load Class D 400* applications with ACO ATec corrosion resistant coating

D 400

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Slot width /hole dia (mm)	Heelguard™	Intake area (mm²/m)	Anti shunt feature	Weight (kg)
23229	ATec coated Heelguard ductile iron 23229DL 🔒	500	223	32	8	Yes	47300	Yes	10.3



23229DL
Heelguard™ ductile iron

ACO ATec coating is a high performance finish that provides a superior resistance to corrosion. The electrochemically applied finish is strong and durable, making maintenance easier than on water-based surface coatings. The ATec finish also enhances long term durability in demanding environments and is particularly well suited for low trafficked areas.
Please download our ATec datasheet for more informaton.

🔒 Indicates security locking available.
*Not suitable for carriageways of public roads or motorways.
**Intercept ductile iron C250 grate is the original design, and differs aesthetically to the new D400 version.

Gratings for Load Class D 400* applications

D 400

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Slot width /hole dia (mm)	Heelguard™	Intake area (mm^2/m)	Anti shunt feature	Weight (kg)
23221	Heelguard™ ductile iron 23221DL 🔒	500	223	32	8	Yes	47300	Yes	7.5
23520	Heelguard™ Intercept ductile iron 23520DL	500	223	43	10	Yes	76800	Yes	8.7
23220	Ductile iron solid cover 23220DL	500	223	32	n/a	No	n/a	Yes	11.0
23224	Slotted ductile iron 23224DL	500	223	32	12	No	72400	Yes	9.8
133621	Heelguard™ mesh galvanised steel 133621DL 🔒	1000	223	65	30 x 10	Yes	137700	Yes	12.9
133622	Heelguard™ mesh galvanised steel 133622DL 🔒	500	223	65	30 x 10	Yes	137700	Yes	6.4
408995	Brickslot single slot offset galvanised steel 408995	1000	223	105	10	Yes	10000	No	9.8
408996	Brickslot single slot offset galvanised steel 408995	500	223	105	10	Yes	10000	No	4.8
408997	Brickslot single slot access unit galvanised steel 408995	500	223	105	10	Yes	10000	No	8.5



23221DL
Heelguard™ ductile iron



23520
Intercept ductile iron



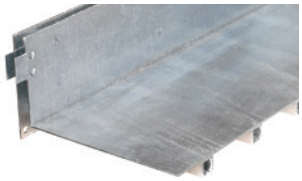
23220DL
Solid cover ductile iron



23224DL
Slotted ductile iron



133621DL / 133622DL
Heelguard™ mesh galvanised steel



408995/408996
Brickslot single slot galvanised steel



408997
Brickslot single slot access unit galvanised steel

ACO can manufacture Brickslot grates in a wide range of sizes for specific site requirements. Twinslot grates (as seen in the M100D section) can also be manufactured for use with M200D channels. For more information please contact your sales representative.

Grating accessories

Product code	Description	For use with	Length (mm)	Width overall (mm)	Depth overall (mm)	Weight (kg)
23225	Drainlock™ security locking assembly	23221, 23229	195	20	13	0.1
445834	Drainlock™ security locking assembly Mesh**	133613, 133614, 133617, 133618, 133621, 133622	195	27	13	0.13
445836	Drainlock™ security locking assembly Profile**	133629, 133630	195	27	13	0.11
23416	Drainlock™ security key	23225	75	30	3	0.01
1367	Drainlock™ grating lifting tool	all	400	150	6	0.2

🔒 Indicates security locking available.
*Not suitable for carriageways of public roads or motorways.
**Security key 23416 not compatible, allen key required.
Note: 1m grates require 2pcs of Security locking assemblies and 0.5m grates require 1pc.

ACO MultiDrain® M100DS channels with stainless steel edge rails

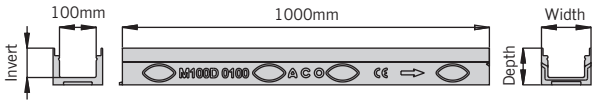
ACO MultiDrain® M100DS channels are manufactured from Vienite®, ACO's sustainable high strength material, which provides high chemical resistance. For improved aesthetics and performance, the channels listed below are provided with integral stainless steel (Grade 304) protective edge rails.

These channels are available in constant depth and shallow depth units.

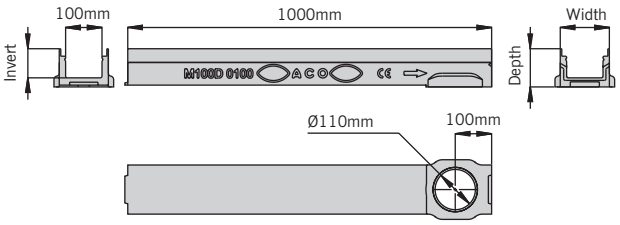
For the ACO MultiDrain® M100DS range of gratings to suit these channels please refer to pages 32-37.

M100DS constant depth channels with stainless steel edge rails

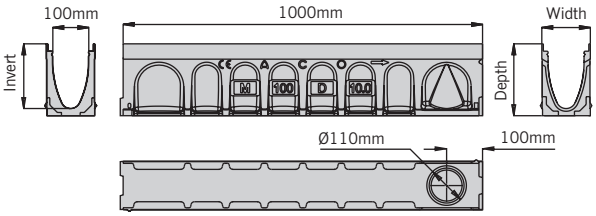
Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Invert depth (mm)	Invert Type	Weight (kg)
24075	M100DS No. 075	1000	135	75	55	1	10.9
24076	M100DS No. 075V	1000	135	75†	55	1	10.6
24110	M100DS No. 0100	1000	135	100	80	1	12.7
24111	M100DS No. 0100V	1000	135	100†	80	1	12.4
24000	M100DS No. 0.0*	1000	135	150	130	1/3	14.9
24050	M100DS No. 0.1J*	500	135	150	130	1/3	8.6
24100	M100DS No.10.0*	1000	135	200	180	1/3	17.9
24101	M100DS No.10.1J*	500	135	200	180	1/3	10.2
24200	M100DS No.20.0*	1000	135	250	230	1/3	21.0
24201	M100DS No.20.1J*	500	135	250	230	1/3	11.8



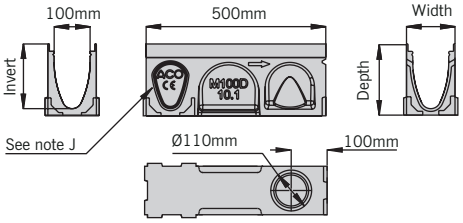
M100DS 075 – 0100 channel



M100DS 075V – 100V channel



M100DS 0.0 to 2.0 constant depth channel

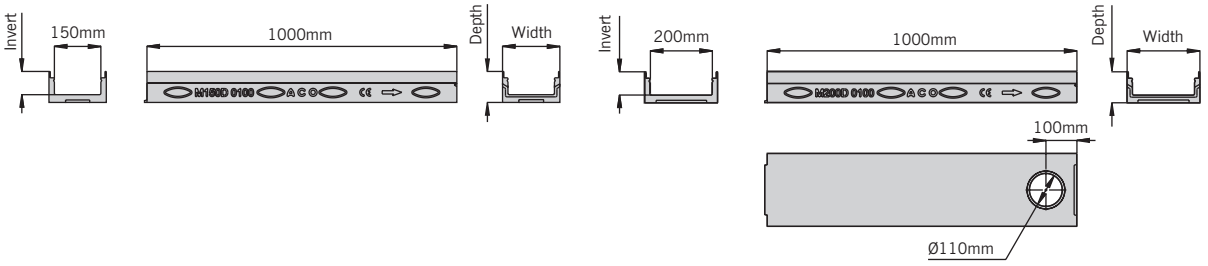


M100DS 0.5m constant depth channel

These products are subject to weight and dimensional tolerances. The dimensions shown on this page are for guidance purposes only.

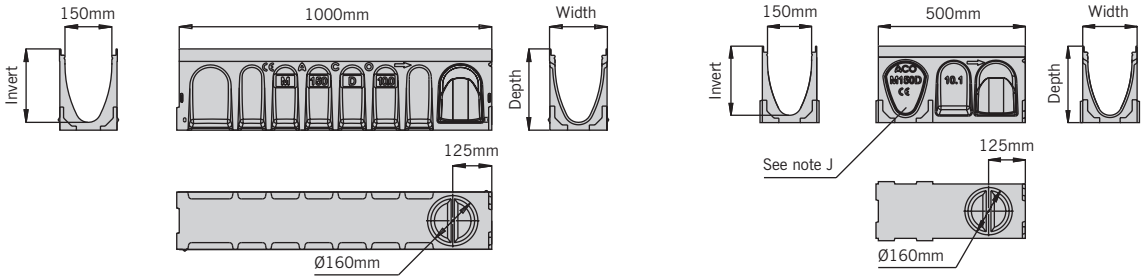
M150DS constant depth channels with stainless steel edge rails

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Invert depth (mm)	Invert Type	Weight (kg)
24156	M150DS No. 0100	1000	185	100	75	1	16.7
24157	M150DS No. 0100V	1000	185	100	75	1	15.9
24150	M150DS No. 0.0*	1000	185	210	185	1/3	25.4
24153	M150DS No. 0.1J*	500	185	210	185	1/3	13.7
24151	M150DS No.10.0*	1000	185	260	235	1/3	28.0
24154	M150DS No. 10.1J*	500	185	260	235	1/3	15.6
24152	M150DS No.20.0*	1000	185	310	285	1/3	32.1
24155	M150DS No. 20.1J*	500	185	310	285	1/3	17.4



M150DS 0100 channel.

M150DS 0100V channel

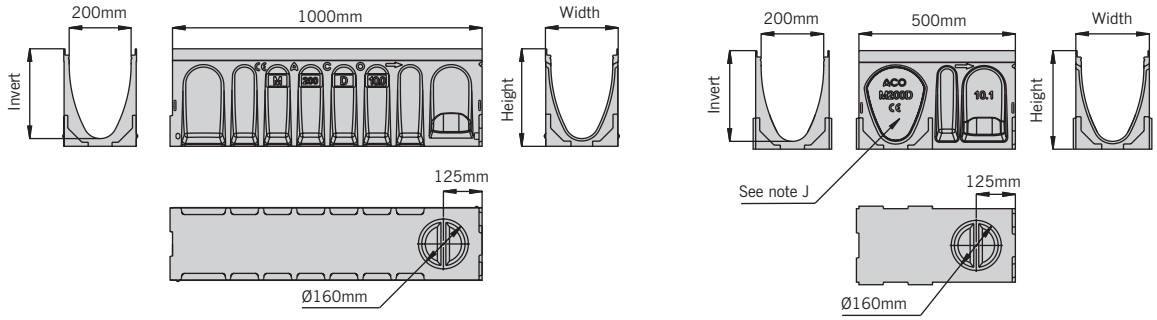


M150DS 0.0 to 2.0 constant depth channel

M150DS 0.5m constant depth channel

M200DS constant depth channels with stainless steel edge rails

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Invert depth (mm)	Invert Type	Weight (kg)
24216	M200DS No. 0100	1000	235	100	75	1	19.4
24217	M200DS No. 0100V	1000	235	100	75	1	18.7
24210	M200DS No. 0.0*	1000	235	265	240	1/3	34.8
24213	M200DS No. 0.1J*	500	235	265	240	1/3	18.9
24211	M200DS No.10.0*	1000	235	315	290	1/3	39.2
24214	M200DS No. 10.1J*	500	235	315	290	1/3	20.9
24212	M200DS No.20.0*	1000	235	365	340	1/3	42.2
24215	M200DS No. 20.1J*	500	235	365	340	1/3	22.9



M200DS 0.0 to 2.0 constant depth channel

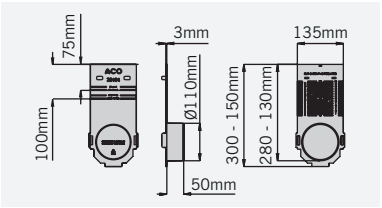
M200DS 0.5m constant depth channel

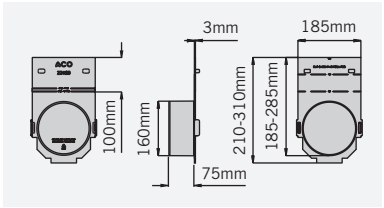
Note: The constant depth channels have an improved knockout feature, see page 41 for more information.
*** Indicates channels supplied with a preformed Ø160mm knockout for vertical outlet.**
J Indicates side knockout for 90° channel connection. Knockout on both sides of the channel.
V Indicates channel with cast in TPE triple lipped seals for water tight connection. See page 41 for further information.

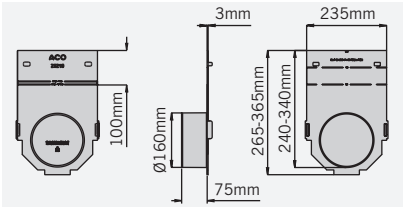
These products are subject to weight and dimensional tolerances. The dimensions shown on this page are for guidance purposes only.

Multifunctional endcap (closing/inlet/outlet)

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Invert depth (mm)	Invert Type	Weight (kg)
23404	M100D multifunctional endcap	-	135	75/300	50	-	0.2
23159	M150D multifunctional endcap	-	185	310/100	75	-	0.3
23219	M200D multifunctional endcap	-	235	365/100	75	-	0.4



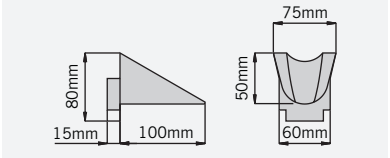


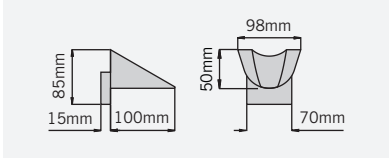


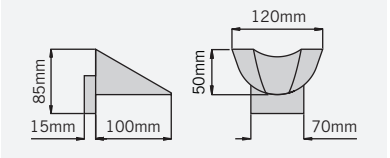
The multifunctional endcap can be cut down to suit all channels. See page 42 for further information.

Step connector

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Invert depth (mm)	Invert Type	Weight (kg)
12601	M100D 50mm Step connector	100	75	50	-	-	0.4
13001	M150D 50mm Step connector	100	98	50	-	-	0.5
13401	M200D 50mm Step connector	100	120	50	-	-	0.6







Note: For information on the Step connector functionality see page 42.

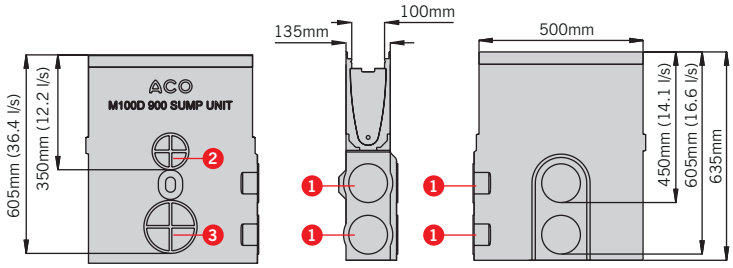
These products are subject to weight and dimensional tolerances. The dimensions shown on this page are for guidance purposes only.

M100DS sump unit with stainless steel edge rails

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Invert depth (mm)	Invert Type	Weight (kg)
24410	M100DS Universal sump with plastic silt bucket	500	135	635	615	-	33.9

Standard sump outlets

1. = Ø110mm outlet with triple lipped seal
2. = Ø110mm knockout
3. = Ø160mm knockout



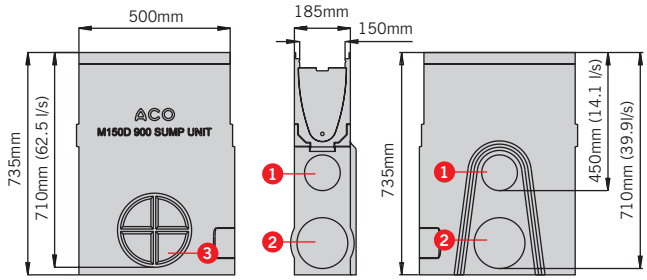
Note: Drawing shows flow through un-trapped unions. For information on the sump unit functionality see page 43.

M150DS sump unit with stainless steel edge rails

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Invert depth (mm)	Invert Type	Weight (kg)
24158	M150DS Universal sump with plastic silt bucket	500	185	735	715	-	44.5

Standard sump outlets

1. = Ø110mm outlet with triple lipped seal
2. = Ø160mm outlet
3. = Ø200mm knockout



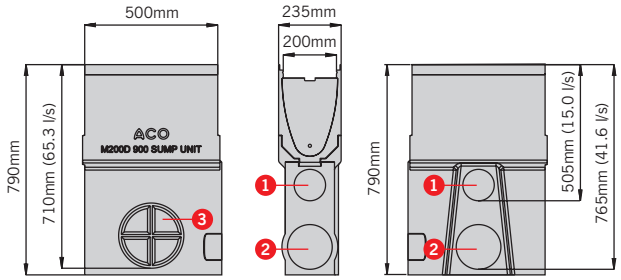
Note: Drawing shows flow through un-trapped unions. For information on the sump unit functionality see page 47.

M200DS sump unit with stainless steel edge rails

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Invert depth (mm)	Invert Type	Weight (kg)
24218	M200DS Universal sump with plastic silt bucket	500	235	790	765	-	48.0

Standard sump outlets

1. = Ø110mm outlet with triple lipped seal
2. = Ø160mm outlet
3. = Ø200mm knockout



Note: Drawing shows flow through un-trapped unions. For information on the sump unit functionality see page 47.

Note: For ACO Universal gully details please refer to page 15. For Foul air trap details please refer to page 17.
For repair kit information please see page 17.

These products are subject to weight and dimensional tolerances. The dimensions shown on this page are for guidance purposes only.

Gratings for use with ACO MultiDrain® M100DS channels with stainless steel edge rails

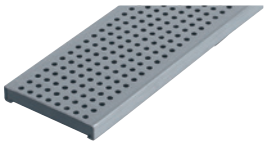
Gratings for Load Class A 15 applications

A 15

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Slot width /hole dia (mm)	Heelguard™	Intake area (mm²/m)	Anti shunt feature	Weight (kg)
12640	Slotted stainless steel 460DL	1000	123	21	10	Yes	25300	n/a	2.0
12641	Slotted stainless steel 461DL	500	123	21	10	Yes	25300	n/a	1.0
12664	Perforated stainless steel 12664DL	1000	123	21	6	Yes	16300	n/a	2.6
12665	Perforated stainless steel 12665DL	500	123	21	6	Yes	16300	n/a	1.3



460/461DL
slotted stainless steel



12664/12665DL
perforated stainless steel

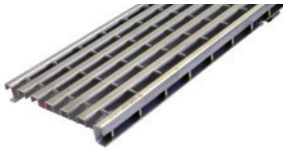
Gratings for Load Class B 125 applications

B 125

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Slot width /hole dia (mm)	Heelguard™	Intake area (mm²/m)	Anti shunt feature	Weight (kg)
132557	Intercept Bar stainless steel 132557DL 🔒	1000	123	21	28 x 6	Yes	43000	Yes	3.8
132552	Intercept Bar stainless steel 132552DL 🔒	500	123	21	28 x 6	Yes	43000	Yes	1.9
132556	Intercept Profile stainless steel 132556DL 🔒	1000	123	21	29 x 8	Yes	44500	Yes	3.7
132551	Intercept Profile stainless steel 132551DL 🔒	500	123	21	29 x 8	Yes	44500	Yes	1.9



132557DL / 132552DL
Intercept Bar stainless steel



132556DL / 132551DL
Intercept Profile stainless steel

Gratings for Load Class C 250 applications

C 250

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Slot width /hole dia (mm)	Heelguard™	Intake area (mm²/m)	Anti shunt feature	Weight (kg)
12644	Slotted stainless steel 470DL	1000	123	21	10	Yes	25300	n/a	5.0
12645	Slotted stainless steel 471DL	500	123	21	10	Yes	25300	n/a	2.5
12654	Perforated stainless steel 12654DL	1000	123	21	6	Yes	16300	n/a	4.8
12655	Perforated stainless steel 12655DL	500	123	21	6	Yes	16300	n/a	2.4
132882	Heelguard™ mesh stainless steel grating 430DL 🔒	1000	123	21	29 x 9.5	Yes	79000	Yes	4.2
132883	Heelguard™ mesh stainless steel grating 431DL 🔒	500	123	21	29 x 9.5	Yes	79000	Yes	2.1

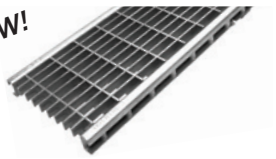


470DL / 471DL
Slotted stainless steel



12654DL / 12655DL
Perforated stainless steel

NEW!



430DL / 431DL
Heelguard™ mesh stainless steel

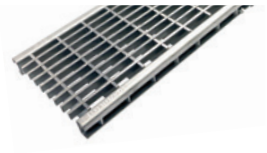
ACO MultiDrain® MD stainless steel gratings are manufactured from Grade 304 stainless steel and are fitted with ACO Drainlock™ as standard. See page 48 for installation details. For Drainlock™ grating lifting tool details please refer to page 33. *Not suitable for carriageways of public roads or motorways.

These products are subject to weight and dimensional tolerances. The dimensions shown on this page are for guidance purposes only.

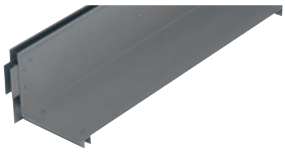
Gratings for Load Class D400* applications

D 400

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Slot width /hole dia (mm)	Heelguard™	Intake area (mm²/m)	Anti shunt feature	Weight (kg)
132887	Heelguard™ mesh stainless steel 132887DL 🔒	1000	123	21	28 x 8.5	Yes	69100	Yes	5.2
132888	Heelguard™ mesh stainless steel 132888DL 🔒	500	123	21	28 x 8.5	Yes	69100	Yes	2.5
23475	Brickslot single slot stainless steel 23475	1000	123	105	10	Yes	10000	No	6.6
23476	Brickslot single slot stainless steel 23476	500	123	105	10	Yes	10000	No	3.5
23477	Brickslot single slot access unit stainless steel 23477	500	123	105	10	Yes	10000	No	6.2
23490	Brickslot Twinslot offset stainless steel	1000	123	105	10 (x2)	Yes	20000	Yes	13
23491	Brickslot Twinslot offset stainless steel	500	123	105	10 (x2)	Yes	20000	Yes	6.5
23492	Brickslot Twinslot offset access unit stainless steel	500	123	105	10 (x2)	Yes	20000	Yes	11.3
23493	Brickslot Twinslot central stainless steel	1000	123	105	10 (x2)	Yes	20000	Yes	11.7
23494	Brickslot Twinslot central stainless steel	500	123	105	10 (x2)	Yes	20000	Yes	5.8
23495	Brickslot Twinslot central access unit stainless steel	500	123	105	10 (x2)	Yes	20000	Yes	14.2



132887/132888DL
Mesh stainless steel



23475/23476
Brickslot single slot stainless steel



23490/23491
Brickslot Twinslot offset stainless steel



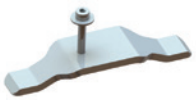
23493/23494
Brickslot Twinslot central stainless steel

Grating accessories

Product code	Description	For use with	Length (mm)	Width overall (mm)	Depth overall (mm)	Weight (kg)
445828	Drainlock™ security locking assembly Mesh** C250	132882, 132883	96	20	13	0.07
445745	Drainlock™ security locking assembly Mesh** D400	132887, 132888	96	27	13	0.06
445830	Drainlock™ security locking assembly Profile**	132551, 132556	96	27	13	0.06
445829	Drainlock™ security locking assembly Bar**	132552, 132557	96	27	13	0.07
1367	Drainlock™ grating lifting tool	all	400	150	6	0.2



445828
Drainlock™ security locking assembly Mesh**



445830
Drainlock™ security locking assembly Profile**



445829
Drainlock™ security locking assembly Bar**



1367
Drainlock™ grating lifting tool 835

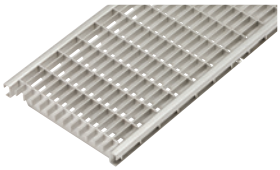
🔒 **Indicates security locking available.**
***Not suitable for carriageways of public roads or motorways.**
****Standard allen key required.**
Note: 1m grates require 2pcs of Security locking assemblies and 0.5m grates require 1pc.

Gratings for use with ACO MultiDrain® M150DS channels with stainless steel edge rails

B 125

Grating for Load Class B 125 applications

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Slot width /hole Ø (mm)	Heelguard™	Intake area (mm²/m)	Anti shunt feature	Weight (kg)
133603	Heelguard™ mesh stainless steel 133603DL	1000	173	36	29 x 10	Yes	118200	Yes	5.5
133604	Heelguard™ mesh stainless steel 133604DL	500	173	36	29 x 10	Yes	118200	Yes	2.7
133627	Intercept-Profile stainless steel 133627DL	1000	173	30	29 x 9	Yes	68700	Yes	5.1
133628	Intercept-Profile stainless steel 133628DL	500	173	30	29 x 9	Yes	68700	Yes	2.6
133633	Intercept-Bar stainless steel 133633DL	1000	173	27	29 x 6	Yes	66800	Yes	5.5
133634	Intercept-Bar stainless steel 133634DL	500	173	27	29 x 6	Yes	66800	Yes	2.8



133603DL / 133604DL
Heelguard™ mesh stainless steel



133627DL / 133628DL
Intercept-Profile stainless steel

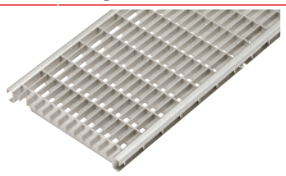


133633DL / 133634DL
Intercept-Bar stainless steel

C 250

Grating for Load Class C 250 applications

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Slot width /hole Ø (mm)	Heelguard™	Intake area (mm²/m)	Anti shunt feature	Weight (kg)
133607	Heelguard™ mesh stainless steel 133607DL	1000	173	40	30 x 10	Yes	118200	Yes	5.7
133608	Heelguard™ mesh stainless steel 133608DL	500	173	40	30 x 10	Yes	118200	Yes	2.9



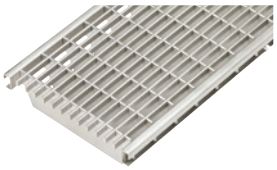
133607DL / 133608DL
Heelguard™ mesh stainless steel

These products are subject to weight and dimensional tolerances. The dimensions shown on this page are for guidance purposes only.

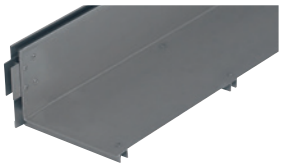
Grating for Load Class D 400* applications

D 400

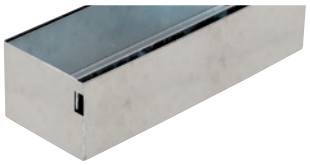
Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Slot width /hole Ø (mm)	Heelguard™	Intake area (mm^2/m)	Anti shunt feature	Weight (kg)
133611	Heelguard™ mesh stainless steel 133611DL 🔒	1000	173	46	30 x 10	Yes	103400	Yes	8.0
133612	Heelguard™ mesh stainless steel 133612DL 🔒	500	173	46	30 x 10	Yes	103400	Yes	4.0
23185	Brickslot single slot stainless steel 23185	1000	173	105	10	Yes	10000	No	8.0
23186	Brickslot single slot stainless steel 23186	500	173	105	10	Yes	10000	No	4.1
23187	Brickslot single slot access unit stainless steel 23187	500	173	105	10	Yes	10000	No	7.2



133611DL / 133612DL
Heelguard™ mesh stainless steel



23185 / 23186
Brickslot single slot stainless steel



23187
Brickslot single slot access unit stainless steel

ACO can manufacture Brickslot grates in a wide range of sizes for specific site requirements. Twinslot grates (as seen in the M100DS section) can also be manufactured for use with M150DS channels. For more information please contact your sales representative.

Grating accessories

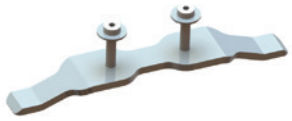
Product code	Description	For use with	Length (mm)	Width overall (mm)	Depth overall (mm)	Weight (kg)
445831	Drainlock™ security locking assembly Mesh**	133603, 133604, 133607, 133608, 133611, 133612	146	20	13	0.1
445833	Drainlock™ security locking assembly Profile**	133627, 133628	146	27	13	0.1
445832	Drainlock™ security locking assembly Bar**	133633, 133634	146	27	13	0.1
1367	Drainlock™ grating lifting tool	all	400	150	6	0.2



445831
Drainlock™ security locking assembly Mesh**



445833
Drainlock™ security locking assembly Profile**



445832
Drainlock™ security locking assembly Bar**



1367
Drainlock™ grating lifting tool 835

🔒 Indicates security locking available.
*Not suitable for carriageways of public roads or motorways.
**Standard allen key required.
Note: 1m grates require 2pcs of Security locking assemblies and 0.5m grates require 1pc.

These products are subject to weight and dimensional tolerances. The dimensions shown on this page are for guidance purposes only.

Gratings for use with ACO MultiDrain® M200DS channels with stainless steel edge rails

Grating for Load Class B 125 applications

B 125

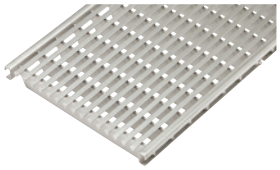
Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Slot width /hole Ø (mm)	Heelguard™	Intake area (mm²/m)	Anti shunt feature	Weight (kg)
133615	Heelguard™ mesh stainless steel 133615DL	1000	223	40	29 x 10	Yes	157500	Yes	7.3
133616	Heelguard™ mesh stainless steel 133616DL	500	223	40	29 x 10	Yes	157500	Yes	3.7
133631	Intercept-Profile stainless steel 133631DL	1000	223	39	29 x 8	Yes	84600	Yes	7.4
133632	Intercept-Profile stainless steel 133632DL	500	223	39	29 x 8	Yes	84600	Yes	3.6
133635	Intercept-Bar stainless steel 133635DL	1000	223	35	29 x 6	Yes	86600	Yes	8.0
133636	Intercept-Bar stainless steel 133636DL	500	223	35	29 x 6	Yes	86600	Yes	4.0



133615DL / 133616DL
Heelguard™ mesh stainless steel



133631DL / 133632DL
Intercept-Profile stainless steel

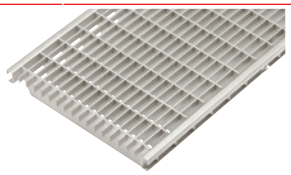


133635DL / 133636DL
Intercept-Bar stainless steel

Grating for Load Class C 250 applications

C 250

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Slot width /hole Ø (mm)	Heelguard™	Intake area (mm²/m)	Anti shunt feature	Weight (kg)
133619	Heelguard™ mesh stainless steel 133619DL	1000	223	46	30 x 10	Yes	137700	Yes	10.7
133620	Heelguard™ mesh stainless steel 133620DL	500	223	46	30 x 10	Yes	137700	Yes	5.3



133619DL / 133620DL
Heelguard™ mesh stainless steel

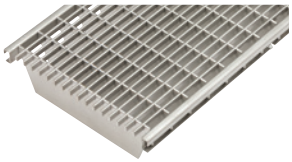
ACO MultiDrain® MD stainless steel gratings are manufactured from Grade 304 stainless steel and are fitted with ACO Drainlock™ as standard.
See page 48 for installation details.

These products are subject to weight and dimensional tolerances. The dimensions shown on this page are for guidance purposes only.

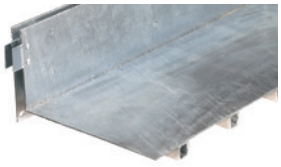
Grating for Load Class D 400* applications

D 400

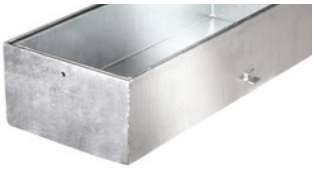
Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Slot width /hole Ø (mm)	Heelguard™	Intake area (mm^2/m)	Anti shunt feature	Weight (kg)
133623	Heelguard™ mesh stainless steel 133623DL 🔒	1000	223	65	30 x 10	Yes	137700	Yes	13.0
133624	Heelguard™ mesh stainless steel 133624DL 🔒	500	223	65	30 x 10	Yes	137700	Yes	6.5
408998	Brickslot single slot stainless steel	1000	223	105	10	Yes	10000	No	9.8
408999	Brickslot single slot stainless steel	500	223	105	10	Yes	10000	No	4.8
409000	Brickslot single slot access unit stainless steel 409000	500	223	105	10	Yes	10000	No	8.5



133623DL / 133624DL
Heelguard™ mesh stainless steel



408998/408999 Brickslot
single slot stainless steel



409000
Brickslot single slot access unit stainless steel

ACO can manufacture Brickslot grates in a wide range of sizes for specific site requirements. Twinslot grates (as seen in the M100DS section) can also be manufactured for use with M200DS channels. For more information please contact your sales representative.

Grating accessories

Product code	Description	For use with	Length (mm)	Width overall (mm)	Depth overall (mm)	Weight (kg)
445834	Drainlock™ security locking assembly Mesh**	133615, 133616, 133619, 133620, 133623, 133624	195	20	13	0.1
445836	Drainlock™ security locking assembly Profile**	133631, 133632	195	27	13	0.13
445835	Drainlock™ security locking assembly Bar**	133635, 133636	195	27	13	0.11
1367	Drainlock™ grating lifting tool	all	400	150	6	0.2



445834
Drainlock™ security locking assembly Mesh**



445836
Drainlock™ security locking assembly Profile**



445835
Drainlock™ security locking assembly Bar**



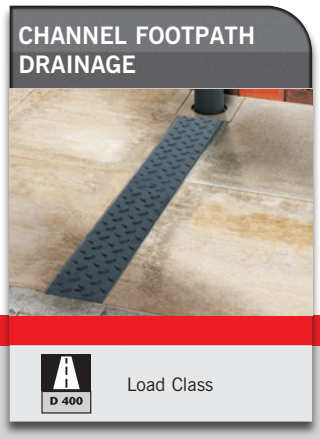
1367
Drainlock™ grating lifting tool 835

🔒 Indicates security locking available.
*Not suitable for carriageways of public roads or motorways.
**Standard allen key required.
Note: 1m grates require 2pcs of Security locking assemblies and 0.5m grates require 1pc.

These products are subject to weight and dimensional tolerances. The dimensions shown on this page are for guidance purposes only.

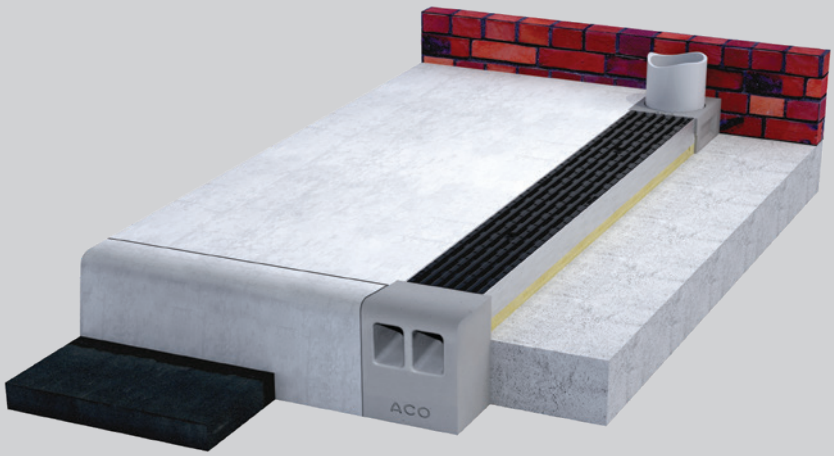
Channel footpath drainage





Channel footpath drainage is specifically used where roof drainage from down pipes is required to cross the footpath into the road gutter. Combining an ACO Downpipe connector and ACO Kerb outlet with ACO MultiDrain® M100D/M100DS channel creates a safer method for water to cross pedestrian areas.

The system can be installed with either a grated channel or solid cover and is suitable for Load Class D 400 applications. The high load class is required as vehicles may occasionally mount the kerb, and ACO's channel footpath drainage has been designed to withstand these loads.



Channel footpath drainage

The ACO MultiDrain® M100D/M100DS system includes a range of accessories which provide a drainage solution ideal for areas where down pipes from roofs and gutters exit on to the pavement. The ACO Channel Footpath drainage system effectively carries water away from paved areas and across into the adjacent carriageway.

The system uses ACO MultiDrain® M100D/M100DS shallow depth channels and has two types of kerb outlets and down pipe connectors to suit application requirements.

Shallow channels

ACO MultiDrain® MD shallow depth channels are available in two sizes, 75mm and 100mm total depths (ACO M100D / M100DS 075 and ACO M100D / M100DS 0100) and have the option of galvanised or stainless steel edge rails.

Downpipe connectors

Two down pipe connectors are available to suit channel depth. Manufactured from grey polymer concrete the down pipe connector has a clear opening of Ø75mm and connects to down pipes with outside diameters of up to 82mm.

Kerb outlets

Two outlets are available to suit the kerb profile of the application, a CFD half battered kerb outlet to suit standard HB kerbs and a CFD Bull nose kerb outlet to match BN kerbs. Manufactured from grey polymer concrete the kerb outlets allow rainwater to discharge into the road gutter from this system.

Gratings

Traditionally solid ductile iron covers are selected in channel footpath drainage applications but all ACO MultiDrain® M100D/M100DS gratings are suitable for use with this system. The system's load class rating is determined by the grating selected, further information of gratings within the range can be found on pages 21–27 and 32–37.

ACO MultiDrain® M100D shallow depth channels with UltraSTEEL™ galvanised edge rails

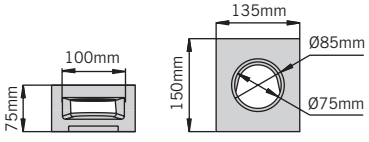
Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Invert depth (mm)	Invert Type	Weight (kg)
23075	M100D No. 075	1000	135	75	55	1	9.2
23076	M100D No. 075V	1000	135	75*	55	1	8.9
23110	M100D No. 0100	1000	135	100	80	1	11.0
23111	M100D No. 0100V	1000	135	100*	80	1	10.7

ACO MultiDrain® M100DS shallow depth channels with stainless steel edge rails

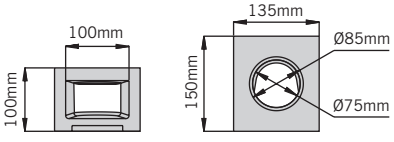
Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Invert depth (mm)	Invert Type	Weight (kg)
24075	M100DS No. 075	1000	135	75	55	1	10.9
24076	M100DS No. 075V	1000	135	75*	55	1	10.6
24110	M100DS No. 0100	1000	135	100	80	1	12.7
24111	M100DS No. 0100V	1000	135	100*	80	1	12.4

Down pipe connectors

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Invert depth (mm)	Invert Type	Weight (kg)
23450	CFD075 downpipe connector grey	150	135	75	n/a	n/a	2.4
23451	CFD0100 downpipe connector grey	150	135	100	n/a	n/a	3.0



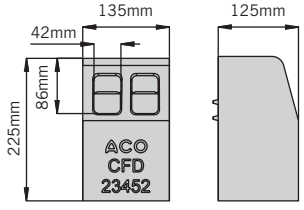
CFD 075 downpipe connector



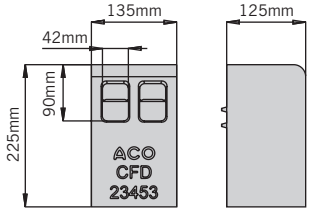
CFD 0100 downpipe connector

Kerb outlet profiles

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Invert depth (mm)	Invert Type	Weight (kg)
23452	CFD kerb outlet half batter grey	125	135	225	n/a	n/a	6.7
23453	CFD kerb outlet bull nose grey	125	135	225	n/a	n/a	7.0



CFD kerb outlet half batter



CFD bull-nose kerb outlet

Note: V Indicates channel with cast in triple lipped seals for water tight connection. See page 41 for further details.
*** 075V and 0100V channels have a depth overall around the outlet of 80mm (075V) and 105 (0100V).**
These products are subject to weight and dimensional tolerances. The dimensions shown on this page are for guidance purposes only.

ACO Downpipe connectors for use with the MultiDrain systems

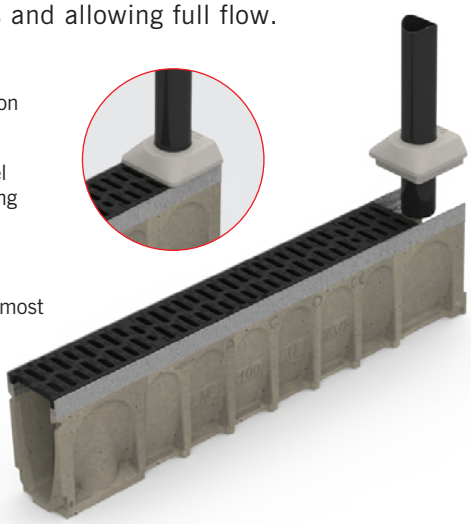
The ACO rainwater downpipe channel connector is an effective method for connecting downpipes directly into the channel body, eliminating the risk of blockages and allowing full flow.

The connector is maintenance friendly and can be easily lifted from the channel to clear localised blockages without the need to lift the entire grating. The connector can be positioned in line or perpendicular to the channel depending on the installation location and has an overhang lip to hide the cut edge of the adjacent grating – resulting in a tidy and safe installation.

The connector is offered in a range of sizes and colours for circular or square downpipes. The connectors can be used on a variety of channels including MultiDrain, MultiDrain PPD and Multiline Sealin.

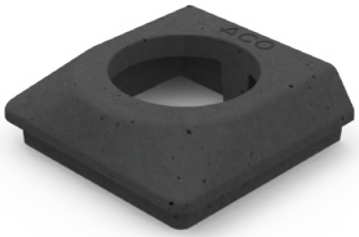
Details of the MultiDrain PPD and Multiline Sealin ranges can be found on the ACO website: www.aco.co.uk

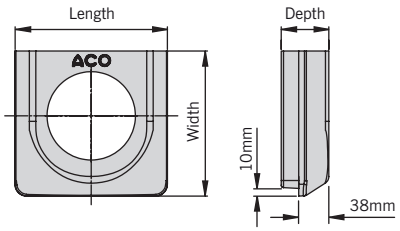
- Direct connection into the channel eliminating blockages in the grating
- Quick and simple installation
- Easy maintenance
- Sizes, shapes and colours to suit most downpipes and installations



Black Downpipe connectors

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Weight (kg)
27132	Downpipe connector, M100D/PPD Ø68mm*	142	133	60	1.07
27138	Downpipe connector, M100D/PPD 65mm*	142	133	60	1.04
27150	Downpipe connector, M150D/PPD Ø110mm	192	183	60	1.65
27152	Downpipe connector, M150D/PPD 100mm	192	183	60	1.66
27155	Downpipe connector, M200D/PPD Ø110mm	242	233	60	2.58





Grey Downpipe connectors

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Weight (kg)
27133	Downpipe connector, M100D/PPD Ø68mm*	142	133	60	1.07
27139	Downpipe connector, M100D/PPD 65mm*	142	133	60	1.04
27151	Downpipe connector, M150D/PPD Ø110mm	192	183	60	1.65
27153	Downpipe connector, M150D/PPD 100mm	192	183	60	1.66
27154	Downpipe connector, M200D/PPD Ø110mm	242	233	60	2.58



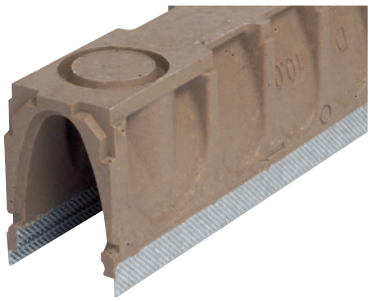
***Also compatible with ACO HexDrain Pro and ACO CivicDrain**

These products are subject to weight and dimensional tolerances. The dimensions shown on this page are for guidance purposes only.

Preparing the system for installation

Channel base knockout details

All ACO MultiDrain® MD constant depth channels in the height range 0.0 to 30.0 are supplied with a pre formed knockout detail in the base of the channels. This knockout detail positioned at the male end of the channel allows a vertical connection to be made from the channel to a Ø110mm (100mm wide bore) or Ø160mm (150mm and 200mm wide bore) PVC-U pipe system. The knockout detail on the base of the channel is indicated by a "hammer" symbol. The method of removal and pipe connection is described below.



Knockout detail.

FUNCTIONS:

Step 1: Pre formed knockout detail



Step 2: Support channel around knockout detail by placing the channel on sand or soft earth for example. Tap the knockout panel from the side indicated by the Hammer symbol to remove panel.



Step 3: Push fit pipe into recess provided and seal as required. For recommended sealants refer to the section headed "watertight sealing".



Channel side wall connection detail

An additional feature provided on all 500mm long channels are removable side wall panels, which allow channel runs to be connected together to form "T" or "L" junctions for continuous water flow through the system. Where channel connections are to be made to the side wall of these units a female joint detail is provided to aid alignment and fast installation.



Removable side wall panel.

FUNCTIONS:

Step 1: Using a disc cutter as shown, cut a cross into the panel provided. Ensure cuts extend to but not beyond the perimeter recess surrounding the removable panel.



Step 2: Tap segments of panel between the cuts to remove the panel.



Step 3: Use a chisel to tidy up any remaining material. Channel connection can now be made and sealed as required.



Shallow Channels

The ACO MultiDrain® MD shallow channels are available in either 75mm or 100mm overall depths. These units are idea for use where installation depths are restricted such in structural slabs, bridge decks and roofs. All units can sealed for watertight installations as each unit is supplied with a preformed sealant groove (see section headed watertight sealing for further details).

The shallow channels identified with a "V" such as the 075V and 0100V units have a cast-in triple lipped seal in their base for push fit watertight connections to Ø110mm PVC-U pipe. These triple lipped seals are manufactured from SEBS-TPE have excellent chemical, UV and weather resistance.



FUNCTIONS:

Step 1: Ensure Triple lipped seal and pipe spigot are clean and free from debris



Step 2: Lubricate joint faces as required and push fit pipe into the seal. The pipe is fully fitted when the end of the pipe is flush with the internal base of the channel.



These products are subject to weight and dimensional tolerances. The dimensions shown on this page are for guidance purposes only.

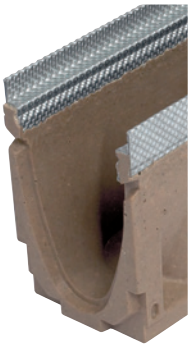
Step connector

Each width of MultiDrain® MD has available a Step connector manufactured from polymer concrete. This unit is used between constant depth channel joints where a stepped fall channel installation is required and takes up the 50mm height difference between units. The Step connector ensures a smooth water flow within the channel system.



Watertight sealing

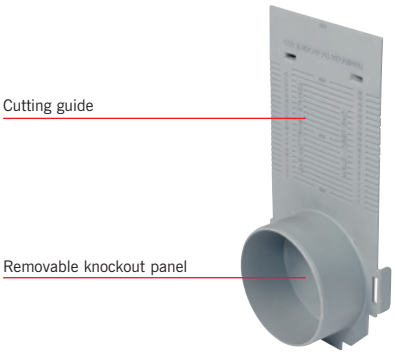
ACO MultiDrain® MD channels are generally installed without a particular water seal. Once butt jointed and with a concrete surround a fairly watertight installation is achieved. If however a water tight system is required each MultiDrain® MD channel is provided with a sealant groove allowing the system to be sealed by the application of a flexible sealant either during or following installation. For rainwater applications we recommend a single component, polyurethane based elastomeric joint sealant such as BASF Masterflex 472 or Sika Sikaflex 11FC or similar.



Application of sealant to be in accordance with the sealant manufacturers recommendations, but for guidance a typical method of application is as follows.

Multifunctional endcap

A Multifunctional endcap is provided for each channel width that is designed to be used with all channel heights in each range. Manufactured from polypropylene these versatile endcaps can be adjusted on site to perform the function of a closing endcap or as an inlet/outlet endcap for connection to Ø110mm (100mm wide bore) or Ø160mm (150mm and 200mm wide bore) PVC-U pipe.



FUNCTIONS:

Step 1: Place Step connector into the base of the deeper channel to be jointed as shown.



Step 2: Push channel joint together to lock Step connector in place forming a smooth transition between units as shown.



FUNCTIONS:

Step 1: Jointing faces of the channels to be sound and cleaned to remove all loose material, dust, oil and grease. This can be done by the use of a wire brush.



Step 2: Butt joint the channels & install as per ACO installation instructions. Ensuring joints are still clean (surfaces can be damp but no water droplets should be evident) apply sealant with a cartridge gun approximately 5mm thick to the end face of the channel & completely fill the sealant groove. Note this type of channel can be sealed either at or following installation.



Step 3: Wipe excess sealant from the inside faces of the channel & inspect sealant groove to ensure it has been fully filled with sealant. Leave sealant to cure before use as per the sealant manufactures recommendations.



FUNCTIONS:

Closing endcap: The endcap supplied fits directly to the deepest channel within the system. All other channel heights can be accommodated by simply cutting the endcap to suit. A cutting guide is printed on the front of the endcap plate. The endcap is fastened to the channel by two clips and can be connected to either male or female channel end.



Adjusting endcap.



Fitting endcap to channel

Inlet & Outlet endcap: The endcap has a knockout panel which can be removed with a hammer. Once fitted to the channel the endcap performs either an inlet or outlet function and is designed to provide a connection to Ø110mm (100mm wide bore) or Ø160mm (150mm and 200mm wide bore) PVC-U pipes.



Adjusting endcap.

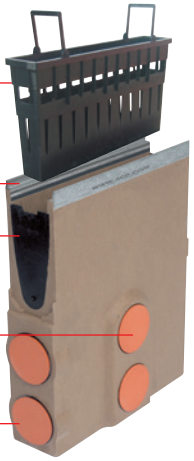


Fitting endcap to channel

These products are subject to weight and dimensional tolerances. The dimensions shown on this page are for guidance purposes only.

Sump unit

A polymer concrete chamber unit which provides the capacity to hold water and silt, and also provides an outlet for the channel system.



Roddable foul air traps

A drain connector available in Ø110mm and Ø160mm for connection to foul or combined drainage. Foul air traps come complete with removable bung for rodding and are manufactured from highly durable recyclable MDPE.



Ø160mm foul air trap



Ø110mm foul air trap

ACO Universal gully

A recycled plastic & ductile iron modular system purposely designed for use with ACO channel drainage systems up to 200mm internal width. The system provides a high capacity for retaining water and also an outlet for the drainage system.



FUNCTIONS:

Step 1: Triple lipped seals for watertight connections.



Step 2: Unit wall ends can easily be removed using knife or saw.



Step 3: Two knockouts for Ø110mm and Ø160mm pipe connections. For knockout removal refer to method stated on page 45 headed 'Channel side wall connection detail'.



FUNCTIONS:

Step 1: Push the foul air trap into place.



Step 2: Bung can be removed for rodding



FUNCTIONS:

Step 1: Once installed ACO Universal gully can be cut to match channel depth



Step 2: The cut ACO Universal gully matches the profile of the ACO MultiDrain® MD channel.



Note: Full installation details are available to download from www.aco.co.uk

ACO's Polymer concrete repair kit is available for bonding applications, for instance where a mitred channel joint is to be made or for the repair of small areas of aesthetic damage. For further product details please see page 17.



ACO Drainlock™ Gratings

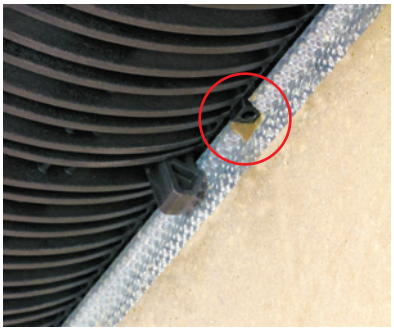
ACO Drainlock™

Fitted as standard to ACO MultiDrain® MD gratings, this fast locking device removes the need for bolts and bars and improves the channels hydraulic capacity. The Drainlock™ mechanism simply clips into the channel edge rail for rapid installation. An installation guide is shown opposite.



Anti-shunt mechanism

A selection of the ACO Drainlock™ gratings are fitted with an anti-shunt mechanism that restricts unwanted grating movement when installed.



Removal of grating

It is recommended that all ACO grates are lifted with our Drainlock™ lifting tool, which allows quick and easy lifting of the grate close to the Drainlock™ mechanism.

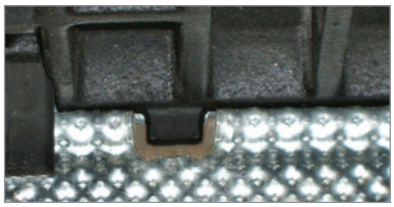


FUNCTIONS:



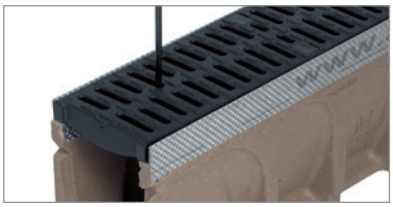
Push or stand on the grating until it clicks into place

FUNCTIONS:



The anti-shunt lines the grate up to the channel and prevents the grates ability to move linearly. When cutting channels to required lengths, remember to also align the grate to the channel so the anti-shunt engages

FUNCTIONS:



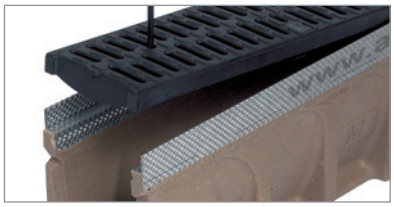
Insert tool as shown. Drainlock™ lifting tool available part no 1367



To install, align the grating onto the channel
Align anti-shunt detail with recess



If your inastallation requires the channel to be cut or mitred, ensure the grate still aligns with the anti-shunt. Photo shows a bad installation where the grate overlaps the channel junction



Pull upwards to unlock grating



ACO Drainlock™ locking mechanism fastens into the channel. Gratings should be fitted in the channels before the installation concrete is installed

Security Locking

In areas such as schools and prisons, where unwanted grating removal needs to be restricted, a security locking can be used in conjunction with the following gratings; and options are available for most styles of galvanised and stainless steel grates The system is fitted to the gratings by one or two M5/M6 screws and clamps the grating in place preventing removal. Security locking key for installation and removal supplied separately.

Grating selection

All channels within the ACO MultiDrain® MD range are certified to BS EN 1433: 2002 Load Class D 400. The system has a wide range of gratings suitable for use in a variety of applications from Load Class A15 to D 400*. Refer to the information on page 8 for load classes and typical applications. Please note when selecting a grating careful consideration should be given to the application requirement. Each grating has a certified load class which, once installed with the channel determines the system's load class.



FUNCTIONS:



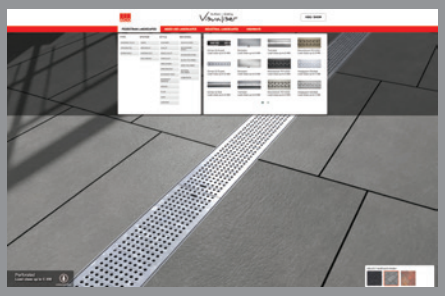
For ductile iron grates, fix the security screws and clamp the grating as shown.



Place grating into the channel and tighten the fixing using the security locking key. Galvanised and stainless steel grate's security locking must be expanded rather than tightened to press against the Drainlock™ mechanism. Please refer to the Drainlock™ tables for more information.

Surface + Grating Visualiser

A clever, yet easy to use software program that visualises how our range of grating designs could enhance your project.



To make specification easier, the software will suggest our most suitable ranges based on the project requirements.

You can then select from the available options and visualise how these may look in different surface finishes. Once a choice is made, a simple, yet detailed specification sheet provides full product information.

To launch the visualiser scan the QR code or visit www.aco.co.uk/gratingvisualiser

Heelguard™ applies to ACOs range of 'Heel-friendly' products with slot widths up to and including 10mm. Suitable for most pedestrian applications and compliant to BS EN1433:2002. For specific widths please refer to grating details.

***Not suitable for carriageways of public roads or motorways**

Design Software

ACO QuAD Hydraulic Design Software

TRY OUR FREE DESIGN TOOL

The new free-to-use ACO QuAD Hydraulic Design software has unprecedented levels of choice and flexibility built-in, to enable the efficient and accurate hydraulic design of any surface water management scheme.

The hydraulic engine has been robustly tested and is the tool used by ACOs own internal Design Services team in modelling surface water solutions for customers.

ACO QuAD Hydraulic Design software uses differential equations for spatially varied flow that online alternative solutions cannot accurately match. For example the Manning's equation for steady uniform flow does not work with level channels and is grossly inaccurate on shallow gradients.



Here are some of the features it includes:

- Powerful project-based software
- Create catchment models that are fully editable
- PDF summary document output
- Cloud based – All designs are stored securely on our server against your login
- Integrated rainfall data for the whole of the UK

To use the QuAD Hydraulic Design software visit: **www.aco.co.uk/quad-hydraulic-design-2.0**

QUAD FEATURES OVERVIEW

Cloud based

The software means increased efficiency providing design resources you need when you need it, allowing you to deploy the same design capability consistently, with the same consistency in results every time.

Flexible catchment design

QuAD is designed to support designers in the creation of catchment areas. Supplementary catchment areas can easily be added upstream and downstream of any previously designed channel run.

Product optimiser

Optimising the specific channel runs can be done with the optimiser feature selecting the smallest product suitable. Excavation and concrete requirements are also provided.

Attenuation assessments

Calculate the attenuation required for the project and compare it with the storage available in the channel design. Attenuation volume is presented along with suitable options for storage.

Flexible download format

Output can be generated for all or parts of the project and can be generated in pdf or CSV formats.

Application

Application selection ensure designers are able to get quick and accurate guidance in selection of the most suitable products based on the type of application the catchment is to cater for.

Rainfall assist

Rainfall intensity by location matters in design. QuAD provides a site locator map enabling the most accurate intensity to be input.

Resilience assessment

By inputting anticipated sedimentation rates and sedimentation density the QuAD software enables the designer to test their suggested maintenance schedules.

Secure scheme filing

All designs created by registered users are stored on a secure server and are password protected. Past projects are easily retrieved from the personalised menu.

Knowledge database

There is support available either through a query submission or through self-help made possible by the comprehensive Knowledge database.



Register Now - It's Free

www.aco.co.uk/quad-hydraulic-design-2.0

Design Support Services

Surface water management system design can often be a complex task. Success in combining products and processes requires a thorough understanding of how these different elements work together.

The ACO Design Services Team is able to work closely with you through the entire design process to ensure accurate and cost-effective product selection is made.

Services we offer include (free and without obligation):

- Whole system design, from collection to the attenuation of surface water
- Hydraulic calculations and AutoCAD detailing
- Parts schedules

ACO has embraced the concept of value engineering as an approach to on-site construction that saves both time and money.

ACO will review any design to minimise the total scheme and life cost of a proposal. The team can suggest the most appropriate range depending on your requirements.

Some ranges like MultiDrain or MonoDrain allow water to be contained and conveyed close to the surface, which accords with the principles advocated for Sustainable Drainage (SuDS Manual, 2015), by removing the need for pumping. Other ranges like Qmax allow attenuation – the storage of large volumes of water during storm events, reducing overall site costs.

For detailed designs using the ACO Hydraulic Design Software, please contact the ACO Water Management Design Services Team.

If manual calculations are preferred to using our QUAD software, hydraulic tables and instructions for manual calculations can be provided.

ACO Water Management
Design Services Team

Tel: 01462 816666
Email: technical@aco.co.uk

ACO BIM MODELS

BIM is the process of generating and managing data, and developing collaborative behaviours that will unlock new and more efficient ways of working at all stages of the project life-cycle. These files will help contractors specify and optimise drainage systems in line with the overall benefits of BIM-enabled working, including faster project delivery, reduced costs, reduced waste and greater project predictability.

Depending on the product range Civils3D, IFC or Revit files are available for download.

www.aco.co.uk/aco-bim-models



Professional Development

Helping create knowledge champions

In today's ever-changing construction industry, it has never been more important to ensure you are up to date with current industry trends and new innovations. Surface water management is one of the most dynamic sectors of the construction industry with new legislation, innovative products and ground-breaking materials constantly emerging.

Depending on your professional body or employer, you may be required to undertake between 20 and 30 hours CPD per year. ACO understands this can be a daunting task and has developed a series of professional development courses that can be accessed in a number of ways including online, in-office or at our state-of-the-art training facility at ACO UK office headquarters in Bedfordshire.

The courses have been carefully developed to provide essential learning and knowledge and are delivered by ACO's UK wide experienced Business Development Team ensuring that only the highest quality content is delivered.

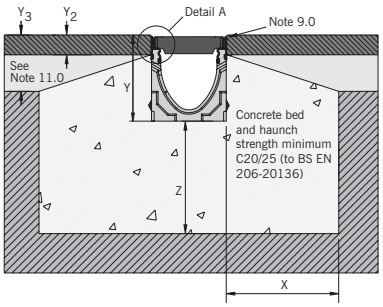


To find out more and book a professional development course, visit: **www.aco.co.uk/professional_development**

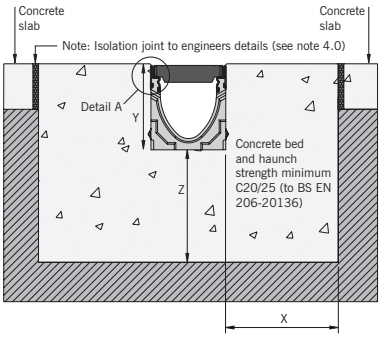
Installation detail

CHANNELS WITH TRADITIONAL GRATINGS

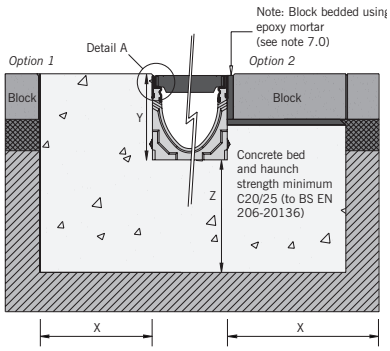
Asphalt pavement



Concrete pavement



Block pavement



1.0 Load Class

Installation recommendations shown are ACO minimum recommendations for BS EN 1433:2002 load class requirements.

2.0 Ground Conditions

The long term performance of a channel installation to sustain vertical and lateral loads depends upon a) ground conditions, b) stability of the adjacent pavement and c) a durable concrete bed and surround. The recommended installation detail may require the minimum dimensions to be revised to achieve site specific load class requirements (referred to in 1.0 above).

3.0 Cutting and Jointing

Mitre joints are formed by cutting the channels to the required angle and butting them together with the appropriate sealant (e.g. Sikaflex 11FC or similar) or ACO Repair Kit. Where possible 90° joints and T's should be formed so that gratings do not have to be cut. Angles can be formed by connecting them using proprietary PVCu pipework attached to the ACO inlet/outlet endcaps. For further details please contact ACO Design Services Team. Note: For load classes higher than C 250, mitred joints are not recommended in vehicular areas. Where requested ACO can custom manufacture angled joints to order.

4.0 Isolation Joints

The channel must be isolated from the surrounding environment. An isolation joint must be positioned up to 1500mm from the channel wall. Any dowel bars must be located no nearer than 150mm from the channel wall. Other isolation joints in surrounding slab must be continued through the channel. Additional crack control may be required to comply with specifier requirements.

5.0 installation into in-situ slab

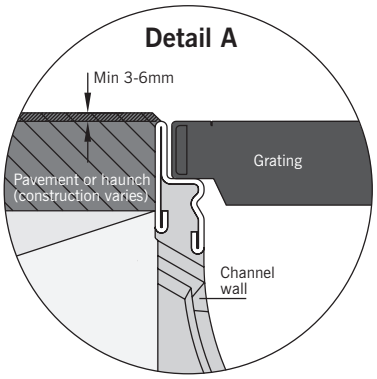
Where a channel is to be installed into an existing concrete slab it is necessary to cut a suitably sized pocket in the slab. The channel will then need to be bedded in polymer modified mortar of 25mm minimum thickness (this may vary depending on the type of mortar used). Engineering advice may be necessary.

6.0 Temporary installation

A channel installation is not complete until the final surfacing is laid. In any temporary condition, i.e., the channel walls projecting above adjacent ground, site traffic should not cross channels. Loose boards, stone fill or cover plates will not protect the channel walls or grating. A temporary channel crossing should be formed by raising the ground level locally, to 3-6mm above top of edge rail, either side of a channel for a distance of 750 to 1000mm, to form ramps. Note that the channel load class should be adequate to carry the site traffic.

7.0 Block pavements

The channel must be supported laterally. Blocks laid directly against the channel must be laid as a soldier course and restrained from movement by bedding securely on the concrete haunch e.g. by using a polymer modified mortar for bed and perpendicular joints (e.g.. RONAFIX mortar mix C or similar). Blocks or slabs bedded on sand remote from the channel should be set at a higher level to compensate for possible settlement of the paving in service.



8.0 Grate locking system

Gratings should be securely fixed to the channel, where required, using an appropriate grate lock system (where available).

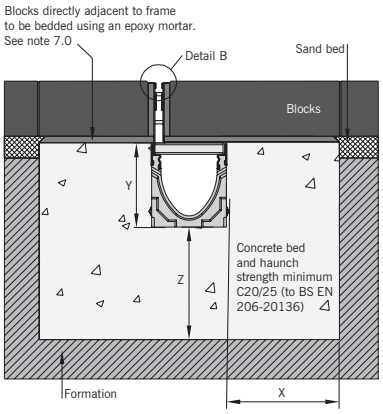
9.0 Channel protection

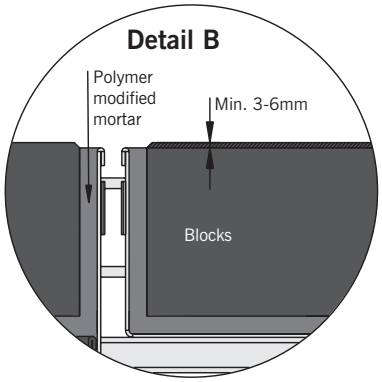
Avoid contact between compaction equipment and top of ACO channel edge rail. The installer must ensure that the finished surface level lies above the top of the edge rail (by at least 3-6mm). Covering or protecting the grating, before concreting the haunch or laying blocks, removes the time and cost associated with cleaning the channel and grating of cement material and embedded stones. (Please not that ACO channels must be installed with the grating in place to prevent deformation of the channel.)

Installation detail

CHANNELS WITH BRICKSLOT GRATINGS

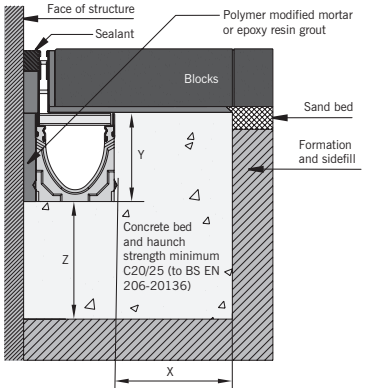
Block pavement



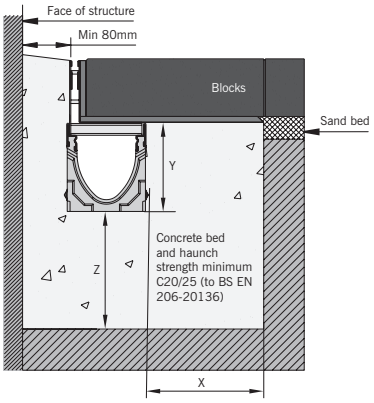


An electronic version of the ACO MultiDrain® MD installation detail is available to download from the ACO website. Visit www.aco.co.uk.

Adjacent to a structure - option 3



Adjacent to a structure - option 4



10.0 Watertight installation to BS EN 1433:2002

Where ACO channel joints/fittings and channel/pavement interfaces are to be sealed, an appropriate sealant must be used (e.g., Silkaflex 11FC or similar). Guidance on the necessary surface preparation and/or priming should be sought from the sealant manufacturer.

See page 46 for typical method of water tight sealing.

Best practice and workmanship

ACO can give guidance with respect to the most suitable methods of installation for each of the products in the ACO MultiDrain® MD range. ACO MultiDrain® MD should be installed using acceptable levels of workmanship and according

to the National Code of Practice (UK: BS8000: Part 14: 1989) in keeping with EN 1433:2002 (Drainage channels for vehicular and pedestrian areas).

Detailed installation statements and methodologies will vary for all sites as each will have different aspects deserving particular consideration, consequently the relevant approvals should be sought from the consulting engineer and/or the installer.

Note: Galvanised iron and steel products have good corrosion resistance to concrete and mortar products but may experience corrosion if high chloride an/or sulphate content is present. Use only good quality concrete and consider using corrosion inhibitors where necessary. The use of protective coatings, such as paint, can minimise the risk of corrosion.

For further information please contact our Design Services Team (technical@aco.co.uk) or the ACO website www.aco.co.uk

11.0 Minimum Dimensions of Concrete Surround

Load Class		A 15	B 125	C 250	D 400*
Minimum Dimensions (mm)	x	100	150	150	200
	y	Full channel height (less Y2 where necessary)			
	z	15 100 0	150	150	200
	Y2	35	35	35	35
Maximum Dimensions (mm)		35	35	35	35
Asphalt pavement only	Y3	100	60	60	60

***E.g.. Parking areas for all types of road vehicle. Not suitable for carriageways of public roads or motorways.**

Chemical resistance chart

Vienite®, ACO's sustainable high strength material, has a high resistance to dilute acids and alkalis, and are unaffected by road salt, fuel and oil, and other commonly encountered chemicals. Further details of the chemical resistance can be obtained from the ACO Water Management Design Services team or, for particular chemicals, samples of the polymer concrete can be supplied to customers for their own testing. The chemical resistance will also depend on the temperature of the effluent. Clean water should not exceed 80ºC.

The resistance of the gratings and edge rails should also be considered, and stainless steel gratings and edge rails are available in the ACO MultiDrain® MD system for aesthetically pleasing installations and for specific chemical resistance.

This chemical resistance chart refers to chemicals at ambient temperatures (20ºC) and the results are for general guidance only.

Chemical medium	% conc	Resistance: Polyester concrete
Acetic acid, glacial	100	No
Acetic acid	10	Yes
Acetic anhydride	100	No
Acetone	10	No
Acetone	100	No
Alum	100	Yes
Aluminium sulphate	100	Yes
Ammonium chloride	100	Yes
Ammonium nitrate	100	Yes
Ammonium phosphate	65	Yes
Ammonium sulphate	100	Yes
Aniline (aminobenzene)	100	No
Barium chloride	100	Yes
Benzaldehyde	100	No
Benzene	100	No
Benzyl alcohol	100	Yes
Benzyl chloride	100	No
Borax	100	Yes
Boric acid	100	Yes
Bromine	100	No
Bromine water	Saturated	No
Butyl acetate	100	No
Butyric acid	100	Yes
Calcium carbonate	100	Yes
Calcium chloride	100	Yes
Calcium chlorate	8	Yes
Calcium hydroxide	100	Yes
Calcium nitrate	100	Yes
Carbon disulphide	100	No
Carbon tetrachloride	100	Yes
Castor oil	100	Yes
Chlorine gas, wet	100	No
Chlorine water	Saturated	No
Chlorobenzene	100	Yes
Chloroform (trichloro-methane)	100	No
Chromic acid	12	Yes
Citric acid	100	Yes
Copper chloride	100	Yes
Copper nitrate	100	Yes
Cyclohexane	100	Yes
Diesel fuel (DERV)	100	Yes
Dimethyl formamide	100	No
Dimethyl phthalate	100	Yes
Dioctyl phthalate	100	Yes
Ethanol	95	No
Ethanolamine	100	Yes
Ethyl acetate	100	No
Ethylene glycol	100	Yes
Ferrous chloride	100	Yes
Ferric chloride	100	Yes
Ferrous sulphate	100	Yes
Formaldehyde	30	Yes
Formic acid	10	Yes
Formic acid	100	No
Fuel oil	100	Yes
Gasoline	100	Yes
Glycerine	100	Yes
Hydrazine	50	No

Chemical medium	% conc	Resistance: Polyester concrete
Hydrobromic acid	48	Yes
Hydrochloric acid	10	Yes
Hydrofluoric acid	10	No
Hydrogen peroxide	30	Yes
Lactic acid	100	Yes
Lead acetate	100	Yes
Magnesium chloride	100	Yes
Magnesium sulphate	100	Yes
Maleic acid	100	Yes
Methyl ethyl ketone (MEK)	100	No
Motor oil	100	Yes
Nickel chloride	100	Yes
Nickel sulphate	100	Yes
Nitric acid	5	No
Nitrobenzine	100	No
Oleic acid	100	Yes
Oxalic acid	100	Yes
Perchloric acid	10	Yes
Perchlorethyline	100	Yes
Phosphoric acid	20	Yes
Phosphorus trichloride	100	No
Potassium carbonate	50	Yes
Potassium chloride	100	Yes
Potassium dichromate	100	Yes
Potassium hydroxide	10	Yes
Potassium nitrate	100	Yes
Potassium permanganate	10	No
Potassium sulphate	100	Yes
Pyridine	100	No
Sodium acetate	100	Yes
Sodium bromide	100	Yes
Sodium carbonate	35	Yes
Sodium chlorate	100	Yes
Sodium chloride	100	Yes
Sodium hydroxide (caustic soda)	50	No
Sodium hypochlorite	18	No
Sodium nitrate	100	Yes
Sodium nitrite	100	Yes
Sodium phosphate	10	Yes
Sodium sulphate	100	Yes
Sodium sulphide	100	Yes
Sodium sulphite	100	Yes
Sodium thiosulphate	100	Yes
Stearic acd	100	Yes
Styrene	100	No
Sulphuric acid	75	No
Sulphuric acid	50	Yes
Sulphuric acid at up to 40ºC	10	Yes
Tetachloroethylene	100	Yes
Thioglycolic acid	80	Yes
Thionyl chloride	100	No
Toluene	100	Yes
Toluene sulphonic acid (aqueous solution)	Saturated	Yes
Trichloroacetic acid	50	Yes
Turpentine	100	Yes
Water	100	Yes
Xylene	100	Yes
Zinc sulphate	100	Yes

Specification clause

The surface drainage system shall be ACO MultiDrain® (Insert channel description as appropriate e.g. ACO M100D) channel system as supplied by ACO Technologies plc; all materials and components within the scope of this channel system shall be obtained from this manufacturer. The system shall be CE marked and fully compliant with BS EN 1433:2002, certificated to Load Class (*) as defined in BS EN 1433:2002.

Declarations of Performance (DoP) shall be supplied to the Supervising Officer upon request. The system shall be of (100mm†, 150mm†, 200mm†) nominal internal width, manufactured in Vienite®, ACO's sustainable high strength material with cast-in (galvanised/stainless†) steel edge rails. The channels shall be installed with manufacturer's grating appropriate to the specified Load Class and locked securely in place using the manufacturer's Drainlock® boltless locking system.

The system shall be installed in accordance with the manufacturer's printed instructions, and the work carried out as specified in drawing no. (… …) and in accordance with recognised good practice. Standards of workmanship shall generally be as specified in BS EN 752 and BS 8000:Part 14:1989.

† delete non-appropriate information.

*** insert information C 250 or D 400 as appropriate.**

Recycled content

ACO Technologies aim to incorporate as much recycled material or waste material as is practicable in their manufactured products. Typically, cast iron materials contain 40% to 90 % recycled iron, and steel products contain 25% to 33% recycled steel. The total recycled content of each product in the ACO MultiDrain® MD system will vary as the proportion of the different materials (in channels, edge rails, gratings etc) varies. As an example, ACO MultiDrain® MD channels with Heelguard™ ductile iron gratings will contain approximately 27% by weight recycled material.

The ACO MultiDrain® MD products are themselves intended for a long life with low maintenance, to reduce the need to recycle, but when eventually they are no longer needed, much of their content can be readily recycled with a very low risk of pollution to the environment.

NBS Specifications

ACO MultiDrain® MD should be specified in section Q10:180. Assistance in completing this clause can be found in the ACO Water Management entry in NBS Plus, or please contact the ACO Water Management Design Services Team.

Note: A specification in NBS format is available to download from www.thenbs.com or www.aco.co.uk

Conformity

The ACO MultiDrain® MD System is fully certified to BS EN 1433:2002 and CE marked in accordance with the Construction Products Regulation.

Declarations of Performance are available via the CPR Zone on our website (www.aco.co.uk), or on request. Please contact ACO Water Management Design Services Team on 01462 816666 for further information.

BS EN 1433:2002

CE



General information
ACO products are subject to weight and dimensional tolerances. The weights and dimensions shown in this document are for guidance purposes only. ACO products are made from naturally occurring materials and may be subject to variations in colour, texture and marking. These aesthetic variations do not affect the performance or functionality of our Goods. The appearance of products shown in our company documentation are for illustration purposes only.

ACO Technologies plc

- ACO Water Management
  Civils + Infrastructure
  Building + Landscape
- ACO Building Drainage
- ACO Sport
- ACO Wildlife

ACO Water Management

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Tel: 01462 816666
Fax: 01462 815895

e-mail Project pricing: awmprojects@aco.co.uk
e-mail Sales: customersupport@aco.co.uk
e-mail Technical: technical@aco.co.uk

website: www.aco.co.uk

ACO. creating the future of drainage

ISO 9001
FM 13502

ISO 14001
EMS 538781

OHSAS 18001
OHS 524145

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Printed on material certificated in accordance with the rules of the FSC® who provide a means of assuring that products come from responsibly managed forest.

PM285

	SDS Limited	Created Date	07/07/2022
Company Address	Clearwater House, Castle Mills Industrial Estate, Biddisham, Axbridge BS26 2RE United Kingdom	Enquiry Number	E247820
Project Name	Plot H3 - Accor Tribe Hotel		
Prepared By	Jason Cartwright	Contact Name	Sanjay Kanadia
Phone	07801200634		
Email	jason.cartwright@sdslimited.com		
Quote For	Spillways Ltd	Site Contact Name	Spillways Ltd
Client Address	260 Sherwood Park Avenue Sidcup DA15 9JN	Site Address	260 Sherwood Park Avenue Sidcup DA15 9JN

Product	Product Code	Line Item Description	Quantity	Quantity Unit Of Measure	Total Price
GEOlight 400 - Attenuation Install	GEOlight400AI	Supply & Installation 1no. Attenuation Tank L12.5m x W13.0m x H1.250m effective storage 187m3	204.00	m3	£28,560.00
GEOlight 400 - Attenuation Install	GEOlight400AI	Supply & Installation 1no. Attenuation Tank L15.0m x W9.0m x H0.750m effective storage 90m3	102.00	m3	£14,280.00
GEOmembrane	Included		1.00		£0.00
GEOtextile	Included		1.00		£0.00
GEOvent	Included		1.00		£0.00
Top Hat Seals	Included		1.00		£0.00
Internal tank Pipework	Included		1.00		£0.00

Subtotal	£42,840.00
Total Price	£42,840.00
Grand Total	£42,840.00

This Quotation includes delivery to site. It is valid for 30 days from the above date and is subject to SDS's current Terms & Conditions of Sale enclosed. Please see below for further details of exclusions.

- SDS Limited proposes to sell to the customer the offered products and materials in accordance with the terms, conditions, specifications and prices detailed in this quotation / tender.
- All prices are nett and exclude VAT.
- Materials will be invoiced on delivery.
- Subject to credit approval all payments are due within 30 days of issue of invoice.
- Retention is not accepted; if retention is taken, the same percentage amount will be added to all monies due.

Delivery to a UK site from the date of order will be subject to lead times available on request.

Delivery is normally by articulated truck with curtain sides.

Unloading / offloading of materials, distribution and storage on site are the responsibility of the purchaser; please avoid any concentrated point loading. Please note that for offloading GEOlight® any forklift requires min 1.8m extension forks.

Flatbed / rigid-only vehicles are available on request and may carry an additional charge.

Specialist deliveries requiring vehicles to be registered with schemes such as FORS/CLOCS will incur a surcharge.

Separate call-off of multiple tanks/crates not detailed in the enquiry may incur surcharges.

Water Release Products
Included in the quotation price for water release products unless specifically stated otherwise:-

- Removable Bypass Mechanism with stainless steel rope and pull handle;
- Removable Maintenance Plate for downstream access;
- Neoprene Rubber Gasket;
- Stainless steel Fixing Bolt and Eyebolt;
- Drill Bit;
- Installation Instructions.

Treatment Products
SDS Aqua-Swirl TM Vortex Separator and SDS Aqua-Filter TM Filtration Unit meet with the New Jersey Department testing facility for the removal of particles from surface water discharge. The New Jersey testing procedure is accepted by the Environment Agency as a reputable accreditation. Oil, debris and sediment capacities can be provided by SDS in order that maintenance programmes can be planned. For further advice regarding maintenance schedules please contact SDS Sales Office. Backfill and coverage details, CAD drawings and specification are available on request.

Delivery to a UK site from the date of order will be subject to lead times of 6 to 8 weeks. SDS Aqua-Swirl TM and SDS Aqua-Filter TM are shipped to site on specific transport depending on size of units. Chains and lifting rig are supplied with the delivery. Specialist deliveries requiring vehicles to be registered with schemes such as FORS/CLOCS will incur a surcharge. Unloading / offloading of materials, distribution and storage on site are the responsibility of the purchaser; please avoid any concentrated point loading.

Conditions of Sale

1 Definitions

In these terms:

"Buyer" means the person who accepts a quotation of the Company for the sale of the Goods or whose order for the Goods is accepted by the Company

"Company" means Sustainable Drainage Systems Limited

"Conditions" means the terms and conditions of sale set out in this document and any special terms and conditions agreed in writing by the Company and the Buyer

"Contract" means the contract for the purchase and sale of the Goods

"Goods" means the goods which the Company is to supply and which the Buyer agrees to buy in accordance with these Conditions

"Price" means the price for the Goods

1.2 Any reference in these Conditions to any provision of a statute shall be construed as a reference to that provision as amended re-enacted or extended at the relevant time

1.3 The headings in these Conditions are for convenience only and shall not affect their interpretation

2 Basis of Sale

2.1 The Company shall sell and the Buyer shall purchase the Goods in accordance with:-

2.1.1 the Company's quotation if provided by the Company and accepted by the Buyer; or

2.1.2 (if the Company does not submit a quotation) the Buyer's order if accepted by the Company,subject in either case to these Conditions, which shall govern the Contract to the exclusion of any other terms, subject to which any such quotation is accepted, or purported to be accepted or any such order is made or purported to be made by the Buyer.

2.2 Any variation to these Conditions (including any special terms and conditions agreed between the parties) shall be inapplicable unless agreed in writing by the Company

2.3 Any advice or recommendation given by the Company or its employees or agents to the Buyer or its employees or agents as to the storage application or use of the Goods which is not confirmed in writing by the Company is followed or acted upon entirely at the Buyer's own risk and accordingly the Company shall not be liable for any such advice or recommendation which is not so confirmed

2.4 Any typographical clerical or other error or omission in any sales literature quotation price list acceptance of offer invoice or other document or information issued by the Company shall be subject to correction without any liability on the part of the Company

2.5 All specifications, drawings, particulars of weight and dimension and performance data contained in any of the Company's literature are approximate only.

2.6 The Company reserves the right to improve and/or modify any specifications, designs and dimensions without notice.

2.7 For the avoidance of doubt nothing in these Conditions or any Contract shall confer on any third party any benefit nor the right to enforce any term of these Conditions or any Contract whether pursuant to the Contracts(Rights of Third Parties) Act 1999 or otherwise

3 The Price and payment

3.1 The Price shall be either the Company's quoted price which shall only be valid for 60 days from its date after which time the Price may be altered by the Company and shall be subject to the Company re-quoting.

3.2 All prices are given by the Company to include the Company's charges for transport, packaging and insurance. It excludes all unloading and distribution unless specifically stated otherwise within the quote.

3.3 The Price and any other sums payable by the Buyer to the Company is exclusive of any applicable Value Added Tax, which the Buyer shall be additionally liable to pay to the Company.

3.4 Subject to any special terms agreed in writing between the Buyer and the Company, the Company may invoice the Buyer for the Price of the Goods on or at any time after delivery of the Goods, or any instalment of the Goods unless the Goods are to be collected by the Buyer or the Buyer wrongfully fails to take delivery of the Goods, in which event the Company shall be entitled to invoice the Buyer for the Price at any time after the Company has notified the Buyer that the Goods are ready for collection or (as the case may be) the Company has tendered delivery of the Goods.

3.5 Unless as otherwise agreed in writing payment of the Price and VAT shall be due within30 days of the date of the invoice without deduction or set off.

3.6 Retention is not accepted and if retention is taken the same percentage is to be added to all monies due.

3.7 If the Buyer fails to make any payment on the due date then without prejudice to any other right or remedy available to the Company the Company shall be entitled to:

3.7.1 cancel the contract or suspend any further deliveries to the Buyer

3.7.2 appropriate any payment made by the Buyer to such of the Goods (or the Goods supplied under any other contract between the Buyer and the Company) as the Company may think fit (notwithstanding any purported

appropriation by the Buyer) and

3.7.3 charge the Buyer interest (both before and after any judgement) on the amount unpaid at the rate of 8% per cent per annum above Bank Of England base rate from time to time until payment in full is made (a part of a month being treated as a full month for the purpose of calculating interest).

3.7.4 Failure to pay the amount due by the due date will render the entire account to become immediately payable. Interest and recovery of all costs incurred in the collection of any overdue amount will be charged in accordance with The Late Payment of Commercial Debts (Interest) Act 1998 & Late Payment of Commercial Debts Regulations 2013.

3.8 All Operation and Maintenance Manuals, Warranties, Guarantees, Liabilities and/or any other form of Assurance are subject to full and complete payment, any outstanding monies owed will result in the company withdrawing and voiding these items at its sole discretion.

4 The Goods

4.1 The quantity and description of the Goods shall be as set out in the Company's quotation (if accepted by the Buyer) or the Buyer's order (if accepted by the Company).

4.2 The Buyer shall be responsible to the Company for ensuring the accuracy of the terms of any order and any information supplied for the Company as to its requirements (including but without limitation the use to which the Goods will be put and any applicable specification) submitted by the Buyer and for giving the Company any necessary information relating to the Goods within a sufficient time to enable the Company to perform the Contract in accordance with its terms

4.3 If the Goods are to be manufactured or any process is to be applied to the Goods by the Company in accordance with a specification or instructions submitted by the Buyer the Buyer shall indemnify the Company against all losses damages costs, claims, demands, liabilities and expenses awarded against or incurred by the Company in connection with or paid or agreed to be paid by the Company in settlement of any claim for infringement of any patent copyright design trade mark or other industrial or intellectual property rights of any other person which results from the Company's use of the Buyer's specification or from compliance by the Company with the Buyer's instructions whether express or implied.

4.4 No order which has been accepted by the Company may be cancelled by the Buyer except with the agreement in writing of the Company and providing that all costs already incurred by the Company are fully recovered.

5 Delivery of Goods

5.1 No deliveries will be made or Goods manufactured until a full order has been received and approved by the Company.

5.2 Company shall deliver the Goods to the address as outlined with the order.

5.3 The Buyer shall be responsible for offloading the Goods at the delivery address and shall advise the Company of any local or internal laws, byelaws or rules relating to parking or loading of vehicles at the delivery address.

5.4 All deliveries will be made on curtain sided articulated lorries unless stated otherwise with the Company quote.

5.5 The Buyer shall be responsible for ensuring that access to the delivery address is wholly by a road with a surface capable of withstanding the weight and size of a vehicle carrying the Goods.

5.6 If the Buyer fails for any reason whatsoever to take delivery of the Goods or fails to give the Company adequate delivery instructions at the time stated for delivery (otherwise than for any cause beyond the Buyer's reasonable control or by reason of the Company's fault) then without prejudice to any other right or remedy available to the Company the Company may:

5.6.1 store the Goods until actual delivery and charge the Buyer for the reasonable costs (including insurance) of returning the Goods to the Company's premises, storage and for transport, packaging and insurance for redelivery of the Goods; or

5.6.2 sell the Goods at the best price readily obtainable and (after deducting all reasonable storage and selling expenses) account to the Buyer for the excess over the Price or charge the Buyer for any shortfall below the Price

6 Installation of the Goods

6.1 No Goods or men will be sent to site until the Company have received a signed commencement to work sheet from the Buyer.

6.2 All unloading, distribution, setting out, pumping out, blinding, backfilling, fall protection and stoning up is the carried out by the Buyer unless agreed otherwise in writing with the Company.

6.3 If the Company is delayed on site due to no fault of their own theThe Buyer will be responsible for all additional costs incurred by the Company. Current daywork rates are £1500.00 per day.

6.4 The Buyer will not be allowed access to or the traffic over the Goods until they that sign a copy of the Companys sign off sheet.

6.5 The Buyer will need to supply a suitable 110V power source within 2 meters of the tank/SA location.

7 Risk and Title

7.1 Risk of damage to or loss of the Goods shall pass to the Buyer once all Goods arrive on site.

7.2 Notwithstanding delivery and the passing of risk in the Goods or any other provision of these Conditions the property in the Goods shall not pass to the Buyer until the Company has received payment in full.

7.3 The Company reserves the right to remove all Goods from site until they have been paid for regardless of whether they have been installed within the permanent works and

Buyer will responsible for the costs associated with removing the Goods from site and any making good if required

8 Warranties and liability

8.1 Subject to the following provisions, the Company warrants that the Goods will be free from defects in material and workmanship for a period of 12 months from their delivery to the Buyer.

8.2 The warranty in clause 8.1 is given by the Company subject to the following conditions:

8.2.1 the Company shall be under no liability in respect of any defect in the Goods arising from any information drawing design or specification supplied by the Buyer

8.2.2 the Company shall be under no liability in respect of any defect arising from fair wear and tear wilful damage negligence abnormal working conditions failure to follow the Company's instructions (whether oral or in writing) misuse or alteration or repair of the Goods without the Company's approval

8.2.3 the Company shall be under no liability under the above warranty (or any other warranty condition or guarantee) if the Price and value added tax for the Goods has not been paid by the due date for payment

8.2.4 the above warranty does not extend to parts materials or equipment not manufactured by the Company in respect of which the Buyer shall only be entitled to the benefit of any such warranty or guarantee as is given by the manufacturer to the Company.

8.3 The Buyer shall not make any statement or representation or give any warranty to any third party in respect of any Goods other than in the terms made or given by the Company to the Buyer in these Conditions nor shall the Buyer have any authority to commit the Company to provide any service in relation to the Goods. The Buyer shall indemnify the Company against all losses, damages, costs, claims, demands, liabilities and expenses incurred or suffered by the Company in respect of or arising out of any such statement, representation or warranty made or given by the Buyer in contravention of this clause.

8.4 The Company's liability to the Buyer for -

8.4.1 death or injury resulting from its own or that of its employees' agents' or sub-contractors' negligence; and

8.4.2 damage suffered by the Buyer as a result of any breach of the obligations implied by Section12 of The Sale of Goods Act 1979 shall not be limited

8.5 Subject as expressly provided in these Conditions all other warranties conditions or terms whether implied by statute or common law or otherwise are hereby excluded

8.6 The Buyer shall examine all Goods delivered forthwith following delivery. Any claim by the Buyer which is based on any defect in the quality or condition of the Goods or their failure to correspond with specification shall (whether or not delivery is refused by the Buyer) be notified to the Company within 7 days from the date of delivery or (where the defect or failure was not apparent on reasonable inspection) within a reasonable time after discovery of the defect or failure. If delivery is not refused and the Buyer does not notify the Company accordingly the Buyer shall not be entitled to reject the Goods and the Company shall have no liability for such defect or failure and the Buyer shall be bound to pay the Price as if the Goods had been delivered in accordance with the Contract In no event shall the Buyer be entitled to reject the Goods on the basis of any defect or failure which is so slight that it would be unreasonable for the Buyer to reject them.

8.7 The Company shall be entitled to examine any Goods which are the subject of any claim by the Buyer and to remove such Goods or any part thereof for testing. No tests carried out by the Buyer will be recognised by the Company unless carried out strictly in accordance with a method previously agreed by the Company as being suitable for the purpose.

8.8 Where any valid claim in respect of any of the Goods which is based on any defect in the quality or condition of the Goods or their failure to meet specification is notified to the Company in accordance with these Conditions the Company shall be entitled to repair or replace the Goods (or the part in question) free of charge or at the Company's sole discretion refund to the Buyer the Price (or a proportionate part of the Price) but the Company shall have no further liability to the Buyer.

8.9 The Company shall not be liable to the Buyer by reason of any representation (unless fraudulent) or any implied warranty condition or other term or any duty at common law (including but without limitation the negligence of the Company its employees agents or otherwise) or under the express terms of the Contract for any loss of production loss of profits or anticipated profits loss of contracts operation time or anticipated savings loss of business or of expected further business loss of or corruption to data damage to the Buyer's reputation or goodwill damages costs or expenses payable by the Buyer to any third party or any other indirect special or consequential loss or damage or claim (whether caused by the negligence of the Company its employees agents or otherwise) which arise out of or in connection with the supply of the Goods or their use or resale by the Buyer

8.10 The liability of the Company under or in connection with the Contract shall not exceed the Price of the Goods and the Buyer acknowledges that by delivery of a copy of these Conditions to them before the date of the Contract that they have notice of the limitation and agree to it.

8.11 The Company shall not be liable to the Buyer or be deemed to be in breach of the contract by reason of any delay in performing or any failure to perform any of the Company's obligations in relation to the Goods if the delay or failure was due to any cause beyond the Company's reasonable control Without limiting the foregoing, the following shall be regarded as causes beyond the Company's reasonable control:

8.11.1act of god, explosion, flood, tempest, or inclement weather, fire or accident;

8.11.2war or threat of war, sabotage, insurrection, civil disturbance or requisition;

8.11.3 acts, restrictions, regulations, by-laws, prohibitions or measures of any kind on the part of any Governmental, Parliamentary or Local Authority;

8.11.4 imports or exports, regulations or embargos;

8.11.5strikes, lockouts or other industrial action or trade disputes(whether employees of the Company or of a third party);

8.11.6 difficulties in obtaining raw materials, labour, fuel, parts or machinery;

8.11.7 power failure, failure of tele-communications lines, failure or breakdown of plant, machinery or vehicles;

8.11.8 theft or malicious damage;

8.11.9 defaults for any reason whatsoever of suppliers or sub-contractors of the Company;

8.11.10 Incompleteness or inaccuracy of any technical information which it is the responsibility of the Buyer to provide

9 Insolvency of the Buyer

9.1 This clause applies if:

9.1.1 the Buyer makes any composition or voluntary arrangement with its creditors (being an individual or firm) becomes bankrupt or (being a company) becomes subject to an administration order or seeks an out of court route into administration or goes into liquidation (otherwise than for the purposes of amalgamation or reconstruction) or a moratorium comes into force in respect of the Buyer(within the meaning of the Insolvency Act 1986); or

9.1.2 an encumbrancer takes possession or a receiver or manager or administrative receiver or administrator is appointed of any of the property or assets of the buyer; or

9.1.3 the Buyer ceases or threatens to cease to carry on business or

9.1.4 the Company reasonably apprehends that any of the events mentioned above is about to occur in relation to the Buyer and notifies the Buyer accordingly.

9.2 If this clause applies then without prejudice to any other right or remedy available to the Company the Company shall be entitled to stop any goods in transit, cancel the Contract or suspend any further deliveries under the Contract without any liability to the Buyer and if the Goods have been delivered but not paid for the Price shall become immediately due and payable notwithstanding any previous agreement or arrangement to the contrary.

10 Health and Safety Information

The Buyer agrees and undertakes with the Company to ensure that the provisions of all instruction manuals including health and safety instructions and any other information or document relating to the use of the Goods provided by the Company with the Goods are fully implemented so as to ensure so far as is reasonably practicable that the Goods will be safe and without risk to health at all times, when it is being installed, set, used, cleaned, or maintained by a person at work and that all such manuals instructions or documents remain with the Goods.

11 General

11.1 The Contract is personal to the Buyer which may not assign or dispose of any of its rights or obligations or otherwise delegate any of its obligations under the Contract without the written consent of the Company.

11.2 The Company shall be entitled to assign its rights and obligations under the Contract and to sub-contract or otherwise delegate any of its obligations under the Contract.

11.3 Any notice required or permitted to be given by either party to the other under these Conditions shall be in writing including a facsimile addressed to that other party at its registered office or principal place of business or such other address as may at the relevant time have been notified pursuant to this provision to the party giving the notice and shall be deemed to have been received by the party to whom it was addressed, if sent by facsimile upon its transmission if during a normal business day and otherwise on the next business day and if sent by post 72 hours after posting.

11.4 No waiver by the Company of any breach of the Contract by the Buyer shall be considered as a waiver of any subsequent breach of the same or any other provision

11.5 If any provision of these Conditions is held by a Court or other competent authority to be invalid or unenforceable in whole or in part the validity of the other provisions of these Conditions and the remainder of the provision in question shall not be affected thereby

11.6 The Contract and these Conditions shall be governed by the laws of England

11.7 The parties hereby submit to the non-exclusive jurisdiction of the English courts

12 Information

The Company will provide the Buyer on request with information as to the proper and safe use of the Goods and the Buyer shall at all times obey and comply with the Company's instructions or other information relating to the use of the Goods.

SDS
Water Infrastructure Systems

INNOVATORS IN
WATER TECHNOLOGY

SDS GEOlight®

Stormwater Management System



SDS GEOlight® is an ultra lightweight honeycombed modular structure, made from recycled PVC, that provides an underground storage facility for the application of stormwater attenuation or infiltration.

SDS
Water Infrastructure Systems

Stormwater Management

The Environment Agency is keen to promote the wider use of sustainable drainage systems, which reduce the impact of surface water runoff. There are two main ways of storing surface water for stormwater management:

- Stormwater attenuation tanks
- Soakaway infiltration systems

Stormwater Attenuation Systems

This consists of underground water storage facilities that hold excess water during periods of peak rainfall.

The stored water is gradually released in a controlled manner into the surface water drainage system or directly into watercourses, reducing the risk of upstream and downstream flooding.

Soakaway Infiltration Systems

Soakaways are designed to store surface water runoff until it can be gradually absorbed by the surrounding ground.

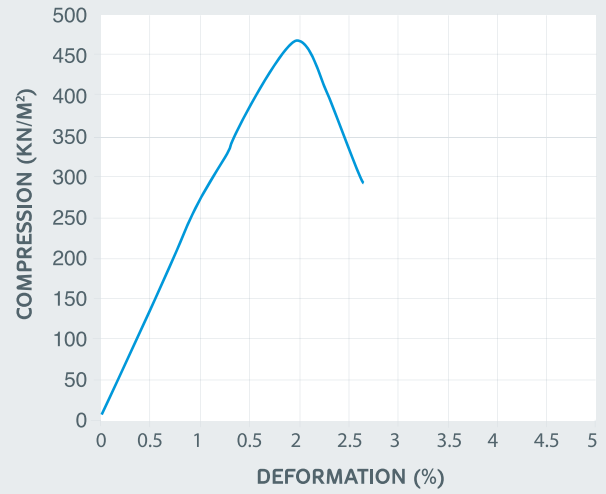
SDS GEOlight® – an efficient and economic solution for stormwater management.

SDS GEOlight® Attenuation

SDS GEOlight® has been specifically designed to form underground water storage reservoirs in stormwater management schemes. Its honeycombed structure gives it certain unique characteristics that make it ideal for this purpose:

- The high void rate (95%) of GEOlight® means that the maximum volume of water is stored in the minimum volume of storage unit.
- High compressive strength. GEOlight® is available in two strengths as standard: 200 and 400kN/m². Note: Higher compressive strengths available from 600 to 1000 kN/m². The graph on the right shows the results of a compression test, where samples of GEOlight® 400 were compressed at the rate of 1mm per minute. The deformation at 400kN/m² is about 1.6%.

RESULTS OF COMPRESSION TEST ON SDS GEOLIGHT® 400



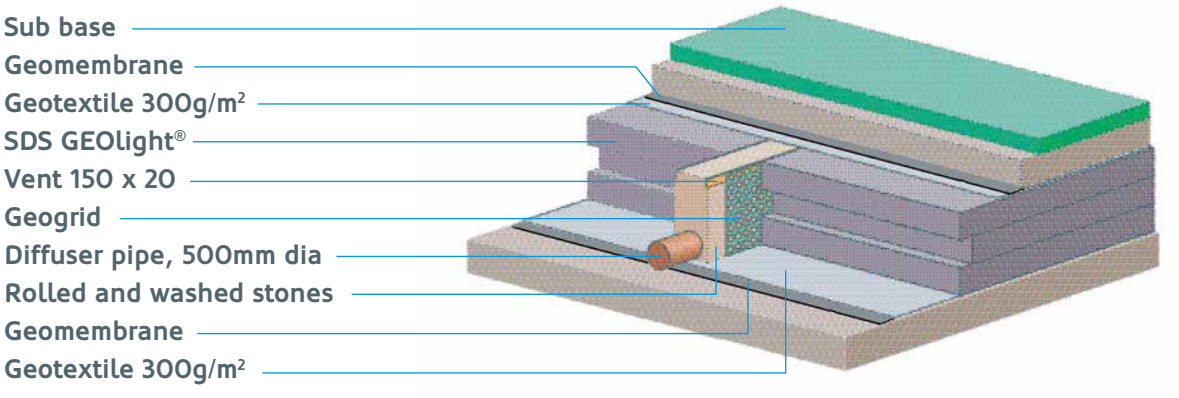
The GEOlight® Stormwater Attenuation System consists of two manholes (inspection chambers) connected by a length of perforated distribution pipe which feeds the stormwater storage reservoirs on either side formed from GEOlight®.

The distribution pipe is normally from 225mm up to 500mm diameter, generally covered in a trench that is filled with draining material such as 15/25 clean graded stone, free from fines.

The reservoirs and distribution pipe are wrapped in a waterproof membrane, such as butyl, to prevent seepage of water into the surrounding ground. The top of each GEOlight® reservoir has a vent which is connected back to the upstream manhole.

A geotextile or 10mm mesh geogrid is laid between the distribution pipe and GEOlight® to prevent the GEOlight® units being clogged by the draining materials.

SDS GEOlight® Attenuation



How does it work?

→ 1. In normal conditions, water enters a back drop manhole. This is the upstream manhole and any silt or sediment will collect in the bottom of the chamber. The water then flows along the distribution pipe into the downstream manhole. The upstream pipework is sized to cope with normal flow conditions. The distribution pipe and attenuation tank are sized to cope with storm conditions. The outflow pipe is sized to cope with the permissible discharge.

→ 2. In storm conditions the flow restrictor (vortex flow control or orifice plate) in the downstream manhole limits the amount of water flowing out of the manhole. This causes the water level in the distribution pipe to rise and water to spill into the GEOlight® reservoirs on either side. As the water level rises in the reservoirs, air is forced out of the high level vents into the upstream manhole.

→ 3. Once the storm has passed, the water level in the GEOlight®reservoirs gradually falls as water passes through the flow restrictor in the downstream manhole. The vents now allow air to return into the GEOlight® reservoirs. Gradually the reservoirs empty. The flow restrictor prevents excess surges of flood water to pass downstream and uses the storage reservoirs to store the water for the period of the storm.

Calculating the storage capacity

The storage capacity of the GEOlight® reservoirs is determined by the maximum outflow permitted, (set by the water company or Environment Agency), the impermeable area of the site and the rainfall return period – normally 1 in 30 years, but again can be dictated by the water company. A full design service, including calculations, can be supplied via a third party consultant.
Please contact SDS for details.

Other uses

The water storage ability of SDS GEOlight® lends itself to a number of other uses:

→ Water recycling combines with irrigation systems – this is increasingly popular: GEOlight® is used to retain stormwater which is then pumped as required to a network of standpipes for irrigation.

→ Drainage channels – the natural permeability of GEOlight® lends itself for use as an underground drainage channel that collects and drains away groundwater.

→ Pollution control – improved water runoff quality. When used in combination with oil / petrol separators, GEOlight® can replenish groundwater without the risk of contamination from oil, chemicals or suspended solids.

→ To form lightweight embankments (slope stabilisation) - GEOlight® can be used to quickly form the base of embankments that only weigh a fraction of earth embankments.

Stormwater Attenuation System

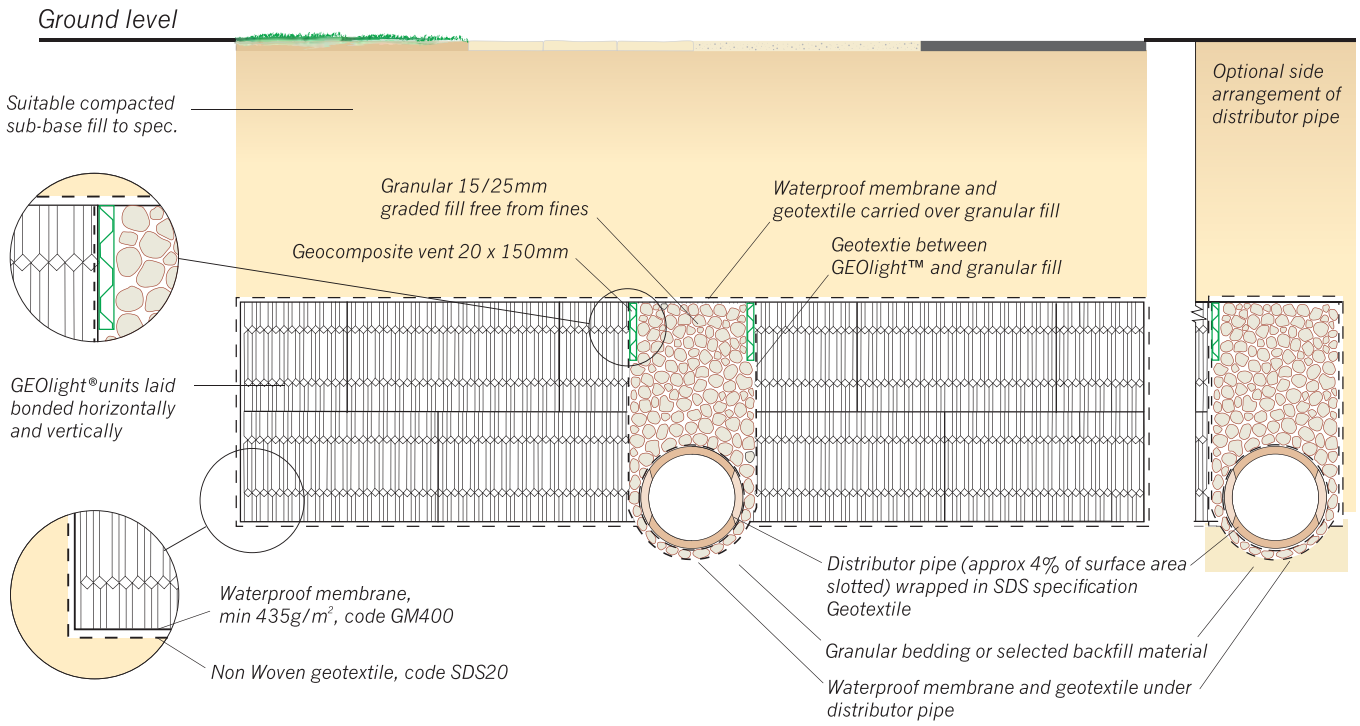
Design Details

The details on these two pages illustrate the construction of a typical SDS GEOlight® Stormwater Attenuation System. The length and height of the GEOlight® reservoirs is determined by the quantity of water to be stored.

The layout of each scheme is specifically designed to suit the characteristics and limitation of the site. Typically the distributor pipe would be arranged in the centre of the reservoir, but can alternatively be placed at the side where topographical constraints dictate.

The high performance waterproof membrane should be sealed continuously to encapsulate the GEOlight® reservoirs, distributor pipe and granular fill. It is protected by a heavyweight needle punched, non woven geotextile. To help with maintenance a high flow geotextile is placed between the granular fill and GEOlight® attenuation units to prevent silt and particles being washed into the reservoir. GEOlight® can be used under a range of surfaces e.g. grass, porous paving, standard paving block, tarmac and concrete.

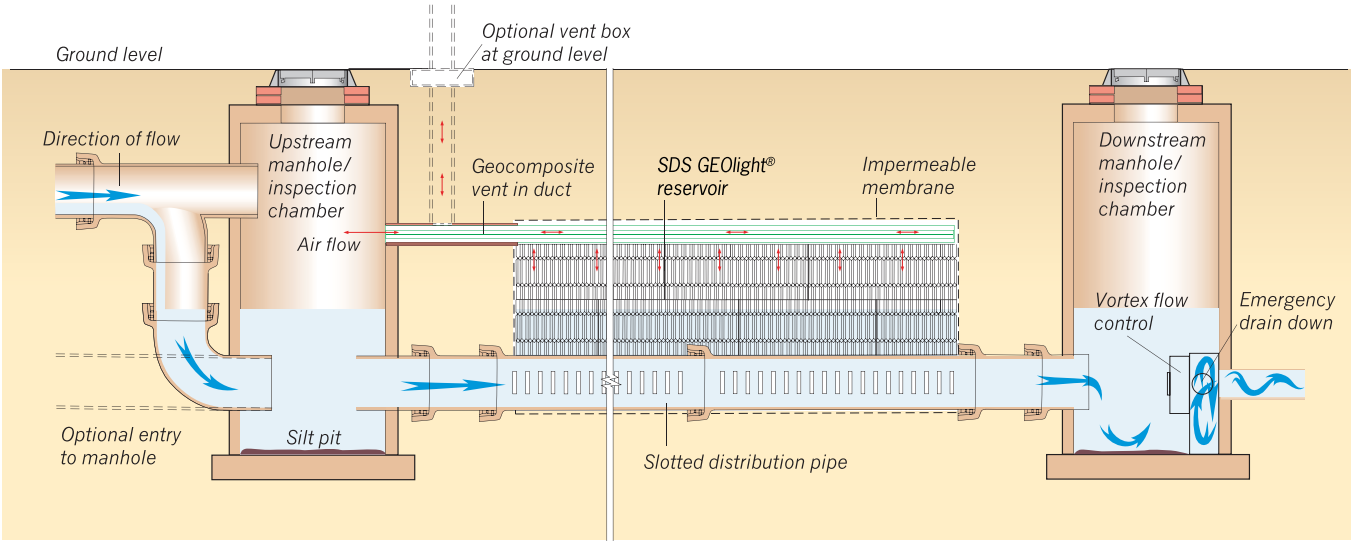
Cross Section



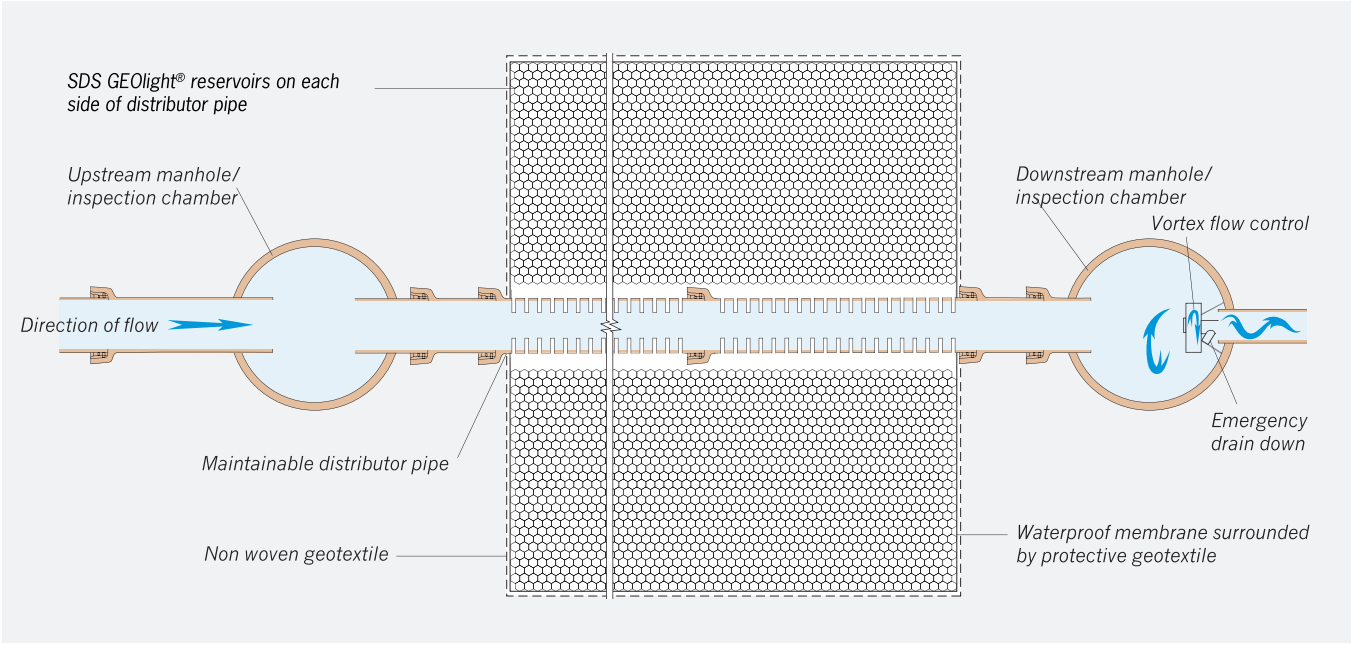
Stormwater Attenuation System

Design Details

Long Section



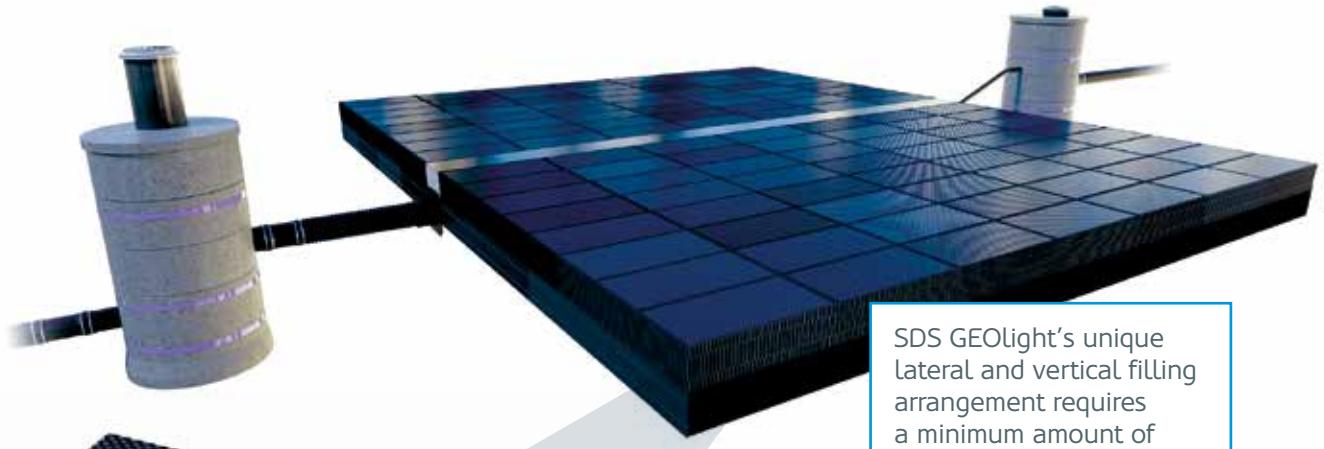
Plan



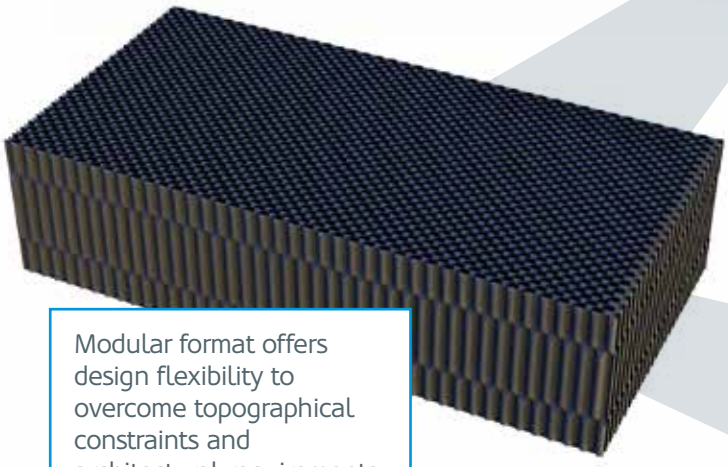
Benefits

- High compressive strength – can be located under all roads, car parks and amenity area surfaces.
- Reduced excavation costs – the very high void rate (95%) minimises the required volume of earthworks.
- Speed of installation – 1000m^3 reservoir, completed in one week.
- Light and easy to handle.
- Depth of tank invert reduced by using patented lateral supply.
- Simplified distribution pipe network, easy maintenance – dispensing with costly and complicated pipework configurations.
- Greatly reduces the risk of flooding when used as stormwater storage.
- Can also be used for water recycling and combining with irrigation systems.
- Can virtually eliminate pollution when used in combination with specialist petrol / oil separators.
- Design service available, including calculations.

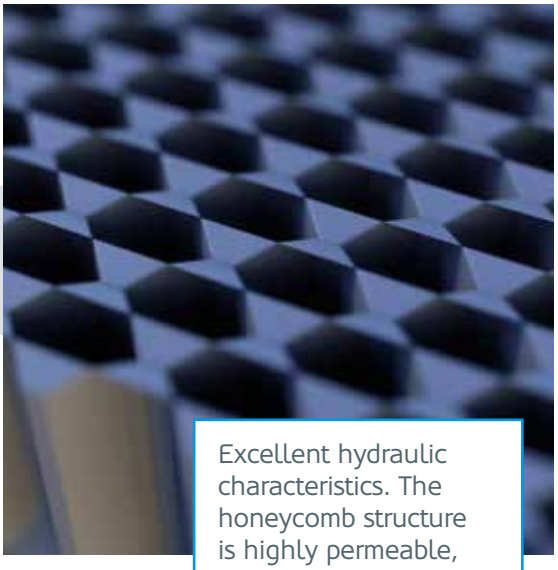
GEOlight® block



SDS GEOlight's unique lateral and vertical filling arrangement requires a minimum amount of pipework and stone.



Modular format offers design flexibility to overcome topographical constraints and architectural requirements.



Excellent hydraulic characteristics. The honeycomb structure is highly permeable, offering low resistance to water flow.

COSHH and Handling Information

1. COMPOSITION/INFORMATION ON INGREDIENTS:

Hazardous ingredients:
None as finished goods or products.

Types of materials:
Polyvinyl chloride (PVC)
MEK

2. HAZARDS IDENTIFICATION

Nature of hazard:
There are no health risks from the products during normal use. The products may contain various pigment colours and stabilisers that may be toxic. The chemicals are, however, bound within the product material and not easily extracted.

3. FIRST-AID MEASURES

Eye contact:
Plastic materials may cause physical irritation in the eyes. Wash out with large amounts of water. If irritation persists, seek medical advice.

Skin contact:
Not applicable.

Inhalation:
Not applicable.

Ingestion:
Not expected to have any toxic effects.

4. FIRE-FIGHTING MEASURES

Extinguishing media:
On small fires use any hand-held extinguisher type.
On large fires use water.

Fire and explosion hazards:
Melting plastics may flow and spread in a large fire.
Products of fire will be thick black toxic smoke.

Material characteristics:
PVC products will burn in the presence of a flame but are classed as self- extinguishing.

Protective equipment:
Wear self-contained breathing apparatus and protective clothing.

5. HANDLING AND STORAGE

Handling:
There are no hazards associated with the finished products. However, when cutting SDS GEOlight®, we recommend that the correct tools are used e.g. Handsaw or Alligator saw. When cutting, dust may be created; avoid inhaling these dusts. Take care of heat build-up within materials during cutting etc. The pallets of SDS GEOlight® units should be placed on level ground and should not be stacked on site. The maximum weight of the pallet of SDS GEOlight® units as delivered to site is 650kg (700kg on one copy), including packaging. Machines used to lift the pallet should be able to lift this weight safely. Loose individual units should not be stored more than three units high. SDS GEOlight® units are lightweight ranging from 23kg to 55kg and can be easily handled – one or two person lift.

Storage:
SDS GEOlight® units will resist the effects of UV light for up to six months; however, prolonged storage in direct sunlight should be avoided. SDS GEOlight® units should not be stored near to any fuel storage areas or any other solvents. SDS GEOlight® units are very robust and resistant to damage during normal handling; however, they should be secured in areas where impacts from vehicles or construction plant will be avoided.

Material characteristics:
PVC products will burn in the presence of a flame but are classed as self-extinguishing.

Protective equipment:
Wear self-contained breathing apparatus and protective clothing.

6. EXPOSURE CONTROLS / PERSONAL PROTECTION

Respiratory protection:
Not required under normal conditions of use. Where cutting etc. creates dust, wear a disposable half-mask to the standard FFP2S.

Hand protection:
Wear impervious strong gloves to prevent cuts to the hands while handling, cutting etc.

Eye protection:
Wear safety glasses when cutting etc.

Skin protection:
Wear overalls.

7. SITE HAZARDS

Other hazards for consideration:
Working in excavations and trenches – SDS GEOlight® may be designed with a shallow invert for infiltration (soakaway) or attenuation (storage) system. This negates the need for deep excavations or trenches, excavation near services e.g. gas, electricity or contaminated soil areas. N.B. All risk assessments should be undertaken by the main contractor for forklift, access to and working in excavations and trench support.

8. STABILITY AND REACTIVITY

Decomposition products:
Major thermal decomposition products are oxides of carbon.
Relevant differences are (in addition): PVC may produce amounts of Hydrogen Chloride.

Stability:
These materials are stable at temperatures up to normal operating limits (moulding parameters).

9. ECOLOGICAL INFORMATION

Biodegradability:
Plastic products are not readily biodegradable but are not detrimental to terrestrial wildlife.

Aquatic toxicity:
Non-toxic to marine life.

10. DISPOSAL CONSIDERATIONS

Method:
The preferred method of disposal is collection and recycling. Plastics can safely be placed with regular industrial or household wastes where recycling is not available.

11. OTHER INFORMATION

As the handling, storage, use and disposal of the product are beyond our control SDS disclaims all liability for loss, damage, injury or expense in any way connected with such activities and further makes no warranties, expressed or implied, as to the suitability of the product for any particular use.

The preferred method of disposal is collection and recycling. Plastics can safely be placed with regular industrial or household wastes where recycling is not available.

SDS
Water Infrastructure Systems

INNOVATORS IN WATER TECHNOLOGY



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Water Infrastructure Systems

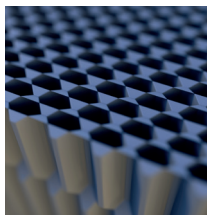
SDS GEOlight®

Stormwater Management System

Product Profile

SDS GEOlight® is an ultra lightweight honeycombed modular structure made from recycled PVC. The ready to install units are preformed to provide an underground stormwater storage facility, for the application of stormwater attenuation or infiltration.

The high void rate (>95%), high compressive strength (to 1000KN/m^2) and low resistance to water flow makes SDS GEOlight® an ideal material for cost efficient and maintainable underground water storage during storm conditions.





SDS GEOlight® Benefits

- High compressive strength – can be located under all roads, car parks and amenity area surfaces.
- Reduced excavation costs – the very high void rate (95%) minimises the required volume of earthworks.
- Speed of installation – 1000m^3 reservoir, completed in one week.
- Light and easy to handle.
- Excellent hydraulic characteristics.
- The honeycomb structure is highly permeable, offering low resistance to water flow.
- SDS GEOlight®'s unique lateral and vertical filling arrangement requires a minimum amount of pipework and stone.
- Depth of tank invert reduced by using patented lateral supply.
- Simplified distribution pipe network, easy maintenance – dispensing with costly and complicated pipework configurations.
- Modular format offers design flexibility to overcome topographical contraints and architectural requirements.
- Greatly reduces the risk of flooding when used as stormwater storage.
- Can also be used for water recycling and combining with irrigation systems.
- Can virtually eliminate pollution when used in combination with specialist separation and filtration technology such as SDS Aqua-Swirl™ and SDS Aqua-Filter™.
- Design service available, including calculations.

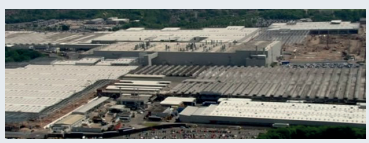
APPLICATIONS



RETAIL



INFRASTRUCTURE



INDUSTRIAL



RESIDENTIAL



COMMERCIAL



PUBLIC SECTOR

SDS Ltd, Clearwater House, Castlemills, Biddisham, Somerset, BS26 2RE

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SDS GEOlight® 400	SDS GEOlight® 600	SDS GEOlight® 800
APPLICATIONS		
Stormwater Management		
Attenuation / Infiltration		
Bacterial filter-bed for biological treatment		
Hydrocarbon Separation		
Filtration and Separation Units		
SPECIFICATIONS		
Material	Recycled Rigid PVC	
Colour	Dark grey to black	
Standard length of a block	2000 mm	2000 mm	2000 mm
Standard width of a block	500 mm	500 mm	500 mm
Standard height of a block*	750 mm	750 mm	750 mm
	*Other block sizes available on request		
Void Ratio	> 95%	> 95%	> 95%
Compressive Strength	420 kN/m²	610 kN/m²	800 kN/m²
ADVANTAGES		
Highly cost effective		
Reduced excavation costs		
High void capacity		
Good UV resistance		
Good hydrocarbon resistance		



GEO DS/1021

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