Client: Lidl Ireland GmbH

Project: PROPOSED DEVELOPMENT OF NEW LIDL STORE AT MAIN STREET UPPER, NEWCASTLE, DUBLIN, CO. DUBLIN.

Document Title: SERVICES DESIGN INFORMATION

PROJECT NO: 22058

Date: JULY 2022

REV. 02

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Document Title Sheet:

Client:	**Lidl Ireland GmbH, Main Road, Tallaght, Dublin 24, D24 PW6K & Lidl RDC (Regional Distribution Centre), Robinstown (Levinge), Mullingar, Co. Westmeath, N91 P921.**
Project:	Permission for development at Main Street Upper, Newcastle, Co. Dublin, principally consisting of the construction of a Discount Foodstore Supermarket with ancillary off-licence sales. The proposed development comprises: 1) The construction of a single storey Discount Foodstore Supermarket with ancillary off-licence use (with mono-pitch roof and overall building height of c. 6.74 metres) measuring c. 2,207 sqm gross floor space with a net retail sales area of c. 1,410 sqm; 2) Construction of a vehicular access point to Main Street Upper and associated works to carriageway and including partial removal of boundary wall / façade, modification of existing footpaths / public realm and associated and ancillary works including proposed entrance plaza area; 3) Demolition of part of an existing rear / southern single storey residential extension (and related alterations to remaining structure) of 'Kelly Estates' building. The original 'Kelly Estates' building (a protected structure - Eircode: D22 Y9H7) will not be modified; 4) Demolition of detached single storey accommodation / residential structure and ancillary wall / fence demolitions to rear of existing 'Kelly Estates' building; 5) Demolition of existing single storey (stable) building along Main Street and construction of single storey retail / café unit on an extended footprint measuring c. 118 sqm and associated alterations to existing Main Street boundary façade; 6) Renovation and change of use of existing (vacant) two storey vernacular townhouse structure to Main Street, and single storey extension to rear, for retail / commercial use (single level throughout) totalling c. 62 sqm; 7) Repair and renewal of existing Western and Eastern 'burgage plot' tree and hedgerow site boundaries; and, 8) Provision of associated car parking, cycle parking (and staff cycle parking shelter), pedestrian access routes and (ramp and stair) structures (to / through the southern and western site boundaries to facilitate connections to potential future development), free standing and building mounted signage, free standing trolley bay cover / enclosure, refrigeration and air conditioning plant and equipment, roof mounted solar panels, public lighting, hard and soft landscaping, boundary treatments and divisions, retaining wall structures, drainage infrastructure and connections to services / utilities, electricity Substation and all other associated and ancillary development and works above and below ground level including within the curtilage of a protected structure.
Project. No.	22058

Disclaimer:

Document Control Sheet:

PROJECT No:	22058				
PROJECT NAME:	Proposed Replacement Lidl Store at Main Street Upper, Newcastle, Dublin, Co. Dublin				
DOCUMENT REF:	P:\2022\22058 - Lidl Ireland - Newcastle, Dublin, Services Design\Design				
REVISION	**DATE**	**DESCRIPTION**	Preliminary Construction & Demolition Waste Management Plan		
01	11/07/2021		PREPARED	CHECKED	ISSUED
		INITIALS:	SG	MM	TD
		DATE:	11/07/2022	11/07/2022	11/07/2022
02	14/07/2021		PREPARED	CHECKED	ISSUED
		INITIALS:	SG	MM	TD
		DATE:	14/07/2022	14/07/2022	14/07/2022
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Contents

1. INSTRUCTION

In conjunction with the appointed multi-disciplinary design team, SDS (Structural Design Solutions) Ltd., Design Engineers, have been requested by Lidl Ireland GmbH, Main Street Upper, Newcastle, Co. Dublin, to prepare the "Services Design Report" for the proposed development on the site of the new Lidl Discount Foodstore Supermarket at Main Street Upper, Newcastle, Co. Dublin.

2. PROJECT DETAILS

Permission for development at Main Street Upper, Newcastle, Co. Dublin, principally consisting of the construction of a Discount Foodstore Supermarket with ancillary off-licence sales. The proposed development comprises:

1) The construction of a single storey Discount Foodstore Supermarket with ancillary off-licence use (with mono-pitch roof and overall building height of c. 6.74 metres) measuring c. 2,207 sqm gross floor space with a net retail sales area of c. 1,410 sqm;

2) Construction of a vehicular access point to Main Street Upper and associated works to carriageway and including partial removal of boundary wall / façade, modification of existing footpaths / public realm and associated and ancillary works including proposed entrance plaza area;

3) Demolition of part of an existing rear / southern single storey residential extension (and related alterations to remaining structure) of 'Kelly Estates' building. The original 'Kelly Estates' building (a protected structure - Eircode: D22 Y9H7) will not be modified;

4) Demolition of detached single storey accommodation / residential structure and ancillary wall / fence demolitions to rear of existing 'Kelly Estates' building;

5) Demolition of existing single storey (stable) building along Main Street and construction of single storey retail / café unit on an extended footprint measuring c. 118 sqm and associated alterations to existing Main Street boundary façade;

6) Renovation and change of use of existing (vacant) two storey vernacular townhouse structure to Main Street, and single storey extension to rear, for retail / commercial use (single level throughout) totalling c. 62 sqm;

7) Repair and renewal of existing Western and Eastern 'burgage plot' tree and hedgerow site boundaries; and,

8) Provision of associated car parking, cycle parking (and staff cycle parking shelter), pedestrian access routes and (ramp and stair) structures (to / through the southern and western site boundaries to facilitate connections to potential future development), free standing and building mounted signage, free standing trolley bay cover / enclosure, refrigeration and air conditioning plant and equipment, roof mounted solar panels, public lighting, hard and soft landscaping, boundary treatments and divisions, retaining wall structures, drainage infrastructure and connections to services / utilities, electricity Substation and all other associated and ancillary development and works above and below ground level including within the curtilage of a protected structure

2.1 Location, Size and Scale of the Development

The application site is 1.04 hectares and is located on the site of the new Lidl Discount Foodstore at Main Street Upper, Newcastle, Dublin - (see Figures 1,2 & 3 below). The site itself is bordered along the northern side with Kelly Estates, along the eastern side with Landmark Architectural Salvage and Granite Products.

The existing site currently comprises a derelict single storey building, which is to be demolished, with a new single-storey Lidl store to be constructed on these grounds. The store is to have a mono-pitch roof and an overall floor space of 2,207m^2.

Figure 1 – Site Location *(image courtesy of Google Maps)*

Figure 2 – Site Location in Newcastle, Co. Dublin

Figure 3 – Aerial Image of the proposed development site *(image courtesy of Google Maps)*

3. LOCAL AUTHORITY

South Dublin County Council will be provided with the relevant drawings and the associated design calculations for the services proposed for this development for consideration.

4. SURFACE WATER

Existing Surface Water System

There is no existing surface water system serving the proposed Lidl site. The only hydrological feature in the area is existing drainage ditch running from south to north along the western boundary. This ditch is culverted by an existing 300mm diameter pipe that is collecting runoff from the existing spring along the western boundary and the ditch to the south, discharging to the drain to the north west of the site along Main Street Upper. The spring and culvert will be retained and it proposed to divert the existing drainage ditch to south west boundary to enable the construction of the new pedestrian access. The existing 300mm culvert will be re-routed thorough the site and a headwall will be installed to minimise flood risk. The existing spring and its connection to the culvert will be maintained within the proposed development.

Proposed Surface Water Collection System-Overview

Our proposal for this development is to provide a new surface water collection network, collecting surface water run-off through roof gutters/downpipes and a network of permeable tarmac, rainwater gardens and gullies located around the site to the design levels proposed for the finished car park layout. The surface water is proposed to be collected in a new surface water pipework network - see drawing no. 22058-1025 (in Appendix B) for details of the proposed collection network). All surface water collected from areas accessible to vehicle traffic will be cleansed by an inline Bypass Fuel/Oil Separator. All surface water will enter either the attenuation tank or clean stone subbase voids all to be located within the site. The outflow from the site will be limited by a Hydrobrake. See below for a more detailed description of the attenuation systems and outflow control from this site. The surface water collection network will be constructed in accordance with the following:

- BS EN 752:2008 – Drain & Sewer Systems Outside Buildings
- Building Regulations - TGD Part H – Drainage and Waste Water Disposal

Outflow from Site

In the Flood Risk Assessment carried out by JBA Consulting the associated groundwater vulnerability is classified as 'Extreme' for the proposed site which indicates that an extreme risk to the groundwater under the site and a bedrock depth of between 0-3 m. The groundwater vulnerability for the additional land to the south is classified as 'High' which indicates that a high risk to the groundwater under the site and a bedrock depth of between 3-5m These classifications are based on relevant hydrogeological characteristics of the underlying geological materials. This make infiltration unviable for the surface water treatment of the proposed development and therefore controlled discharge and storage is proposed.

The outflow from the site will be limited to the pre-development greenfield runoff rate of 2.00 l/s/ha. This practice is in accordance GDSDS requirements and SDCC-suds-explanatory-design-and-evaluation-guide. As the site area is 1.04 ha the outflow from the site will be restricted to 2.08 l/s. A Hydrobrake Optimum by Hydro International (or similar equivalent) will be provided within the last manhole within the site to limit the outflow as above.

The discharge from this proposed development is proposed via the existing drainage ditch currently servicing the existing 0.6m diameter culvert to the north west corner of the site. A new headwall will be constructed at the proposed outlet to the existing drainage ditch.

Attenuation Tank

The attenuation tank and permeable surfacing subbase have been designed to provide storage for the surface water generated during a 1 in 100 year rainfall. The rainfall generated by a 1 in 100 year rainfall will be increased by 20% for the predicted climate changes due to global warming. The required storage volume of the attenuation has been calculated as 618m^3. This will be divided between the permeable surface subbase 159m^3 and geocellular storge 459m^3. See Appendix 1 for surface water design calculations.

Suds Elements Proposed

In accordance with the SDCC SuDS Explanatory, Design and Evaluation guide the following are proposed:

- Rain Garden

  The proposed rain gardens shall promote biodiversity.

- Permeable Surfacing

  The proposed permeable surfacing and clean stone subbase will assist with water quality

- Attenuation Storage

  The proposed attenuation storage shall assist with water quantity.

5. FOUL EFFLUENT

Existing Foul Sewer System

The existing foul sewer service is to be removed and a new foul sewer pipeline is proposed to be provided to service the facilities in the proposed new store. There is an existing public foul sewer located in the access road to the store that the new foul sewer will connect to again.

Proposed Foul Sewer System

A new foul sewer system will be constructed within the site in accordance with the following:

- BS EN 752:2008 – Drain & Sewer Systems Outside Buildings
- Building Regulations - TGD Part H – Drainage and Waste Water Disposal

The effluent generated by the proposed building is outlined in the following table:

Building	Type	Loading[1] (l day)	No.	Avg. Flow (l/s)[2]	Peak Flow[4] (l/s)
Cafe	Staff	60	3	0.0042	0.0252
	Visitor	15	1003	0.0347	0.2082
Retail Unit	Staff	60	3	0.0042	0.0252
	Visitor	15	503	0.0174	0.1044
Licensed Discount Food Store	Staff	60	8[5]	0.0111	0.067
	Visitor	15	250[3]	0.0868	0.521
TOTAL FLOW				**0.1584**	**0.951**

Table 3: Recommended Wastewater Loading Rate

[1] Based on EPA's Treatment Systems for Small Communities, Business, Leisure Centres and Hotels –

[2] Food Store and Retail Units are open 12 hours day, so average flow is spread over 12 hours.

[3] Based on 25% of Visitors per day. Store/Retail Unit open 12 hours day.

[4] Peak flow = 6 times average flow.

[5] Number of staff on duty at any one time. Total staff to be 20-25.

The overall daily wastewater loading is 6843 litres/day or 6.843m3 day. The proposed foul sewer system will be connected to an existing foul sewer network within the site. A new connection will be made to the existing public foul sewer along the adjacent public road along the northern boundary of the application site.

6. WATERMAINS

The proposed development will be connected to the existing public watermain along the adjacent public road along the northern boundary of the application site. Allowing for a drinking water requirement of 2 l/day/person and the wastewater daily loading of 6.843m3 day, the proposed development will require in the order of 6.903m3 of potable water per day. The proposed connection for the new store will be made in accordance with Irish Water Standard Details for Non-Mechanical Meter Chamber (40-250mm diameter): Ref. STD-W-26-Rev 03. Please refer to drawing 22058-1025 for the location and details of the proposed new watermains network and fire hydrants proposed for this new site layout.

7. EXISTING SERVICES

All existing foul sewer, surface water pipeline, gullies and watermains have been identified on site and are shown on the topographic survey. All existing services will be removed from the site and the proposed new systems will be provided.

8. SUMMARY CONCLUSIONS

Surface Water: The proposed surface water network on site will be served by a bypass fuel/oil separator, permeable surfacing of the carpark spaces to northern half of the site, stone subbase with 30% void ratio (non-infiltration) and an attenuation tank. The provision of an attenuation tank and subbase storage with Hydrobrake flow control device will restrict the outflow from the site to the equivalent of 2.0 l/s/ha.

Foul Water: The wastewater loading from the site will be 6.843m^3 day, with a peak flow of 0.951 l/s.

Watermains: The volume of water required by the proposed development will be 6.903m^3 day.

9. APPENDIX A – SURFACE WATER ATTENUATION DESIGN.

Summary of Results for 100 year Return Period (+20%)

Half Drain Time : 2202 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	7.737	0.237	0.0	2.1	2.1	146.4	O K
30 min Summer	7.824	0.324	0.0	2.1	2.1	199.9	O K
60 min Summer	7.913	0.413	0.0	2.1	2.1	255.1	O K
120 min Summer	8.011	0.511	0.0	2.1	2.1	315.3	O K
180 min Summer	8.071	0.571	0.0	2.1	2.1	352.5	O K
240 min Summer	8.116	0.616	0.0	2.1	2.1	380.3	O K
360 min Summer	8.180	0.680	0.0	2.1	2.1	419.7	O K
480 min Summer	8.224	0.724	0.0	2.1	2.1	447.1	O K
600 min Summer	8.257	0.757	0.0	2.1	2.1	467.4	O K
720 min Summer	8.282	0.782	0.0	2.1	2.1	483.2	O K
960 min Summer	8.319	0.819	0.0	2.1	2.1	505.5	O K
1440 min Summer	8.357	0.857	0.0	2.1	2.1	528.9	O K
2160 min Summer	8.371	0.871	0.0	2.1	2.1	537.6	O K
2880 min Summer	8.369	0.869	0.0	2.1	2.1	536.6	O K
15 min Winter	7.766	0.266	0.0	2.1	2.1	164.2	O K
30 min Winter	7.863	0.363	0.0	2.1	2.1	224.3	O K
60 min Winter	7.964	0.464	0.0	2.1	2.1	286.4	O K
120 min Winter	8.074	0.574	0.0	2.1	2.1	354.5	O K
180 min Winter	8.143	0.643	0.0	2.1	2.1	397.1	O K
240 min Winter	8.194	0.694	0.0	2.1	2.1	428.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	89.992	0.0	128.5	27
30 min Summer	61.591	0.0	163.1	41
60 min Summer	39.558	0.0	249.3	70
120 min Summer	24.745	0.0	305.6	130
180 min Summer	18.646	0.0	330.3	190
240 min Summer	15.231	0.0	333.4	250
360 min Summer	11.417	0.0	325.5	368
480 min Summer	9.294	0.0	317.8	488
600 min Summer	7.918	0.0	311.7	608
720 min Summer	6.945	0.0	306.8	726
960 min Summer	5.644	0.0	299.9	966
1440 min Summer	4.212	0.0	294.5	1442
2160 min Summer	3.143	0.0	624.6	2060
2880 min Summer	2.551	0.0	605.3	2400
15 min Winter	89.992	0.0	142.0	26
30 min Winter	61.591	0.0	170.6	41
60 min Winter	39.558	0.0	277.6	70
120 min Winter	24.745	0.0	329.8	128
180 min Winter	18.646	0.0	333.6	188
240 min Winter	15.231	0.0	328.5	246

Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
360 min Winter	8.266	0.766	0.0	2.1	2.1	473.2	O K
480 min Winter	8.317	0.817	0.0	2.1	2.1	504.8	O K
600 min Winter	8.356	0.856	0.0	2.1	2.1	528.6	O K
720 min Winter	8.386	0.886	0.0	2.1	2.1	547.2	O K
960 min Winter	8.430	0.930	0.0	2.1	2.1	574.5	O K
1440 min Winter	8.481	0.981	0.0	2.1	2.1	605.5	O K
2160 min Winter	9.319	1.819	0.0	2.8	2.8	618.5	O K
2880 min Winter	8.763	1.263	0.0	2.3	2.3	618.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
360 min Winter	11.417	0.0	319.3	364
480 min Winter	9.294	0.0	313.2	480
600 min Winter	7.918	0.0	309.4	598
720 min Winter	6.945	0.0	307.1	714
960 min Winter	5.644	0.0	306.4	946
1440 min Winter	4.212	0.0	311.0	1402
2160 min Winter	3.143	0.0	637.8	1988
2880 min Winter	2.551	0.0	622.1	2560

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	16.800	Shortest Storm (mins)	15
Ratio R	0.292	Longest Storm (mins)	2880
Summer Storms	Yes	Climate Change %	+20

Time Area Diagram

Total Area (ha) 0.880

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	0.293	4	8	0.293	8	12	0.293

Model Details

Storage is Online Cover Level (m) 10.000

Cellular Storage Structure

Invert Level (m) 7.500 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	650.0	0.0	1.001	0.0	0.0
1.000	650.0	0.0			

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0069-2100-1000-2100
Design Head (m)	1.000
Design Flow (l/s)	2.1
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	69
Invert Level (m)	7.500
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

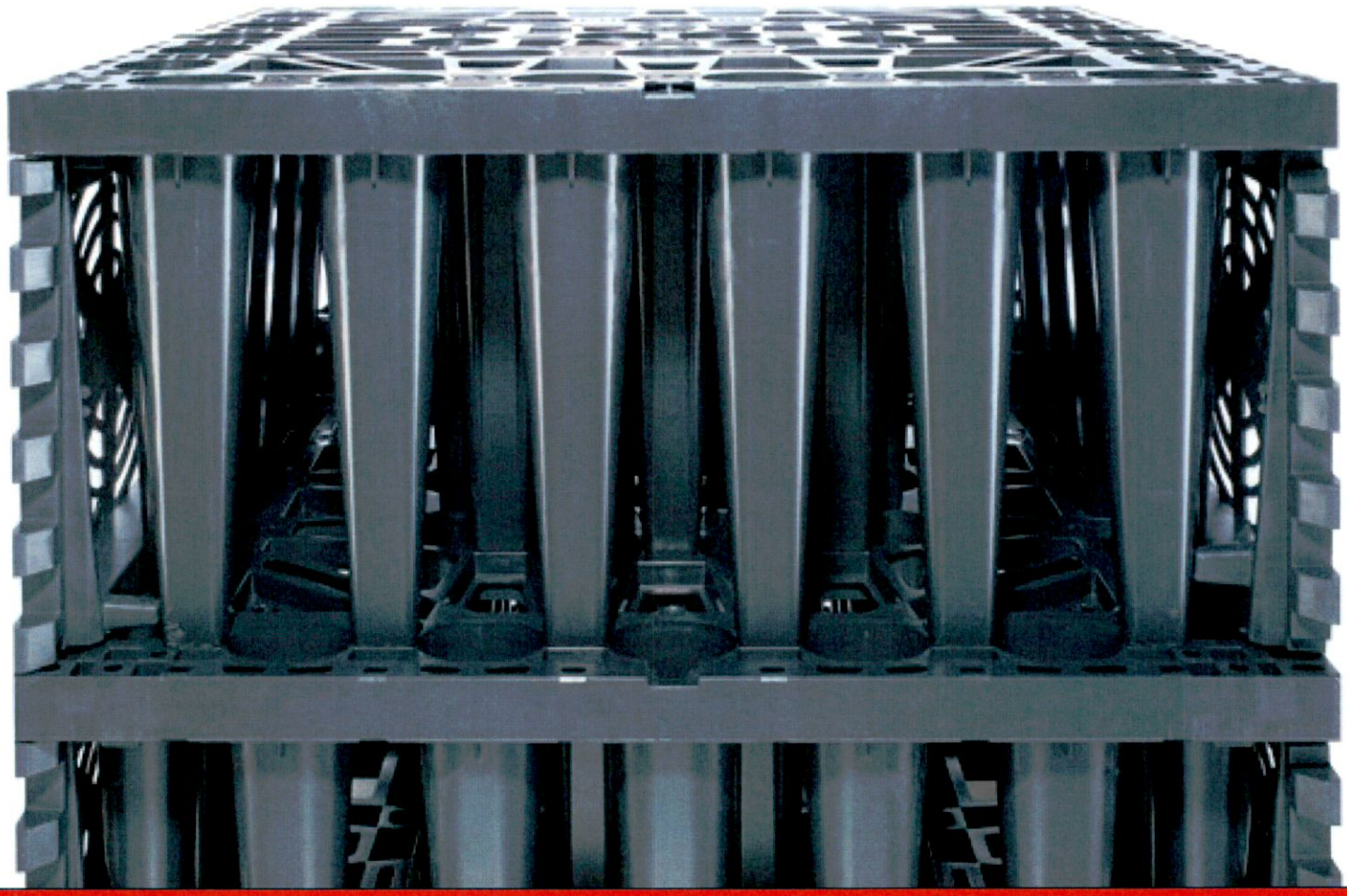
Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	2.1
Flush-Flo™	0.302	2.1
Kick-Flo®	0.614	1.7
Mean Flow over Head Range	-	1.8

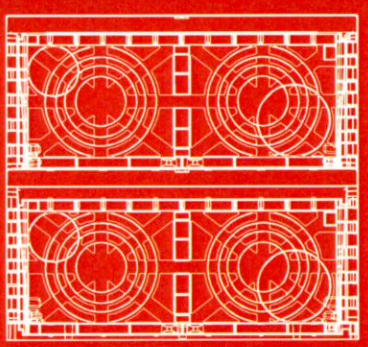
The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.7	1.200	2.3	3.000	3.5	7.000	5.2
0.200	2.0	1.400	2.4	3.500	3.7	7.500	5.3
0.300	2.1	1.600	2.6	4.000	4.0	8.000	5.5
0.400	2.1	1.800	2.7	4.500	4.2	8.500	5.7
0.500	2.0	2.000	2.9	5.000	4.4	9.000	5.8
0.600	1.7	2.200	3.0	5.500	4.6	9.500	6.0
0.800	1.9	2.400	3.1	6.000	4.8		
1.000	2.1	2.600	3.3	6.500	5.0		

10. APPENDIX B – GRAFF ECO BLOCK SYSTEM AND PERMEABLE TARMAC

EcoBloc System
Stormwater management





EN Salesfolder EcoBloc System
950431 – 35-2

Production site in Dachstein (France)

Production site in Teningen (Germany) near Freiburg

GRAF – Setting standards in quality

Otto Graf GmbH has been supplying high-quality plastic products to its customers for 50 years. In 1974, GRAF developed its first pioneering range of rainwater harvesting products. Today we are market leader in numerous countries for Rainwater Harvesting Systems.

High Quality Manufacturing

Graf continuously invests in the expansion of its headquarters in Teningen, near Freiburg (Breisgau). The facility has now an approximate area of 155,000 m² and is one of the most modern production facilities for plastic products in the world.
Our choice of Germany for the new production site was easy. On the one hand, we feel an obligation to the site because of our history. On the other, we would like to offer our customers products of the highest quality.

Where quality comes first

To ensure consistent high product quality, you need optimised production processes and outstanding quality management. Every individual tank at the new production site in Teningen is checked for dimensional accuracy, wall thickness and weight.
All production parameters, e.g. material composition, machine settings and the staff involved in the production process, are documented for each individual product.

Our goal: your satisfaction

More than 100,000 satisfied customers already benefit from the advantages of GRAF products.

Manufacturing certified according to ISO 9001

Manufacturing certified according to ISO 50001

Internationally proven: GRAF infiltration technology

Warehouse, Kent (UK)

Housing development, Singapur (SG)

Energy supplier, Warwick (UK)

Daycare centre, Lörrach (DE)

University of Agriculture, Prague (CZ)

Industrial building, Tumeltsham (AT)

EcoBloc
Stormwater management system

Various applications

- ✓ Rainwater infiltration
- ✓ Stormwater attenuation
- ✓ Rainwater harvesting

100 % RECYCLING

CO_2

No tools required

Fully integrated shaft

The Vario 800 flex shaft system (page 12) can be directly installed in an EcoBloc infiltration or infiltration/attenuation system. The connection surfaces of the inspection channels in the Vario 800 flex shaft system are accurately matched to the EcoBloc system.

load ★★★★★
logistics ★★★
EcoBloc Inspect flex

load ★★
logistics ★★★★★
EcoBloc light

load ★★★★★
logistics ★★★★★
EcoBloc maxx

Optimum connection positions

Optimum connection positions ensure full use of infiltration ditch volume.

Lorry-bearing up to 60 tons

The GRAF EcoBloc Inspect flex has a heavy-duty lorry-bearing capacity of 60 tons with an 800 mm (2' 7.5") earth covering.

High pressure jetting possible

GRAF EcoBloc Inspect flex can easily resist high pressure jetting.

Easy to inspect

The standard inspection channel allows the entire infiltration/attenuation system to be monitored effectively. The EcoBloc Inspect flex allows access by commercially available inspection cameras. This has been confirmed by several independent testing authorities.

High storage volume

GRAF infiltration modules have three times the storage volume of a standard gravel infiltration ditch. One module therefore takes the place of around 1300 kg (1,4 tons) of gravel or a 50 m (164') drainage pipe. Since you don't have to excavate so much soil and enjoy great value for money compared with a standard gravel infiltration ditch, the GRAF modules save you hard-earned cash!

Service life of over 50 years

A durable product design ensures sustainability. The GRAF EcoBloc system and the Vario 800 flex shaft system is designed for a service life of over 50 years.

Easy to install

The modules are fitted simply, at speed and in various ways. They can be installed without heavy machinery – one EcoBloc Inspect flex module weighs just 8 kg (17.6 lbs), even only 7 kg (15.4 lbs) for one EcoBloc light

Up to 97 % reservoir volume

The GRAF EcoBloc light has a gross volume of 225 litres (59.4 US gal.) and a reservoir volume of 219 litres (57.9 US gal.). With a reservoir volume in excess up to 97 %, it is a market-leading product. The EcoBloc variants maxx and Inspect flex still offer a reservoir coefficient of 96 % despite their high load-bearing capacity.

Installation depth of up to 5 metres (16' 4.8")

Even under very heavy loads, GRAF EcoBloc Inspect flex modules can be installed at a depth of up to 5 metres (16' 4.8"). This means that up to 14 layers are possible. Please consult GRAF when the installation depth is greater than 5 metres.

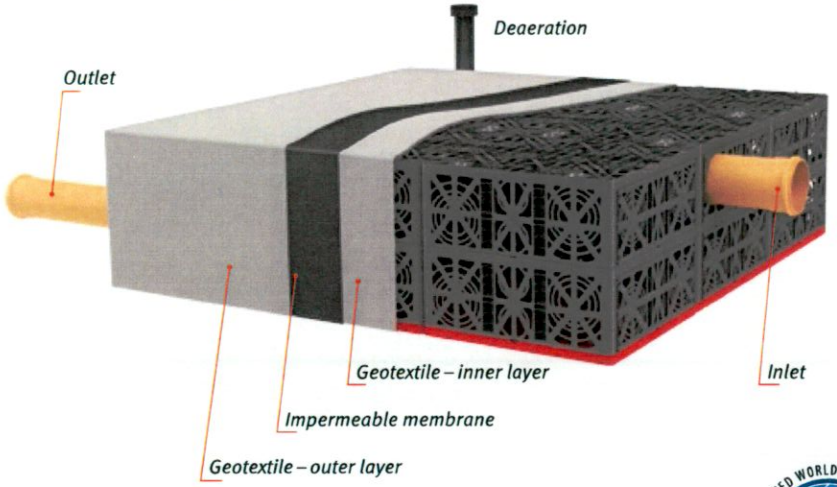
GRAF EcoBloc Configurator

Please ask your GRAF sales consultant for your login account information to the GRAF EcoBloc Configurator.

Application and logistics

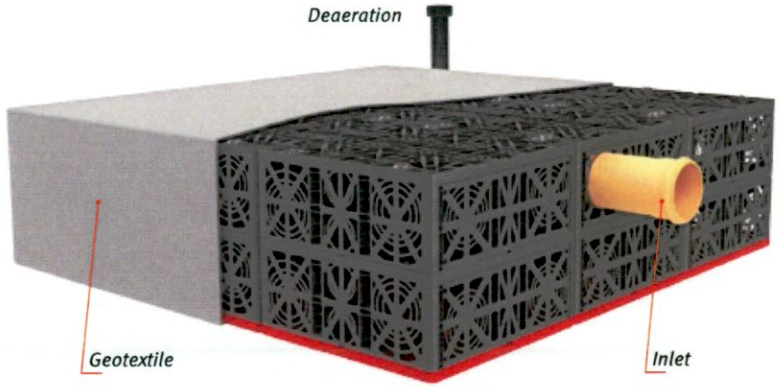
Stormwater attenuation

The controlled discharge of rainwater is increasingly important during heavy rain. The GRAF EcoBloc modules can be also surrounded by an impermeable membrane, which prevents water from escaping from the system unchecked. Restricted outflow allows the water to be discharged into the sewage system in a controlled manner.



Rainwater infiltration

Local infiltration of rainwater is gaining in importance. As we cover over more and more ground with concrete, we are interrupting the natural water cycle. The GRAF EcoBloc modules combine environmental management of rainwater with the opportunity to protect against flooding. It stores rainwater and gradually releases it back into groundwater reserves.



1. Stackable

To save space during transport, the EcoBloc maxx and EcoBloc light modules are stacked into each other. This minimizes transport costs, storage space in stock and CO_2 emissions.

2. Easy installation

The EcoBloc base plate forms the foundations of each EcoBloc system. Up to 14 EcoBloc modules can be fitted on one base plate.

3. Ready

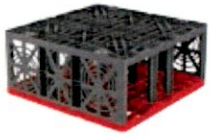
The side faces are sealed with EcoBloc end plates. The EcoBloc system can be adapted to match individual requirements.

Eco-friendly product – green logistics

One lorry can transport up to 2700 EcoBloc light units. That corresponds to a volume of 610 m³ (161,145 US gal.). This reduces carbon emissions during transport by 85 %!

The system at a glance

EcoBloc Inspect flex



- Lorry-bearing 60 tons/HS-25
- 150 m³ (39,625 US gal.)/Truck
- Inspectable
- High pressure jetting possible

Load ★★★★★
Logistics ★★★

DIBt Z-42.1-526 Certification

EcoBloc Inspect flex
DN 100 (4")/150 (6")/200 (8") connecting surfaces

Volume	Length	Width	Height	Weight	Colour	Order no.
205 l (54.2 US gal.)	800 mm (2' 7.5")	800 mm (2' 7.5")	320 mm (12.6")	8 kg (17.6 lbs)	grey	402005

Webcode G4107

EcoBloc Inspect flex base plate
Forms the foundation of the EcoBloc Inspect flex system

Volume	Length	Width	Height	Weight	Colour	Order no.
25 l (6.6 US gal.)	800 mm (2' 7.5")	800 mm (2' 7.5")	40 mm (1.6")	4 kg (8.8 lbs)	grey	402006

EcoBloc Inspect flex end plates
The front ends of an EcoBloc Inspect flex system are sealed by end plates with DN 100 (4")/150 (6")/200 (8") contact surfaces

Item	Colour	Order no.
EcoBloc Inspect flex end plates (Set 2 units)	grey	402002

EcoBloc maxx

- Lorry-bearing 40 tons/HS-20
- 410 m³ (108,310 US gal.)/Truck

Load ★★★★
Logistics ★★★★

EcoBloc maxx
Connecting surfaces on EcoBloc maxx end plates

Volume	Length	Width	Height	Weight	Colour	Order no.
225 l (59.4 US gal.)	800 mm (2' 7.5")	800 mm (2' 7.5")	350 mm (13.8")	9 kg (19.8 lbs)	grey	402200

Webcode G4108

EcoBloc maxx base plate
Forms the foundation of the EcoBloc maxx system

Volume	Length	Width	Height	Weight	Colour	Order no.
25 l (6.6 US gal.)	800 mm (2' 7.5")	800 mm (2' 7.5")	40 mm (1.6")	4 kg (8.8 lbs)	grey	402201

EcoBloc maxx end plates
The outside surface of an EcoBloc maxx system is sealed by end plates with contact surfaces DN 100 (4") / 150 (6") / 200 (8") / 250 (10")

Item	Colour	Order no.
EcoBloc maxx end plates (Set 2 units)	grey	402203

EcoBloc light

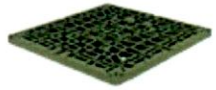
- Lorry-bearing 12 tons
- 610 m³ (161,145 US gal.)/Truck

Load ★★
Logistics ★★★★★

EcoBloc light
Connecting surfaces on EcoBloc light end plates

Volume	Length	Width	Height	Weight	Colour	Order no.
225 l (59.4 US gal.)	800 mm (2' 7.5")	800 mm (2' 7.5")	350 mm (13.8")	7 kg (15.4 lbs)	green	402300

Webcode G4109



EcoBloc light base plate
Forms the foundation of the EcoBloc light system

Volume	Length	Width	Height	Weight	Colour	Order no.
25 l (6.6 US gal.)	800 mm (2' 7.5")	800 mm (2' 7.5")	40 mm (1.6")	4 kg (8.8 lbs)	green	402301

EcoBloc light end plates
The outside surface of an EcoBloc light system is sealed by end plates with contact surfaces DN 100 (4") / 150 (6") / 200 (8") / 250 (10")

Item	Colour	Order no.
EcoBloc light end plates (Set 2 units)	green	402303

EcoBloc System accessories

EcoBloc connectors
For horizontal connection

Order no. 402015	Set 10 units
Order no. 402018	Set 25 units
Order no. 402020	Set 50 units
Order no. 402025	Set 200 units

Deaeration end
DN 100 (4")
Order no. 369017

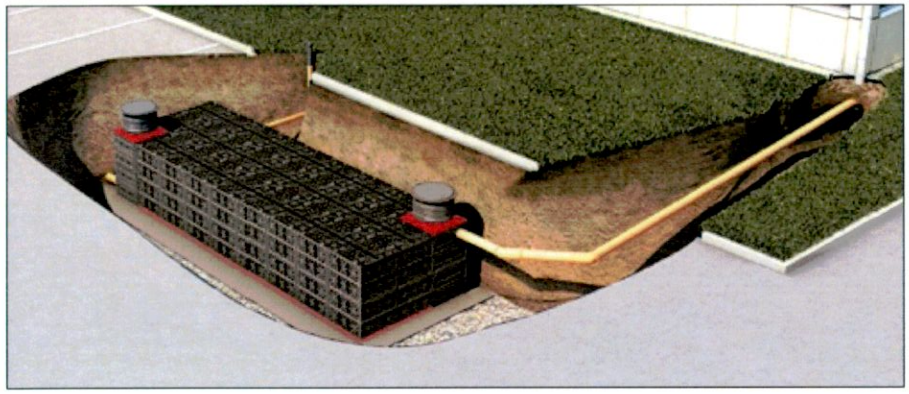
Adaptor plate

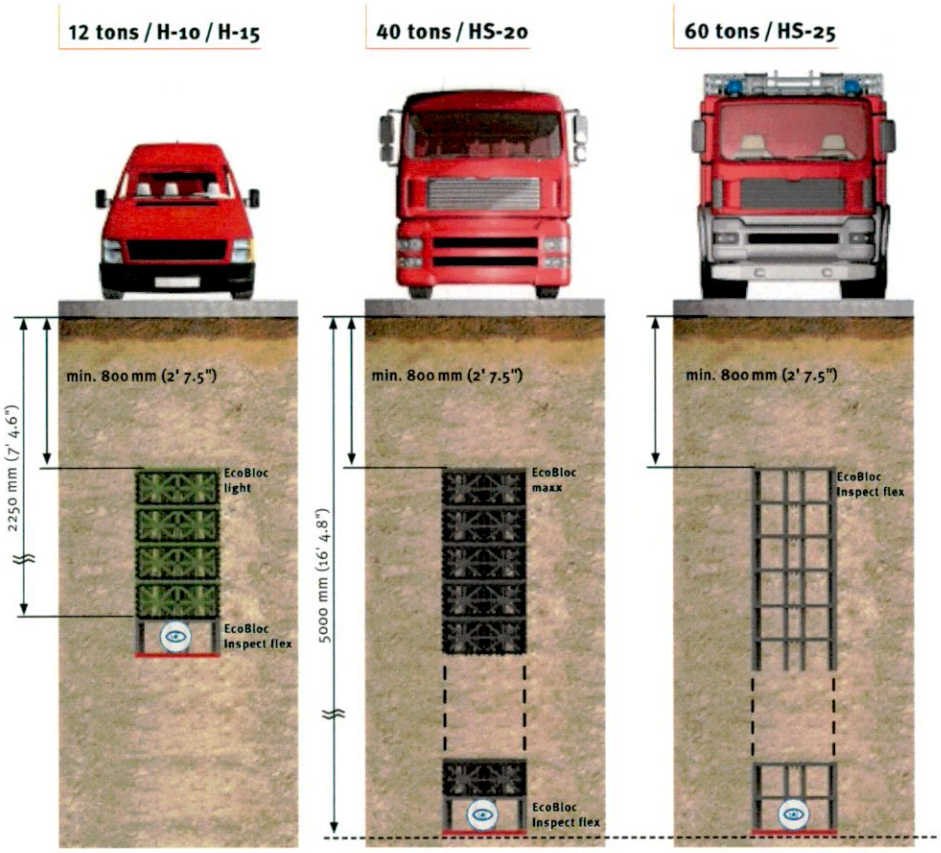
Order no. 402030	DN 300 (12")
Order no. 402031	DN 400 (16")
Order no. 402032	DN 500 (20")

GRAF-Tex geotextile
size of 2.50 x 2.50 m (8' 2.4" x 8' 2.4")
Order no. 231006

Sold by the metre, roll width 5 m (16' 4.8")
Order no. 231002

Applications and loads





Technical data sheet



Infiltration module		EcoBloc Inspect flex	EcoBloc maxx	EcoBloc light
Gross volume		205 l (54.2 US gal.)	225 l (59.4 US gal.)	225 l (59.4 US gal.)
Net volume		195 l (51.5 US gal.)	217 l (57.3 US gal.)	219 l (57.9 US gal.)
Storage coefficient		96 %	96 %	97 %
Inspectable		•		
High pressure jetting possible		•		
Load				
Load	Short-term	max. 100 kN/m²	max. 100 kN/m²	max. 75 kN/m²
	Long-term	max. 59 kN/m²	max. 59 kN/m²	max. 35 kN/m²
Without traffic load	min. earth covering	250 mm (9.8")	250 mm / 500 mm [1] (9.8") / (1' 7.7") [1]	250 mm [2] (9.8") [2]
	max. earth covering	2750 mm (9')	2750 mm / 2000 mm [1] (9') / (6' 6.7") [1]	1500 mm / 1250 mm [2] (4' 11") / (4' 1.2") [2]
	max. installation depth	5000 mm (16' 4.8")	5000 mm (16' 4.8")	2500 mm (8' 2.4")
	max. number of layers	14	13	6
Vehicle	min. earth covering	250 mm (9.8")	250 mm / 500 mm [1] (9.8") / (1' 7.7") [1]	500 mm / o.r. [2] (1' 7.7") / o.r. [2]
	max. earth covering	2750 mm (9')	2750 mm / 2000 mm [1] (9') / (6' 6.7") [1]	1250 mm / o.r. [2] (4' 1.2") / o.r. [2]
	max. installation depth	5000 mm (16' 4.8")	5000 mm (16' 4.8")	2250 mm (7' 4.6")
	max. number of layers	14	13	4
Lorry 12/H-10/H-15	min. earth covering	500 mm (1' 7.7")	500 mm / 800 mm [1] (1' 7.7") / (2' 7.5") [1]	800 mm / o.r. [2] (2' 7.5") / o.r. [2]
	max. earth covering	2750 mm (9')	2750 mm / 2000 mm [1] (9') / (6' 6.7") [1]	1000 mm / o.r. [2] (3' 3.3") / o.r. [2]
	max. installation depth	5000 mm (16' 4.8")	5000 mm (16' 4.8")	2250 mm (7' 4.6")
	max. number of layers	13	12	4
Lorry 30	min. earth covering	500 mm (1' 7.7")	500 mm / 800 mm [1] (1' 7.7") / (2' 7.5") [1]	
	max. earth covering	2500 mm (8' 2.4")	2500 mm / 1750 mm [1] (8' 2.4") / (5' 8.9") [1]	
	max. installation depth	5000 mm (16' 4.8")	5000 mm (16' 4.8")	
	max. number of layers	13	12	
Lorry 40/HS-20	min. earth covering	500 mm (1' 7.7")	800 mm (2' 7.5") [1]	
	max. earth covering	2250 mm (7' 4.5")	2250 mm / 1500 mm [1] (7' 4.5") / (4' 11") [1]	
	max. installation depth	5000 mm (16' 4.8")	5000 mm (16' 4.8")	
	max. number of layers	13	11	
Lorry 60/HS-25	min. earth covering	800 mm (2' 7.5")		
	max. earth covering	2000 mm (7' 4.5")		
	max. installation depth	5000 mm (16' 4.8")		
	max. number of layers	13		
Connections				
DN 100 (4")		•	•	•
DN 150 (6")		•	•	•
DN 200 (8")		•	•	•
DN 250 (10")		–	•	•
DN 300 (12")		• [3),4)]	• [3),4)]	• [3),4)]
DN 400 (16")		• [3),4)]	• [3),4)]	• [3),4)]
DN 500 (20")		• [4)]	• [4)]	• [4)]
Measurements				
Length		800 mm (2' 7.5")	800 mm (2' 7.5")	800 mm (2' 7.5")
Width		800 mm (2' 7.5")	800 mm (2' 7.5")	800 mm (2' 7.5")
Height		320 mm (12.6")	350 mm (13.8")	350 mm (13.8")
Weight		8 kg (17.6 lbs)	9 kg (19.8 lbs)	7 kg (15.4 lbs)

[1)] When combined with EcoBloc Inspect flex

[2)] Values on request when combined with EcoBloc Inspect flex

[3)] Optionally available with Vario shaft (page 12)

[4)] Optionally available with adaptor plates (page 9)

Vario 800 flex shaft system

Flexible use

The GRAF Vario 800 shaft provides easy access to all EcoBloc modules. It can be used in many different ways:

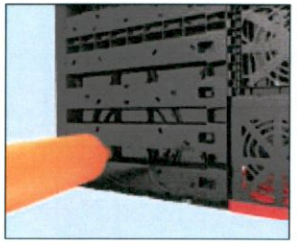
- ✓ As an inspection shaft
- ✓ As an inlet shaft
- ✓ As a filter shaft
- ✓ As a flow control shaft

Easy to inspect

The Vario 800 shaft allows easy access to the EcoBloc system by commercially available inspection cameras. This has been confirmed by several independent testing authorities.

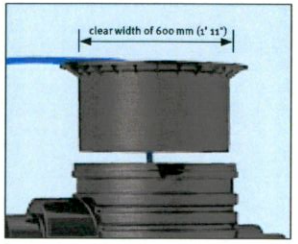
Lorry-bearing up to 60 tons

The GRAF Vario 800 shaft has a heavy-duty lorry-bearing capacity of 60 tons with an 800 mm (2' 7.5") earth covering. The fibreglass reinforced material gives the shaft extra strength.



Connection surfaces up to DN 400 (16")

The Vario 800 comes with DN 200 (8"), DN 300 (12") and DN 400 (16") connection surfaces. The optional, freely rotating inlet module can be connected to pipes of sizes DN 150 (6"), DN 200 (8"), DN 250 (10") and DN 300 (12").

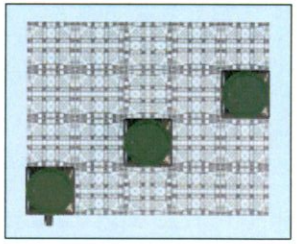


Wide access

The Vario 800 is terminated at the top by GRAF telescopic dome shafts. With a clear width of 600 mm, it gives easy access to the shaft. The base of the shaft itself is 800 x 800 mm (2' 7.5") x (2' 7.5") in size, providing sufficient space for all possible applications.

No additional excavation

The Vario 800 flex shaft system can be directly installed in an EcoBloc infiltration or detention system. The connection surfaces of the inspection channels in the Vario 800 flex shaft system are accurately matched to the EcoBloc system.



Can be positioned in any location

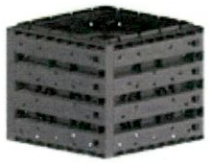
The dimensions of the Vario 800 shaft enable free positioning within the EcoBloc system. The corner position enables the connection of large pipe diameters of up to DN 400 (16") on the two side panels. The central position offers ideal access to the inspection camera from all directions. Using the optional inlet module, a connection of up to DN 300 (12") can be made with a freely defined angle.

Vario 800 flex shaft system

Vario 800 flex, type 1
shaft body for one or more layer of EcoBloc system

Volume	Length	Width	Height	Weight	Colour	Order no.
230 l (60.7 US gal.)	800 mm (2' 7.5")	800 mm (2' 7.5")	355 mm (1' 2")	16 kg (35.3 lbs)	grey	450050

Webcode G9303

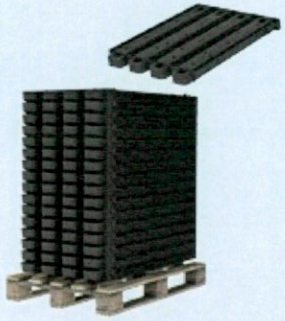


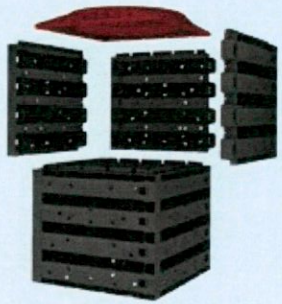
Vario 800 flex, type 2
shaft body for two or more layer of EcoBloc system

Volume	Length	Width	Height	Weight	Colour	Order no.
420 l (113.5 US gal.)	800 mm (2' 7.5")	800 mm (2' 7.5")	660 mm (2' 2")	27 kg (59.5 lbs)	grey	450051

Vario 800 flex, base/cover set
base- and cover for Vario 800 flex shaft

Item	Colour	Order no.
set consisting out of Vario base- and cover plate	grey	450052





1. Stackable

To save space during transport and storage, the parts of the Vario 800 are stacked into each other. This minimizes transport costs and CO_2 emissions.

2. Easy installation

Groups of four wall elements are connected in a few simple steps and without tools to form a single height unit of the Vario 800. The height can be easily adjusted to the EcoBloc tank depth. A shaft cover and base plate complete the element.

3. Ready

GRAF accessory components can now be added to the Vario 800 shaft as required.

Accessories

Shaft components

Infiltration filter strainer DN 600 (24")
Made entirely from stainless steel, mesh width 0.75 mm (0.03")
Order no. 340523

Infiltration inlet module DN 600 (24")
Incl. profile seal for telescopic dome shaft; DN 150 (6")/ DN 200 (8")/ DN 250 (10")/ DN 300 (12") connections
Order no. 330360

Infiltration connecting piece 1000 DN 600 (24")
With DN 200 (8") contact surface, incl. profile seal, length 1000 mm (3' 3.3"), 750 mm (2' 5.5"), 500 mm (1' 7.7")
Order no. 371015

Infiltration connecting piece 1000 DN 600 (24")
With DN 200 (8") pipe connections, incl. profile seal, length 1000 mm (3' 3.3"), 750 mm (2' 5.5"), 500 mm (1' 7.7")
Order no. 371016

Retention accessories

Choke drain DN 100 (4")
Incl. emergency overflow and DN 100 (4") connector seal; flow rate of 1.0 l (0.26 US gal.)/sec. up to 6.5 l (1.72 US gal.)/sec.
Order no. 330547

Choke drain DN 150 (6")
Incl. emergency overflow and DN 150 (6") connector seal; flow rate of 2.0 l (0.53 US gal)/sec. up to 16 l (4.22 US gal.)/sec.
Order no. 330598

Tank Covers

Mini telescopic dome shaft
Suitable for pedestrian loading, height adjustable from 140 – 340 mm (5.5" – 13.4")
Order no. 371010

Maxi telescopic dome shaft
Suitable for pedestrian loading, height adjustable from 140 – 440 mm (5.5" – 17.3")
Order no. 371011

Cover and compensating ring to be provided on site

Cast iron telescopic dome shaft
Suitable for vehicle loading, height adjustable from 140 – 440 mm (5.5" – 17.3")
Order no. 371020

Telescopic dome shaft lorry
Suitable for lorry-bearing loading, height adjustable from 140 – 440 mm (5.5" – 17.3")
Order no. 371021

Your expert specialist dealer:

Rainwater harvesting solutions

For more information about our rainwater harvesting solutions, ask for our catalogue.

Prices:
A price list with our export conditions is available on request.

Warranty clause:
The warranty mentioned in this brochure only refers to the tank in question and not to the accessories. Within the warranty period we grant free replacement of the material. Further benefits are excluded. Pre-condition for warranty benefits are proper handling, assembly and installation according to the mounting guidelines.

N.B. Protect tanks from frost when installed above ground! In case of groundwater installation, please contact us for further information prior to purchase!

For all dimensions and abstracts provided in this brochure, we reserve a tolerance of +/- 3 %. Depending on the connection type, the useful volume of the underground tanks may be up to 10 % below the tank capacity.

Subject to technical modifications and errors. Design details, methods and standards of individual products may change as a result of technical advancements and environmental regulations.

For all our offers and conclusions of contract, only our General Terms and Conditions of Business dated 01/10/2012 shall apply, which we will send to you on request.

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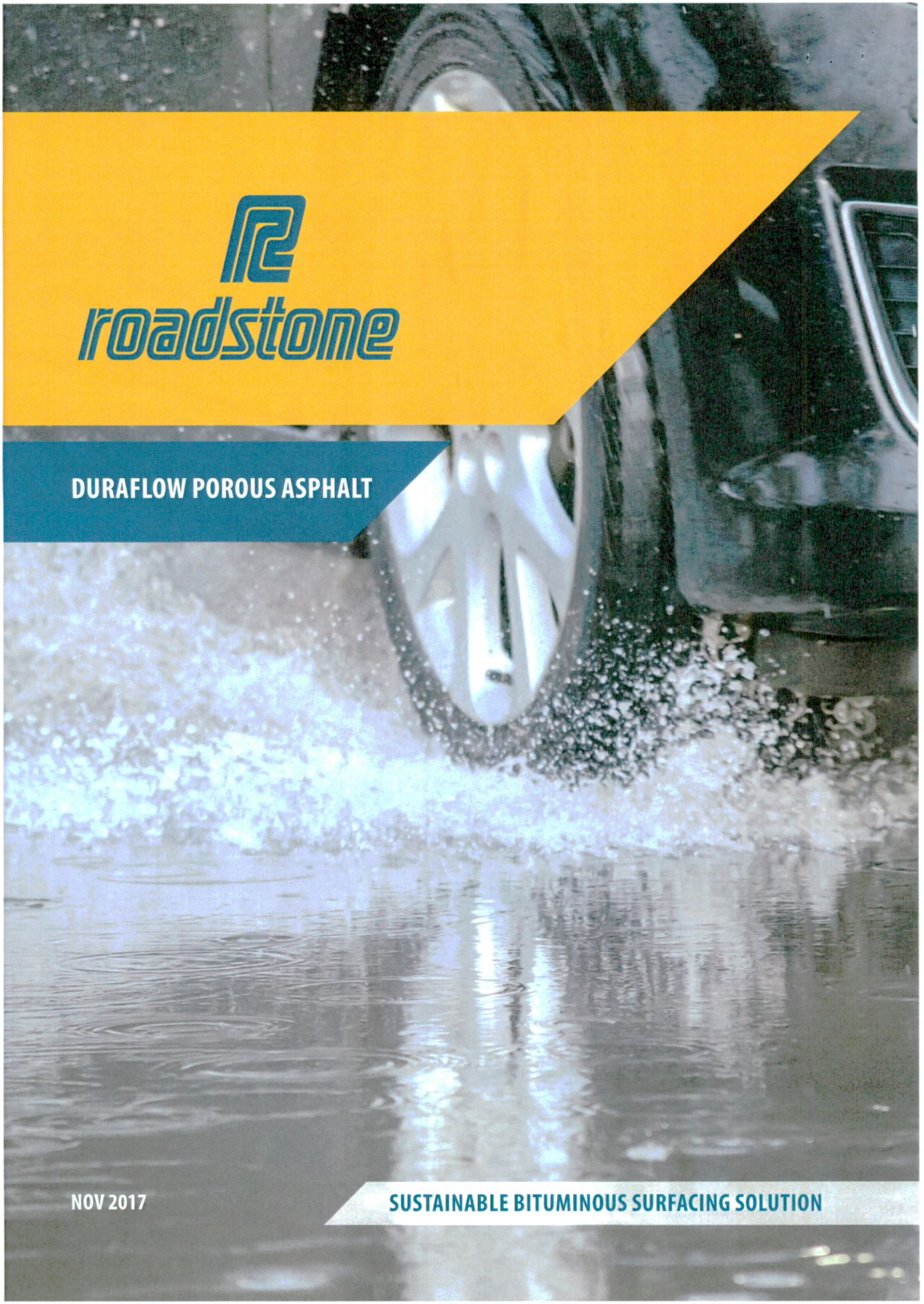
Item no. 950431/EN



roadstone

DURAFLOW POROUS ASPHALT

NOV 2017

SUSTAINABLE BITUMINOUS SURFACING SOLUTION

DURAFLOW™ SUSTAINABLE BITUMINOUS SURFACING SOLUTION

Description

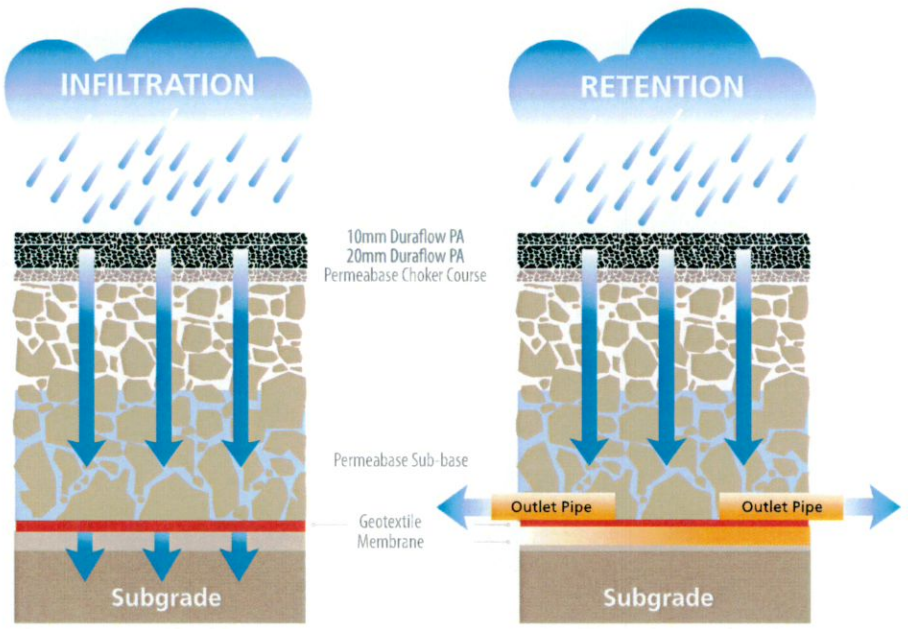
Duraflow™ porous asphalt has been designed by Roadstone for use as a surfacing solution for porous pavements and Sustainable Urban Drainage System (SUDS) applications. Duraflow™ has been designed to allow surface water to pass through it which then percolates into a stone subbase layer, PermeabaseT™. Water is discharged at a controlled rate into a water attenuation drainage system or infiltrates through other layers into the sub soil. Duraflow™ surface course has been designed by Roadstone using polymer modified bitumen and carefully selected high quality aggregates to maximise performance and durability. Roadstone can also supply Duraflow™ open graded base and binder course materials for complete porous pavement designs. The significant storage capacity of Porous asphalt pavement systems provides a cost-effective drainage solution for capturing and controlling the release of surface water.

PRODUCT SPECIFICATION

Duraflow™ porous asphalt is manufactured in accordance with the requirements of IS EN13108-7: Porous Asphalt and NSAI Standard Recommendation (SR) 28. This product is CE marked with conformity assessment operated in accordance with IS EN 13108-20: Type Testing and IS EN13108-21: Factory Production Control to a System 2+ certification.

DRAINAGE CAPACITY

The drainage capacity of Duraflow™ porous asphalt can be measured using the hydraulic conductivity test which shows how fast water drains away from the surface. The hydraulic conductivity of Duraflow™ is 0.2/s



Uses and Applications

Duraflow™ can be used for a wide range of applications including:

- Road Surfacing
- Car Parks
- Sports Surfaces
- Schools

DRAINAGE SYSTEM

Drainage System When selecting the type of drainage system (infiltration or retention) at the design stage, it is important that the sub soil permeability and California Bearing Ratio (CBR) is considered. It is possible to have a combined drainage system for porous pavement systems. An appropriate Geotextile/Geogrid must also be selected for the elected system.

MIX PERFORMANCE

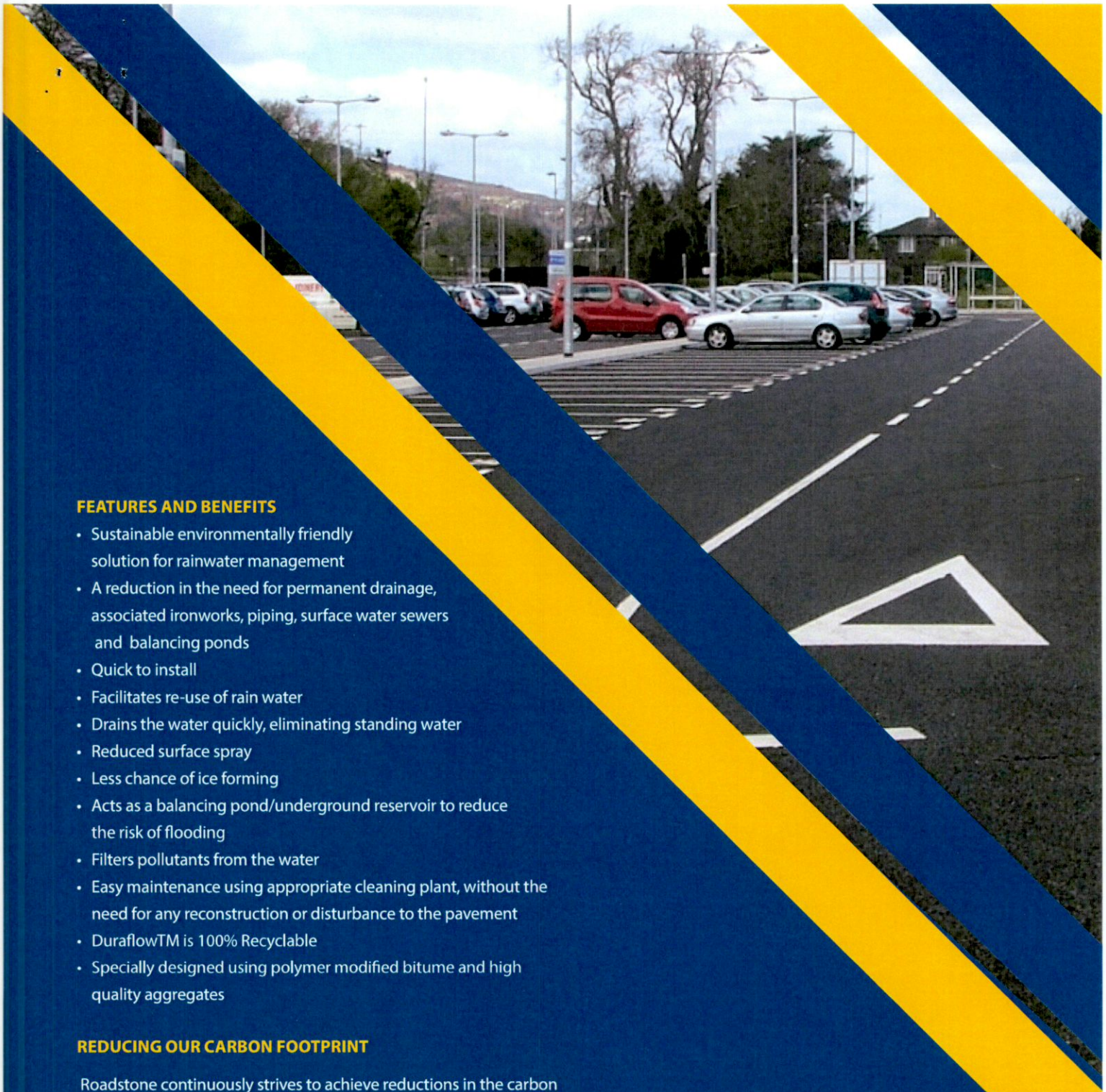
Duraflow™ porous asphalt is designed in Roadstone's INAB accredited R&D facility to provide a tough and durable surfacing solution

PAVEMENT LAYERS (MIN THICKNESS)*

For car and light vehicle loadings:

- Duraflow™ surface course - 40mm
- Duraflow™ binder course - 80mm
- Permeabase™ choker course - 30mm
- Permeabase™ sub base - 220mm

The ultimate solution for porous pavements and SUDS applications



FEATURES AND BENEFITS

- Sustainable environmentally friendly solution for rainwater management
- A reduction in the need for permanent drainage, associated ironworks, piping, surface water sewers and balancing ponds
- Quick to install
- Facilitates re-use of rain water
- Drains the water quickly, eliminating standing water
- Reduced surface spray
- Less chance of ice forming
- Acts as a balancing pond/underground reservoir to reduce the risk of flooding
- Filters pollutants from the water
- Easy maintenance using appropriate cleaning plant, without the need for any reconstruction or disturbance to the pavement
- DuraflowTM is 100% Recyclable
- Specially designed using polymer modified bitume and high quality aggregates

REDUCING OUR CARBON FOOTPRINT

Roadstone continuously strives to achieve reductions in the carbon footprint of our product range through our certified management systems, ISO50001: 2011 (Energy Management System) and ISO14001: 2004 (Environmental Management System). Reductions in our Carbon Footprint have been achieved through new product development, process and energy efficiencies, recycling and reductions in waste.

www.roadstone.ie

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NSAI Certified

NSAI Certified

CE

11. APPENDIX C – BYPASS PETROL / OIL INTERCEPTORPETROL / OIL INTERCEPTOR

SEPARATORS

A RANGE OF FUEL/OIL SEPARATORS
FOR PEACE OF MIND

Kingspan

Klargester

60 YEARS OF
Expertise &
1955–2015 Innovation

Separators

A RANGE OF FUEL/OIL SEPARATORS FOR PEACE OF MIND

Surface water drains normally discharge to a watercourse or indirectly into underground waters (groundwater) via a soakaway. Contamination of surface water by oil, chemicals or suspended solids can cause these discharges to have a serious impact on the receiving water.

The Environment Regulators, Environment Agency, England and Wales, SEPA, Scottish Environmental Protection Agency in Scotland and Department of Environment & Heritage in Northern Ireland, have published guidance on surface water disposal, which offers a range of means of dealing with pollution both at source and at the point of discharge from site (so called 'end of pipe' treatment). These techniques are known as 'Sustainable Drainage Systems' (SuDS).

Where run-off is draining from relatively low risk areas such as car-parks and non-operational areas, a source control approach, such as permeable surfaces or infiltration trenches, may offer a suitable means of treatment, removing the need for a separator.

Oil separators are installed on surface water drainage systems to protect receiving waters from pollution by oil, which may be present due to minor leaks from vehicles and plant, from accidental spillage.

Effluent from industrial processes and vehicle washing should normally be discharged to the foul sewer (subject to the approval of the sewerage undertaker) for further treatment at a municipal treatment works.

SEPARATOR STANDARDS AND TYPES

A British (and European) standard (EN 858-1 and 858-2) for the design and use of prefabricated oil separators has been adopted. New prefabricated separators should comply with the standard.

SEPARATOR CLASSES

The standard refers to two 'classes' of separator, based on performance under standard test conditions.

CLASS I

Designed to achieve a concentration of less than 5mg/l of oil under standard test conditions, should be used when the separator is required to remove very small oil droplets.

CLASS II

Designed to achieve a concentration of less than 100mg/l oil under standard test conditions and are suitable for dealing with discharges where a lower quality requirement applies (for example where the effluent passes to foul sewer).

Both classes can be produced as full retention separators. The oil concentration limits of 5 mg/l and 100 mg/l are only applicable under standard test conditions. It should not be expected that separators will comply with these limits when operating under field conditions.

FULL RETENTION SEPARATORS

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

On large sites, some short term flooding may be an acceptable means of limiting the flow rate and hence the size of full retention systems.

BYPASS SEPARATORS

Bypass separators fully treat all flows generated by rainfall rates of up to 6.5mm/hr. This covers over 99% of all rainfall events. Flows above this rate are allowed to bypass the separator. These separators are used when it is considered an acceptable risk not to provide full treatment for high flows, for example where the risk of a large spillage and heavy rainfall occurring at the same time is small.

FORECOURT SEPARATORS

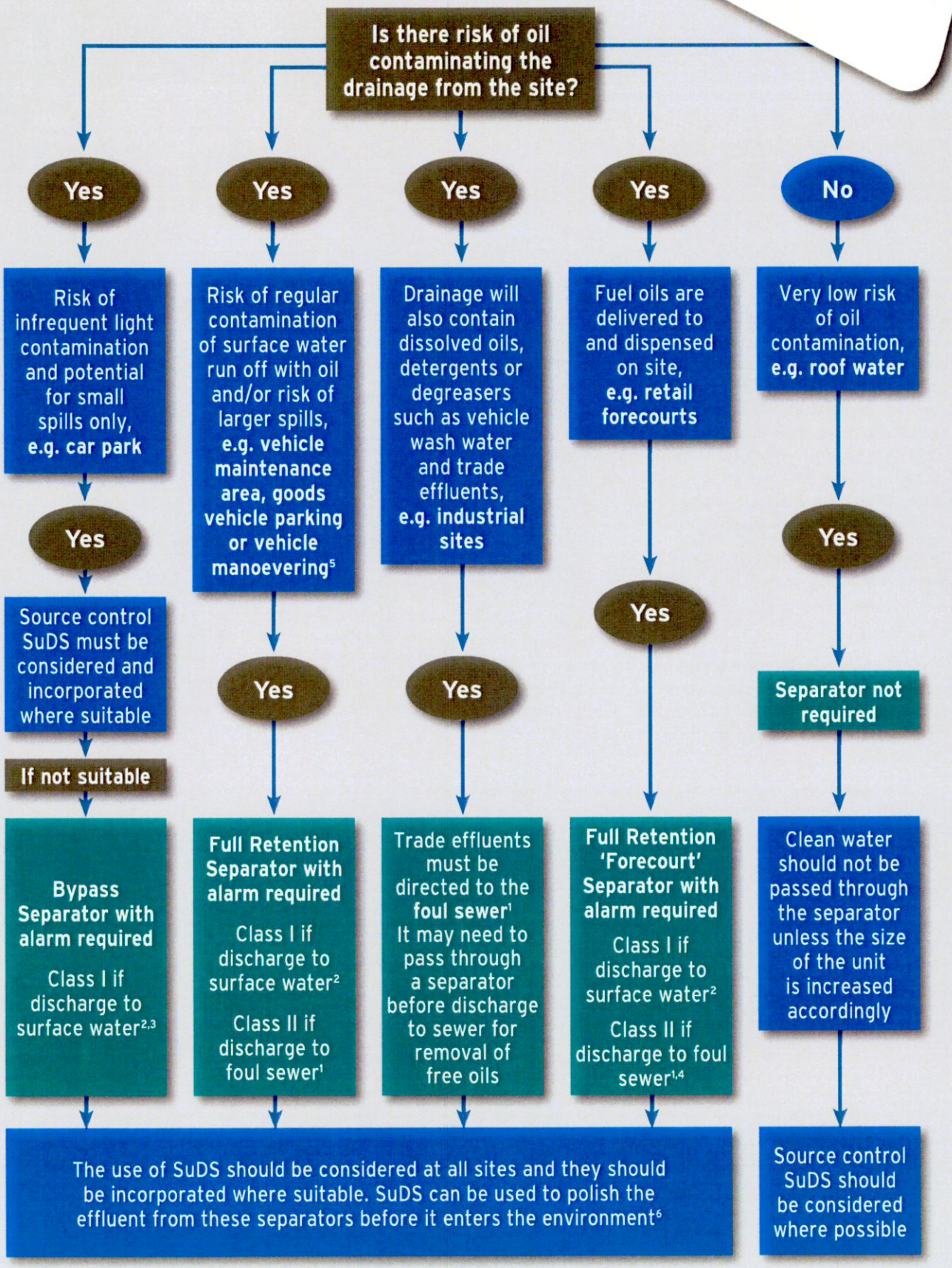
Forecourt separators are full retention separators specified to retain on site the maximum spillage likely to occur on a petrol filling station. They are required for both safety and environmental reasons and will treat spillages occurring during vehicle refuelling and road tanker delivery. The size of the separator is increased in order to retain the possible loss of the contents of one compartment of a road tanker, which may be up to 7,600 litres.

SELECTING THE RIGHT SEPARATOR

The chart on the following page gives guidance to aid selection of the appropriate type of fuel/oil separator for use in surface water drainage systems which discharge into rivers and soakaways.

For further detailed information, please consult the Environment Agency Pollution Prevention Guideline 03 (PPG 3) 'Use and design of oil separators in surface water drainage systems' available from their website.

Kingspan Klargester has a specialist team who provide technical assistance in selecting the appropriate separator for your application.



1 You must seek prior permission from your local sewer provider before you decide which separator to install and before you make any discharge.
2 You must seek prior permission from the relevant environmental body before you decide which separator to install.
3 In this case, if it is considered that there is a low risk of pollution a source control SuDS scheme may be appropriate.
4 In certain circumstances, the sewer provider may require a Class 1 separator for discharges to sewer to prevent explosive atmospheres from being generated.
5 Drainage from higher risk areas such as vehicle maintenance yards and goods vehicle parking areas should be connected to foul sewer in preference to surface water.
6 In certain circumstances, a separator may be one of the devices used in the SuDS scheme. Ask us for advice.

Bypass NSB RANGE

APPLICATION

Bypass separators are used when it is considered an acceptable risk not to provide full treatment, for very high flows, and are used, for example, where the risk of a large spillage and heavy rainfall occurring at the same time is small, e.g.

- Surface car parks.
- Roadways.
- Lightly contaminated commercial areas.

PERFORMANCE

Klargester were one of the first UK manufacturers to have separators tested to EN 858-1. Klargester have now added the NSB bypass range to their portfolio of certified and tested models. The NSB number denotes the maximum flow at which the separator treats liquids. The British Standards Institute (BSI) tested the required range of Kingspan Klargester Bypass separators and certified their performance in relation to their flow and process performance assessing the effluent qualities to the requirements of EN 858-1. Klargester bypass separator designs follow the parameters determined during the testing of the required range of bypass separators.

Each bypass separator design includes the necessary volume requirements for:

- Oil separation capacity.
- Oil storage volume.
- Silt storage capacity.
- Coalescer.

The unit is designed to treat 10% of peak flow. The calculated drainage areas served by each separator are indicated according to the formula given by PPG3 NSB = 0.0018A(m2). Flows generated by higher rainfall rates will pass through part of the separator and bypass the main separation chamber.

Class I separators are designed to achieve a concentration of 5mg/litre of oil under standard test conditions.

FEATURES

- Light and easy to install.
- Inclusive of silt storage volume.
- Fitted inlet/outlet connectors.
- Vent points within necks.
- Oil alarm system available (required by EN 858-1 and PPG3).
- Extension access shafts for deep inverts.
- Maintenance from ground level.
- GRP or rotomoulded construction (subject to model).

To specify a nominal size bypass separator, the following information is needed:-

- The calculated flow rate for the drainage area served. Our designs are based on the assumption that any interconnecting pipework fitted elsewhere on site does not impede flow into or out of the separator and that the flow is not pumped.
- The drain invert inlet depth.
- Pipework type, size and orientation.

SIZES AND SPECIFICATIONS

UNIT NOMINAL SIZE	FLOW (l/s)	PEAK FLOW RATE (l/s)	DRAINAGE AREA (m²)	STORAGE CAPACITY (litres) SILT	OIL	UNIT LENGTH (mm)	UNIT DIA. (mm)	ACCESS SHAFT DIA. (mm)	BASE TO INLET INVERT (mm)	BASE TO OUTLET INVERT	STANDARD FALL ACROSS (mm)	MIN. INLET INVERT (mm)	STANDARD PIPEWORK DIA.
NSBP003	3	30	1670	300	45	1700	1350	600	1420	1320	100	500	160
NSBP004	4.5	45	2500	450	60	1700	1350	600	1420	1320	100	500	160
NSBP006	6	60	3335	600	90	1700	1350	600	1420	1320	100	500	160
NSBE010	10	100	5560	1000	150	2069	1220	750	1450	1350	100	700	315
NSBE015	15	150	8335	1500	225	2947	1220	750	1450	1350	100	700	315
NSBE020	20	200	11111	2000	300	3893	1220	750	1450	1350	100	700	375
NSBE025	25	250	13890	2500	375	3575	1420	750	1680	1580	100	700	375
NSBE030	30	300	16670	3000	450	4265	1420	750	1680	1580	100	700	450
NSBE040	40	400	22222	4000	600	3230	1920	600	2185	2035	150	1000	500
NSBE050	50	500	27778	5000	750	3960	1920	600	2185	2035	150	1000	600
NSBE075	75	750	41667	7500	1125	5841	1920	600	2235	2035	200	950	675
NSBE100	100	1000	55556	10000	1500	7661	1920	600	2235	2035	200	950	750
NSBE125	125	1250	69444	12500	1875	9548	1920	600	2235	2035	200	950	750

Rotomoulded chamber construction GRP chamber construction * Some units have more than one access shaft – diameter of largest shown.

Full Retention NSF RANGE

APPLICATION

Full retention separators are used in high risk spillage areas such as:

- Fuel distribution depots.
- Vehicle workshops.
- Scrap Yards

PERFORMANCE

Kingspan Klargester were the first UK manufacturer to have the required range (3-30 l/sec) certified to EN 858-1 in the UK. The NSF number denotes the flow at which the separator operates.

The British Standards Institute (BSI) have witnessed the performance tests of the required range of separators and have certified their performance, in relation to their flow and process performance to ensure that they met the effluent quality requirements of EN 858-1. Larger separator designs have been determined using the formulas extrapolated from the test range.

Each full retention separator design includes the necessary volume requirements for:

- Oil separation capacity.
- Silt storage capacity.
- Automatic closure device.
- Oil storage volume.
- Coalescer (Class I units only).

Klargester full retention separators treat the whole of the specified flow.

FEATURES

- Light and easy to install.
- Class I and Class II designs.
- 3-30 l/sec range independently tested and performance sampled, certified by the BSI.
- Inclusive of silt storage volume.
- Fitted inlet/outlet connectors.

- Oil alarm system available.
- Vent points within necks.
- Extension access shafts for deep inverts.
- Maintenance from ground level.
- GRP or rotomoulded construction (subject to model).

To specify a nominal size full retention separator, the following information is needed:-

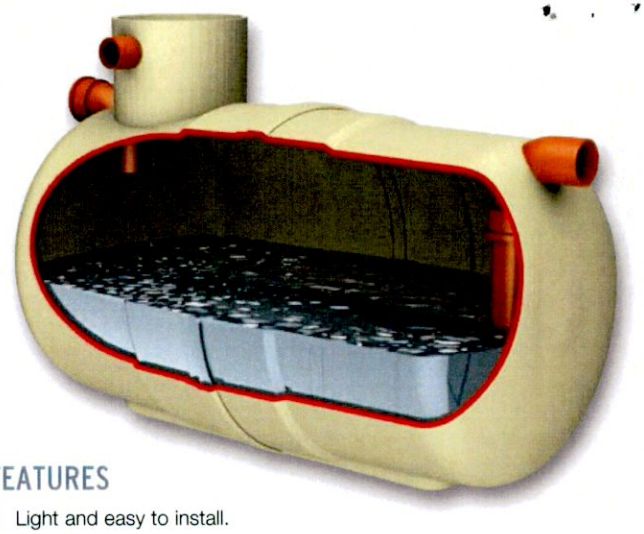
- The calculated flow rate for the drainage area served. Our designs are based on the assumption that any interconnecting pipework fitted elsewhere on site does not impede flow into or out of the separator and that the influent is not pumped.
- The required discharge standard. This will decide whether a Class I or Class II unit is required.
- The drain invert inlet depth.
- Pipework type, size and orientation.

SIZES AND SPECIFICATIONS

UNIT NOMINAL SIZE	FLOW (l/s)	DRAINAGE AREA (m^2) PPG-3 (0.018)	STORAGE CAPACITY (litres) SILT	OIL	UNIT LENGTH (mm)	UNIT DIA. (mm)	BASE TO INLET INVERT (mm)	BASE TO OUTLET INVERT	MIN. INLET INLET (mm)	STANDARD PIPEWORK DIA. (mm)
NSFP003	3	170	300	30	1700	1350	1420	1345	500	160
NSFP006	6	335	600	60	1700	1350	1420	1345	500	160
NSFA010	10	555	1000	100	2610	1225	1050	1000	500	200
NSFA015	15	835	1500	150	3910	1225	1050	1000	500	200
NSFA020	20	1115	2000	200	3200	2010	1810	1760	1000	315
NSFA030	30	1670	3000	300	3915	2010	1810	1760	1000	315
NSFA040	40	2225	4000	400	4640	2010	1810	1760	1000	315
NSFA050	50	2780	5000	500	5425	2010	1810	1760	1000	315
NSFA065	65	3610	6500	650	6850	2010	1810	1760	1000	315
NSFA080	80	4445	8000	800	5744	2820	2500	2450	1000	300
NSFA100	100	5560	10000	1000	6200	2820	2500	2450	1000	400
NSFA125	125	6945	12500	1250	7365	2820	2500	2450	1000	450
NSFA150	150	8335	15000	1500	8675	2820	2550	2450	1000	525
NSFA175	175	9725	17500	1750	9975	2820	2550	2450	1000	525
NSFA200	200	11110	20000	2000	11280	2820	2550	2450	1000	600

Rotomoulded chamber construction GRP chamber construction

Washdown & Silt



APPLICATION

This unit can be used in areas such as car wash and other cleaning facilities that discharge directly into a foul drain, which feeds to a municipal treatment facility.

If emulsifiers are present the discharge must not be allowed to enter an NS Class I or Class II unit.

- Car wash.
- Tool hire depots.
- Truck cleansing.
- Construction compounds cleansing points.

PERFORMANCE

Such wash down facilities must not be allowed to discharge directly into surface water but must be directed to a foul connection leading to a municipal treatment works as they utilise emulsifiers, soaps and detergents, which can dissolve and disperse the oils.

FEATURES

- Light and easy to install.
- Inclusive of silt storage volume.
- Fitted inlet/outlet connectors.
- Vent points within necks.
- Extension access shafts for deep inverts.
- Maintenance from ground level.

SIZES AND SPECIFICATIONS

REF.	TOTAL CAPACITY (litres)	MAX. REC. SILT	MAX. FLOW RATE (l/s)	LENGTH (mm)	DIAMETER (mm)	ACCESS SHAFT DIA. (mm)	BASE TO INLET INVERT (mm)	BASE TO OUTLET INVERT (mm)	STANDARD FALL ACROSS UNIT (mm)	MIN. INLET INVERT (mm)	STANDARD PIPEWORK DIA. (mm)	APPROX EMPTY (kg)
W1/010	1000	500	3	1123	1225	460	1150	1100	50	500	160	60
W1/020	2000	1000	5	2074	1225	460	1150	1100	50	500	160	120
W1/030	3000	1500	8	2952	1225	460	1150	1100	50	500	160	150
W1/040	4000	2000	11	3898	1225	460	1150	1100	50	500	160	180
W1/060	6000	3000	16	4530	1440	600	1360	1310	50	500	160	320
W1/080	8000	4000	22	3200	2020	600	2005	1955	50	500	160	585
W1/100	10000	5000	27	3915	2020	600	2005	1955	50	500	160	680
W1/120	12000	6000	33	4640	2020	600	2005	1955	50	500	160	770
W1/150	15000	7500	41	5435	2075	600	1940	1890	50	500	160	965
W1/190	19000	9500	52	6865	2075	600	1940	1890	50	500	160	1200

Car Wash Silt Trap

APPLICATION

Car Wash silt trap is designed for use before a separator in car wash applications to ensure effective silt removal.

FEATURES

- FACTA Class B covers.
- Light and easy to install.
- Maintenance from ground level.

Forecourt

APPLICATION

The forecourt separator is designed for installation in petrol filling station forecourts and similar applications. The function of the separator is to intercept hydrocarbon pollutants such as petroleum and oil and prevent their entry to the drainage system, thus protecting the environment against hydrocarbon contaminated surface water run-off and gross spillage.

PERFORMANCE

Operation ensures that the flow cannot exit the unit without first passing through the coalescer assembly.

In normal operation, the forecourt separator has sufficient capacity to provide storage for separated pollutants within the main chamber, but is also able to contain up to 7,600 litres of pollutant arising from the spillage of a fuel delivery tanker compartment on the petrol forecourt. The separator has been designed to ensure that oil cannot exit the separator in the event of a major spillage, subsequently the separator should be emptied immediately.

FEATURES

- Light and easy to install.
- Inclusive of silt storage volume.
- Fitted inlet/outlet connectors.
- Vent points within necks.
- Extension access shafts for deep inverts.
- Maintenance from ground level.
- Class I and Class II design.
- Oil storage volume.
- Coalescer (Class I unit only).
- Automatic closure device.
- Oil alarm system available.

INSTALLATION

The unit should be installed on a suitable concrete base slab and surrounded with concrete or pea gravel backfill. See sales drawing for installation.

If the separator is to be installed within a trafficked area, then a suitable cover slab must be designed to ensure that loads are not transmitted to the unit.

The separator should be installed and vented in accordance with Health and Safety Guidance Note HS(G)41 for filling stations, subject to Local Authority requirements.

SIZES AND SPECIFICATIONS

ENVIROCEPTOR CLASS	TOTAL CAP. (litres)	DRAINAGE AREA (m^2)	MAX. FLOW RATE (l/s)	LENGTH (mm)	DIAMETER (mm)	ACCESS SHAFT DIA. (mm)	BASE TO INLET INVERT (mm)	BASE TO OUTLET INVERT (mm)	STD. FALL ACROSS UNIT (mm)	MIN. INLET INVERT (mm)	STD. PIPEWORK (mm)	EMPTY WEIGHT (kg)
I	10000	555	10	3963	1920	600	2110	2060	50	400	160	500
II	10000	555	10	3963	1920	600	2110	2060	50	400	160	500
I	10000	1110	20	3963	1920	600	2110	2060	50	400	200	500
II	10000	1110	20	3963	1920	600	2110	2060	50	400	200	500

Alarm Systems

British European Standard EN 858-1 and Environment Agency Pollution Prevention Guideline PPG3 requires that all separators are to be fitted with an oil level alarm system and that it should be installed and calibrated by a suitably qualified technician so that it will respond to an alarm condition when the separator requires emptying.

- Easily fitted to existing tanks.
- Excellent operational range.
- Visual and audible alarm.
- Additional telemetry option.

PROFESSIONAL INSTALLERS

Kingspan Klargester Accredited Installers
Experience shows that correct installation is a prerequisite for the long-lasting and successful operation of any wastewater treatment product. This is why using an installer with the experience and expertise to install your product is highly recommended.

Services include :

- Site survey to establish ground conditions and soil types
- Advice on system design and product selection
- Assistance on gaining environmental consents and building approvals
- Tank and drainage system installation
- Connection to discharge point and electrical networks
- Waste emptying and disposal

Discover more about the Accredited Installers and locate your local expert online.

www.kingspanenviro.com/klargester

Kingspan Klargester Accredited Installer

CARE & MAINTENANCE

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Who better to look after your treatment plant than the people who designed and built it?

Kingspan Environmental have a dedicated service division providing maintenance for wastewater products.

Factory trained engineers are available for site visits as part of a planned maintenance contract or on a one-off call out basis.

To find out more about protecting your investment and ensuring peace of mind, call us on:

0844 846 0500

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www.kingspanenvservice.com

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Kingspan Klargester

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- **BIODISC® & ENVIROSAFE** HIGH PERFORMANCE SEWAGE TREATMENT SYSTEMS
- PACKAGE PUMP STATIONS
- **PUMPSTOR24** PUMPING SYSTEMS
- OIL/WATER SEPARATORS
- BELOW GROUND STORAGE TANKS
- GREASE & SILT TRAPS

RAINWATER SOLUTIONS

- BELOW GROUND RAINWATER HARVESTING SYSTEMS
- ABOVE GROUND RAINWATER HARVESTING SYSTEMS

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BRITISH WATER
UK GREEN BUILDING COUNCIL Founding Member
CIBSE CPD

Issue No. 21: September 2015

12. APPENDIX D – HYDROBRAKE INFORMATION

Design Data

Hydro-Brake® Optimum

Vortex Flow Control

Inspired by nature and engineered to deliver the perfect curve, the Hydro-Brake® Optimum is the most advanced vortex flow control available. There is no equivalent to the Hydro-Brake® Optimum when it comes to delivering the best possible hydraulic performance with a passive flow control.

With a wide range of configurations and options available, the Hydro-Brake® Optimum is able to provide precision flow control to suit the vast majority of applications.

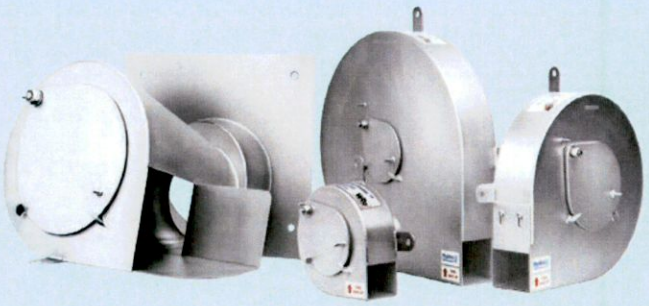


Figure 1 - The Hydro-Brake® Optimum is designed and manufactured to deliver precise, repeatable flow control.

Precision Engineered Vortex Flow Controls

Each Hydro-Brake® Optimum is custom configured to suit the application and is manufactured under strict quality assurance procedures to deliver precise flow control to exacting requirements.

Every unit is backed by significant R&D investment to fine-tune the performance, meaning that the Hydro-Brake® Optimum is the only vortex flow control to have been independently certified by the BBA and WRc.

BBA APPROVAL INSPECTION TESTING CERTIFICATION
CERTIFICATE 08/4596

wrc approved
PT/409/0417

Benefits

- Manufactured from high grade stainless steel.
- Future proof – adjustable or replaceable inlet plates available to alter flow rates post-installation.
- Configurations available to suit a wide variety of installations.
- Large cross sectional area at all heads.
- Simple installation.
- Self-activating.
- No moving parts or external power requirement.

Versatile and Flexible

At Hydro International, we pride ourselves on providing solutions that meet your requirements, rather than providing a standard solution and asking you to compromise on your project needs.

The Hydro-Brake® Optimum offers designers options to precision-engineer a vortex flow control to:

- Minimise upstream storage volumes.
- Maximise internal (inlet & outlet) cross sectional areas to prevent blockages.
- Build-in a climate change factor to allow for future changes in flow rate.

Furthermore, if you need to retrofit a flow control, our dedicated team of engineers can assist with providing a customised Hydro-Brake® Optimum suitable for installation into existing drainage infrastructure.

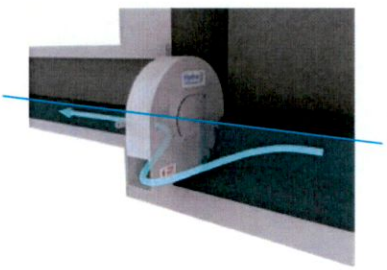
Design Data
Hydro-Brake® Optimum
Vortex Flow Control

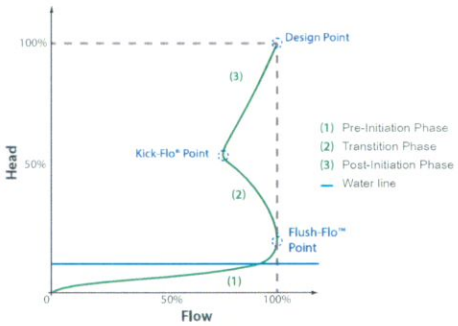
Operating Principles

The hydraulic behaviour of the Hydro-Brake® Optimum is described by its hydraulic characteristic curve, which relates the discharge flow from the unit to the hydraulic head acting upon that unit.

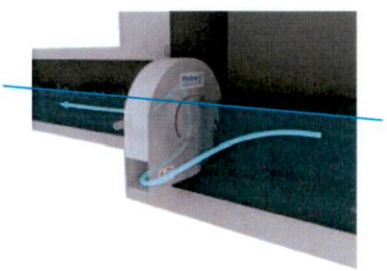
The hydraulic characteristic curve consists of three distinct sections, each corresponding to a different governing flow control regime:

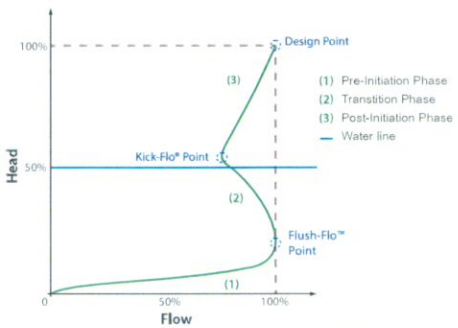
1. The pre-initiation phase – governed by orifice flow and defined on the characteristic curve as the region between the origin and the point at which the vortex begins to have a throttling effect (Flush-Flo™ point). In this region, the depth of water is below the soffit of the outlet orifice of the Hydro-Brake® Optimum.



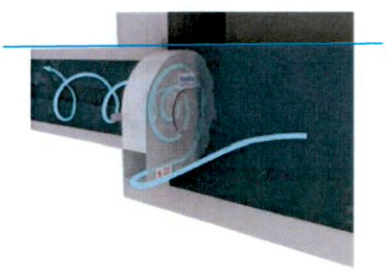


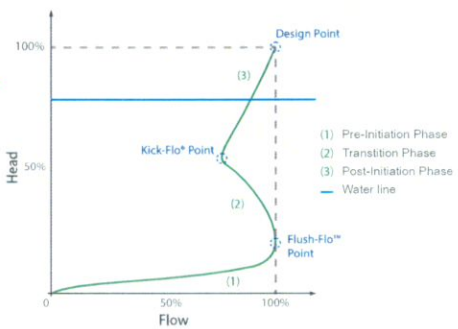
2. The transition phase – governed by vortex formation and defined on the characteristic curve as the region between the Flush-Flo™ and the point at which the vortex has fully initiated (Kick-Flo® point). In this region the vortex will continually form and collapse. A trapped volume of air inside the Hydro-Brake® Optimum will exert a backpressure and cause the discharge rate to reduce even though the hydraulic head continues to increase.





3. The post-initiation phase – governed by stable vortex flow and defined on the characteristic curve as the region above the Kick-Flo® point. A stable vortex is formed and sustained. An air filled core at the centre of the vortex acts as a pseudo-physical flow restriction by reducing the cross sectional area available for the passage of water.





Design Flexibility

It is possible for the Design Point to be achieved using a number of different flow control configurations, each with a different hydraulic response or characteristic curve.

An in-depth understanding of the flow regimes and interactions at each stage of the hydraulic characteristic curve allows custom configuration of the Hydro-Brake® Optimum to achieve the hydraulic profile best suited to the site requirements.

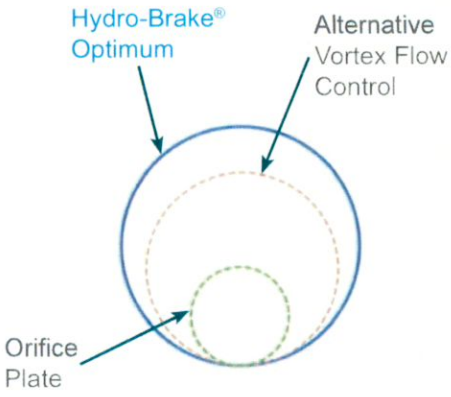
Hydro-Brake® Flow Control Series
Hydro-Brake® Hotline: 01275 337937
stormwater@hydro-int.com

Design Data
Hydro-Brake® Optimum
Vortex Flow Control

Resilience by Design

Hydro-Brake® Optimum has outlets **(clearances) up to 20% larger than** competitor products to minimise the **risk of blockages. All units are fitted** with a pivoting bypass door to enable full access to the internal chamber and the outlet structure in the event that a blockage does occur.

All Hydro-Brake® Optimum units can also be supplied with an adjustable or replaceable inlet to future-proof the **device, allowing flows to be altered** post-installation, to account for site expansion or climate change.



Expert Design Support Services

Hydro International's professional engineers work with you to provide expert technical and aftersales support to ensure your projects meet exacting design requirements and deliver the very best hydraulic controls for your site.

With over 35 years' experience of flow control knowledge and experience, Hydro International's design support team is available to advise on any aspect of water flow management, including detailed modelling of vortex flow controls and composite outlet structures.

Call the Hydro-Brake® Hotline on: 01275 337937 or email stormwater@hydro-int.com

Online Design Tool

Engineers have the flexibility to try out any number of flow control iterations and explore their impact on hydraulic performance.

Our Online Design Tool allows you to quickly and easily compare a **number of different flow control options for your site to develop the** most robust and sustainable drainage solution possible.

The new tool now also has the added options to size and design the First Defense® and Downstream Defender® stormwater treatment separators, alongside the existing functionality to size and design Hydro-Brake® **Optimum flow controls.**

hydro-int.design

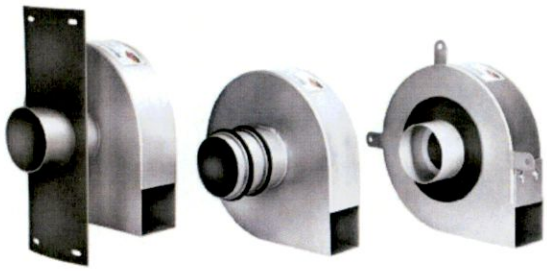
Full MicroDrainage® Compatibility

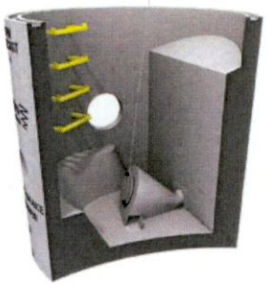
Engineers can carry out sizing and flow rate calculations and conduct hydraulic modelling of drainage networks containing Hydro-Brake® Optimum units using the industry-standard drainage design software, MicroDrainage®.

Design Data
Hydro-Brake® Optimum
Vortex Flow Control

Easy to Install

Hydro-Brake® Optimum has a range of mounting options for ease of installation or can be supplied ready fitted into a manhole chamber (with or without a weir wall) for simple plug-and-play installation. There are no set-up or commissioning requirements.





The Hydro-Brake® Flow Control Series

As a brand leader for vortex flow controls for more than 30 years, Hydro International continues to set the standard in flow control management technologies. The Hydro-Brake® Flow Control Series is a comprehensive and versatile toolbox of precision-**engineered devices for flow attenuation and control that can help deliver compliant schemes with scaleable, precision flow control** performance.

Every device in the series is tested and manufactured to exacting standards and wherever possible, independently accredited to provide the reassurance of reliable, repeatable through-life operation.

Hydro-Brake® Orifice

The low-cost option for unconstrainted sites (shown with **optional screen).**

Hydro-Brake® Optimum

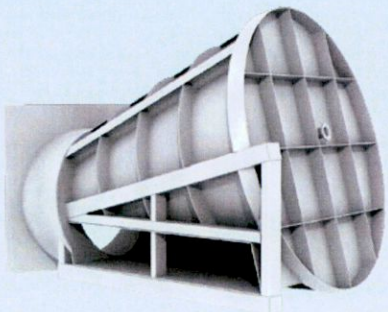
The vortex flow control with no equvalent, **delivering Nature's Perfect** Cuve with no moving parts **and independently verified by the BBA and WRc.**

Hydro-Brake® Agile

Precision engineered flow control for highly constrained applications.

Hydro-Brake® Flood Alleviation

The vortex controlled solution to watercourse **flooding.**



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