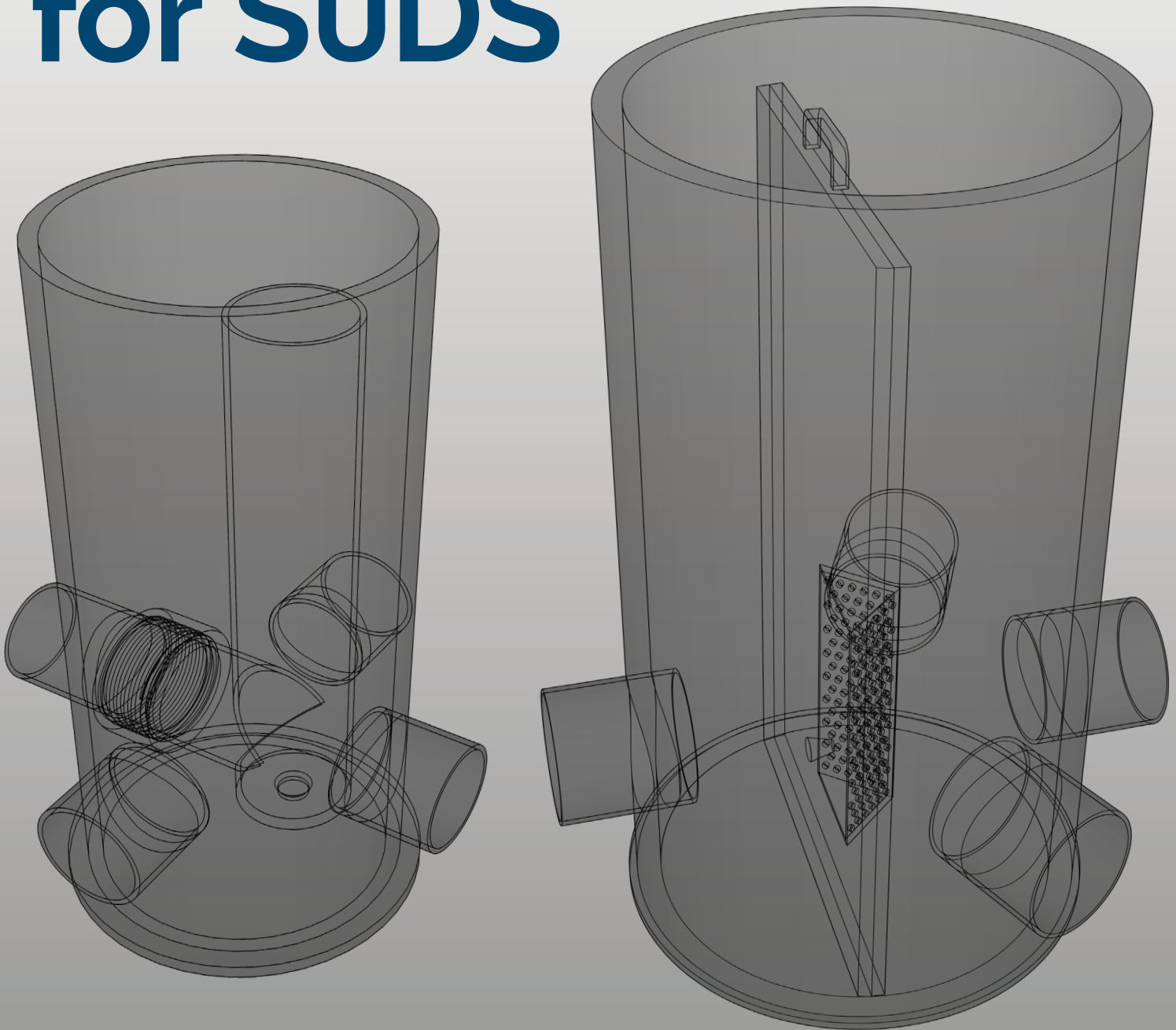


Controflow

Flow Controls for SuDS



Controflow

exclusively from

**SuDS
store**

www.sudsstore.com

Controflow

SuDS are now a requirement on many developments, approved and often adopted by local authorities. The key to successful SuDS is water storage and treatment strategically deployed around a site within SuDS elements – such as swales, basins, ponds and, particularly, permeable paving – forming discrete sub-catchments with flow controls. Controflow chambers can also maximise storage in permeable paving on sloping sites, with terraced compartments separated by simple check dams. They can also detain water to optimise ground infiltration, so reducing discharge volumes.

These techniques using Controflow chambers avoid the additional land-take and costs of large, heavily engineered control and storage structures at the perimeter of developments. Their low cost and shallow construction enable Controflow chambers to be used more widely, to manage flows at source and within each sub-catchment, as part of the management train, as well as at site perimeters, whilst keeping water flow on or near the surface.

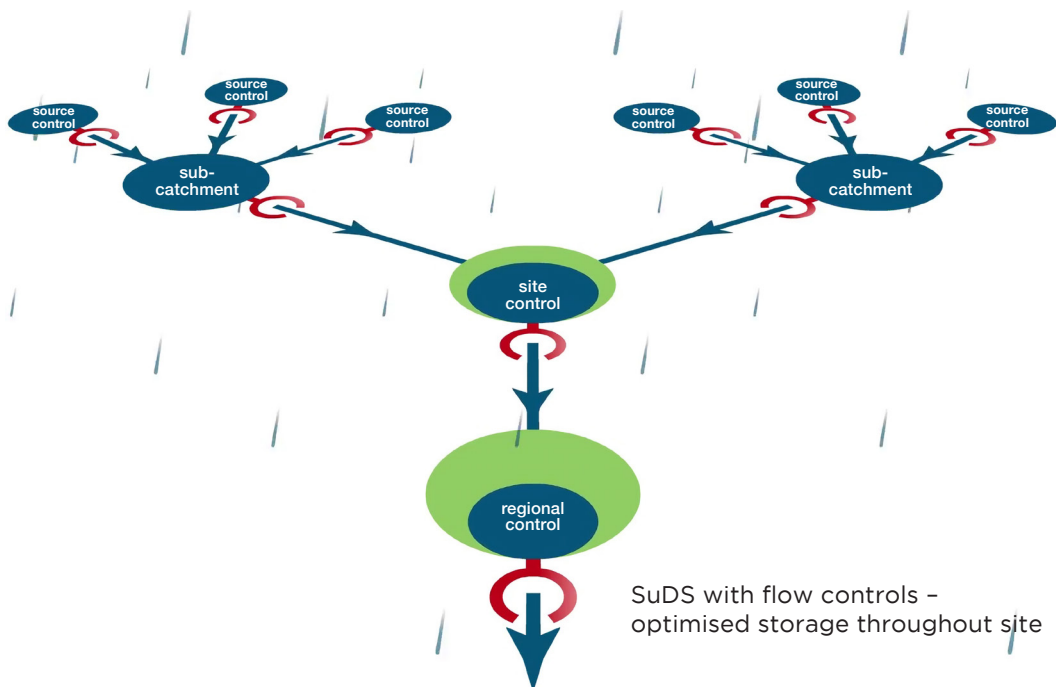
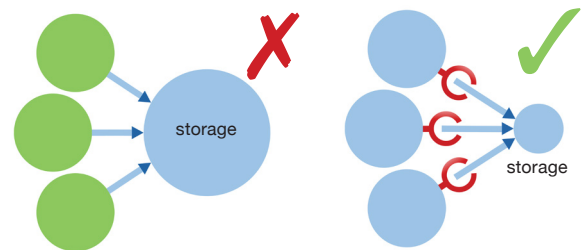
All orifice flow controls should be protected to prevent debris from entering the chamber, either with pre-filtering SuDS components, such as permeable paving, or Controflow SuDS Baskets.

Efficient & Compliant SuDS

SuDS are set to become mandatory for developments throughout England during 2024, requiring nature-based solutions using components near the surface to provide multiple benefits.

Flow controls are essential for SuDS, to demonstrate agreed flow rates to regulators and to optimise spatial efficiency of SuDS features, minimising land-take in development.

Meeting the latest mandatory SuDS requirements, controlling the flow with Controflow enables source control, sub-catchments and management trains, near the surface. Flow controls also enable SuDS (notably permeable paving) on sloping sites and offer protection to downstream drainage assets.



Conventional drainage designs using gullies and pipes to transfer polluted runoff straight to expensive underground tanks or large storage ponds cannot meet these requirements.

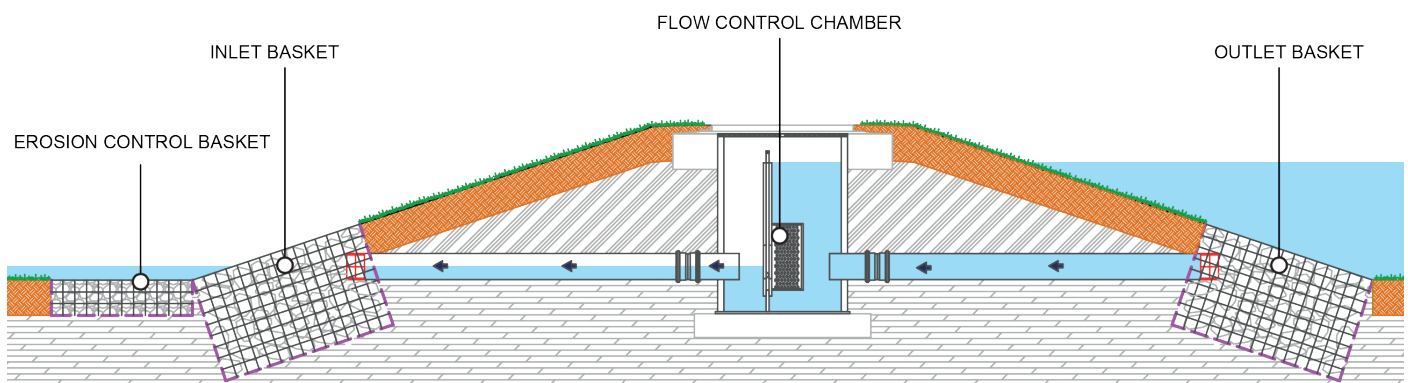
With their low cost and shallow construction, Controflow chambers are ideally suited to control flows from control features and each sub-catchment, as well as from whole sites, while realising a key aim of SuDS to keep water management on or near the surface.

Controflow

The Controflow range from SuDSstore was developed specifically for sustainable drainage systems (SuDS) by professional SuDS designers with over 25 years of experience. With expert product support, the range includes flow control chambers and inlet/outlet baskets.

Controflow Flow Control Chambers are specifically designed to manage surface water discharge from shallow SuDS elements including permeable pavements, swales and basins. They meet the latest requirements for accessible, small orifice flow controls to manage greenfield runoff rates, at modest cost. Based on established engineering principles, they demonstrate straightforward compliance to local authorities as part of the SuDS design approval process. Standard and flexible products are available, and bespoke flow control chambers can also be manufactured to suit site-specific requirements.

Controflow SuDS Baskets are manufactured in stainless steel mesh for filling with stone and act as attractive inlets or outlets that protect pipe openings and flow control orifices, or as erosion control to enable gentle water flows down slopes.



A Typical Basin-to-Swale Arrangement using Controflow products

The Controflow range

Developed by experienced SuDS designers
with practicality in mind

Low-cost flow control devices
for use throughout management trains

Tested in situ for over a decade

Performance easily verified by local authorities

Satisfies National Standards
as well as the SuDS Manual 2015

Straightforward specification
using established criteria

Simple installation

Passive operation with consistent performance

Minimal maintenance over the long term

Made to order using recyclable materials

Standard stock universal formats for flexible
specification or bespoke designs available

Easy access for inspection,
measurement or sampling

Dramatically reduces risk of wildlife mortality

Well-suited to nature-based SuDS

Demonstrating SuDS Benefits

To demonstrate the government's approach to mandatory SuDS, Defra's January 2023 report cited Lamb Drove in Cambridgeshire as an exemplar. This monitored SuDS demonstration project covers a 35 homes development on 1-hectare compared with a similar, neighbouring development using piped drainage. Completed in 2006, it was one of the first housing projects in England with integrated SuDS and included Controflow chambers – still performing well today.



Another housing project, this time in Stamford, takes a similar approach – but applied to high-density urban scheme with 104-units per hectare. Here, defined sub-catchments optimise available space for multifunctional SuDS with permeable pavements also accepting runoff from impermeable paving and roofs. Controflow chambers ensure a gradual flow of clean water into planted rills and canals adding interest and greenery to the courtyard environment.



Selecting Flow Controls

Controflow products are specifically designed for all types of shallow SuDS elements with low flow rates, whether new-build or retrofit. Use the Product Selector Table to identify typical SuDS Applications and specific product Features

Level or Stepped Inverts?

If the discharge route for runoff is through a series of 'green infrastructure' features at or near the surface – like filter strips, filter drains, swales, basins, wetlands, ponds and bioretention raingardens – then flow controls will need to be shallow, accessible and restrict flows to low flow rates. A level invert arrangement is needed so that inlets into subsequent SuDS features are above final storage levels to maximise storage in open SuDS features and reduce risk to people using the SuDS landscape.

Where the discharge route is to the storm sewer or combined sewer – particularly in SuDS retrofit – and the sewer is significantly below the adjacent construction surface, then a stepped invert should be selected to provide cover and avoid unnecessary encasement of pipe outlets to the sewer system.

Guarded or Unguarded Orifices?

All openings in drainage systems are at risk from blockage irrespective of the size of the opening. However, Controflow orifice openings regularly go down to 10mm and in more than 20 years there has not been one report of blockage.

Permeable paving and filter drains themselves provide complete upstream protection to the flow control orifice and orifice guards are therefore unnecessary. In contrast, open 'green infrastructure' features rely on a combination of vegetation to trap debris that is heavier than water, including silt, and Controflow SuDS Baskets with stone fill help to prevent floating debris entering the flow control chamber. In addition, flow controls with an integral upstream orifice guard are recommended.

| Applications | Universal SUDS02005 | Mini SUDS01111 | Micro SUDS01001 | Domestic SUDS01101 | Housing SUDS02008 | Commercial SUDS03001 | Combi SUDS02009 |
|--------------------------------------|------------------------|-------------------|--------------------|-----------------------|----------------------|-------------------------|--------------------|
| Permeable paving | ● | ● | ● | ● | ● | ● | ● |
| Green infrastructure | ● | | | | | | |
| Filter drains | ● | | ● | | | | |
| Attenuation tanks | ● | | | ● | | | ● |
| Site outfalls or general drainage | ● | | | | | | ● |

Features

| | | | | | | | |
|-------------------------------|---|---|---|---|---|---|---|
| Level inverts | ● | ● | ● | | | | ● |
| Stepped inverts | | | | ● | ● | ● | |
| Integral overflow | ● | ● | | | ● | ● | ● |
| 110mm connections | ● | ● | ● | ● | ● | | ● |
| 160mm connections | ● | | | | | ● | ● |
| Guarded orifice | ● | | | ● | ● | ● | |
| Outfalls to combined sewer | | | | | | | ● |

Controflow Universal

SUDS02005

Applications: all SuDS elements, particularly those that do not provide filtration for orifice protection and at the end of the management train.

The Controflow Universal 500mm features a slide-out plate with guarded orifice and weir overflow. Suitable for all SuDS elements, it offers design flexibility, with 110mm or 160mm pipe connections, for depths up to 1.2m.

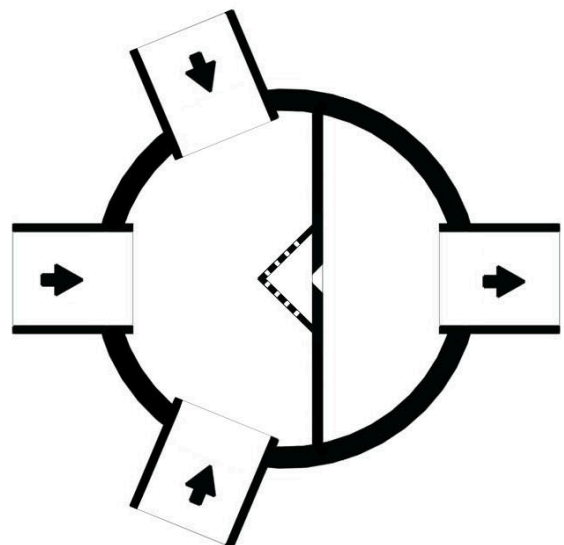
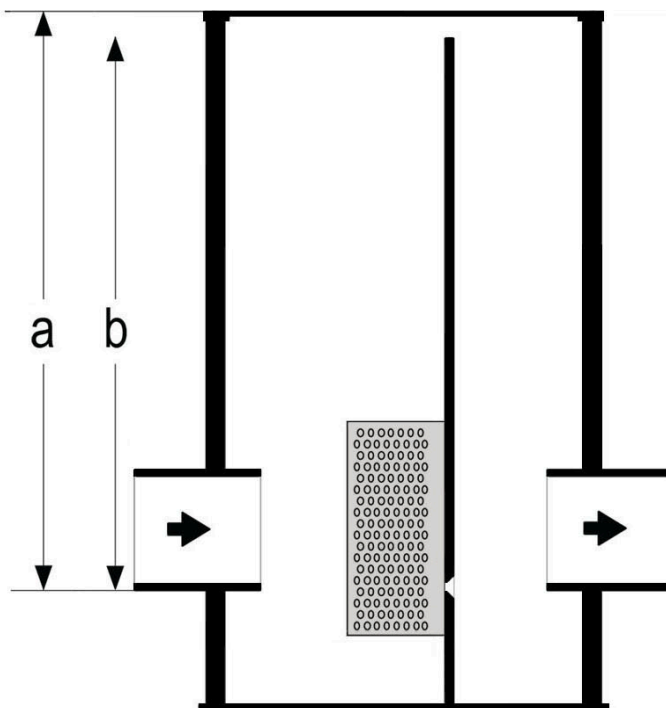
A flexible, universal flow control chamber suitable for any SuDS technique, with level inverts. The slide-out centre plate contains a circular orifice (to specified diameter), protected by an upstream guard, and acts as an overflow weir. Additional orifices can be added to order.

Three 160mm diameter inlet pipe connection stubs offer layout flexibility. Supplied with a temporary protective site cover (permanent cover and frame not included). Suitable for depths ranging from 537mm to 1.2m (finished cover to base). An optional foul air trap is available for use when connected to combined sewers. The chamber is fully compatible with 'Cloud Water Control' wireless SuDS monitoring systems to remotely monitor live and historical stormwater performance.



Please specify:

- Cover to inlet depth 'a'
- Weir to inlet depth 'b' (Head Driving Flow)
- Type/depth of cover/frame to be used
- Any additional orifice positions and diameters
- If foul air trap is required
- Orifice diameter



Controflow Mini

SUDS01111

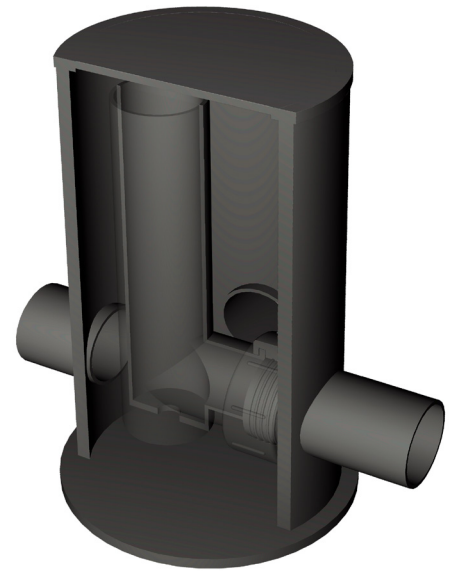
Applications: permeable paving, shallow underground storage structures or where haunching or other underground obstruction prevents the use of the shallow Micro level invert chamber.

The Controflow Mini 315mm offers simple, cost-effective intermediate flow control for small sub-catchments. Suitable for filtering SuDS elements, notably permeable paving, it incorporates 110mm pipe connections including an overflow, for depths up to 700mm (min. 330mm).

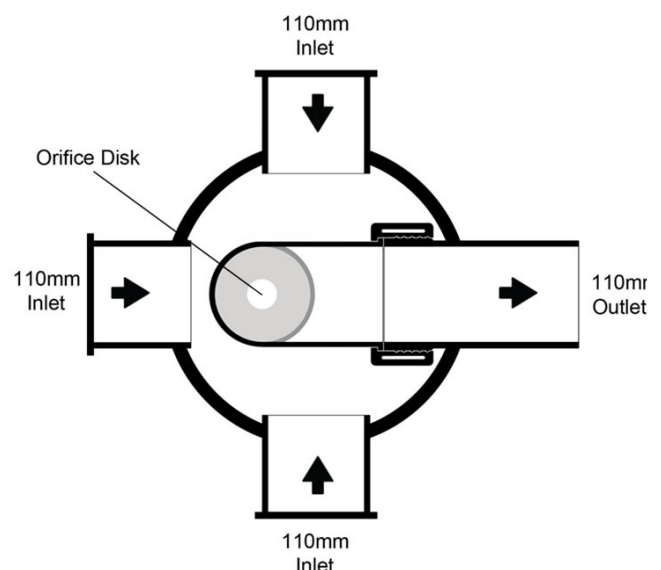
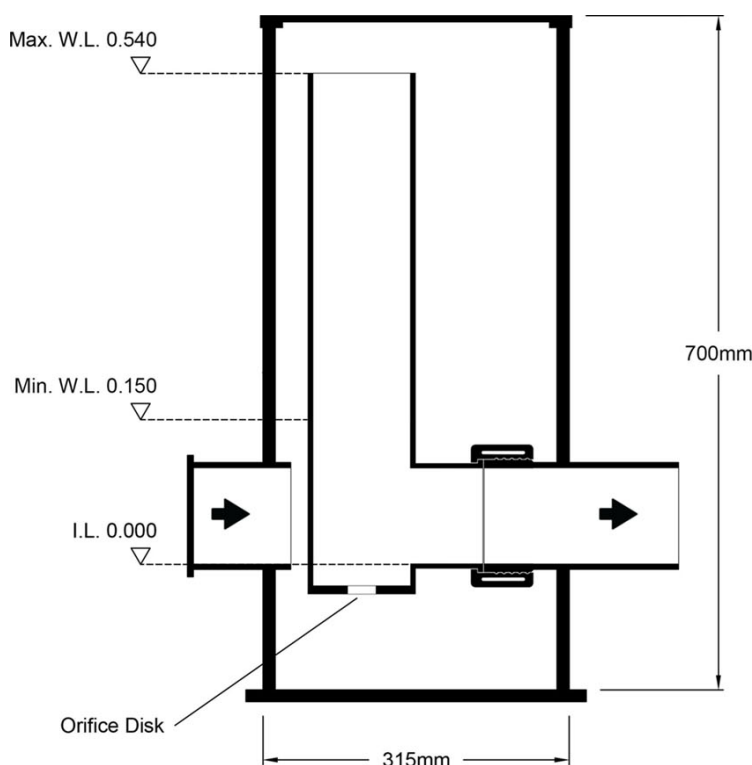
A standardised shallow flow control chamber with an un-guarded single orifice (to specified diameter), designed to manage outflows from permeable paving or other filtering SuDS elements. Its design assumes that the 'protected orifice principle' is provided upstream in the SuDS feature, to prevent blockage of the flow control chamber by silt or other debris.

The small size and low cost enable multiple Controflow Mini chambers to be deployed for simple intermediate flow control throughout management trains, such as check dams between permeable paving compartments. A Controflow Universal chamber should be used as the final flow control in any sequence of SuDS features.

A particular benefit of the Controflow Mini is the presence of a 100mm pipe overflow in the event of surcharge during exceptional rainfall. The orifice/overflow unit can be disconnected (by hand operation of the screw-collar) and removed for annual inspection or cleaning, also enabling access to the discharge pipe. Three 110mm diameter inlet pipe connection stubs offer layout flexibility. Manufactured with a depth of 700mm, the chamber (and overflow pipe to suit) can be cut on site or at the factory to order, as required. Supplied with a temporary protective site cover (permanent cover and frame not included).



Please specify:
• Orifice diameter



Controflow Micro

SUDS01001

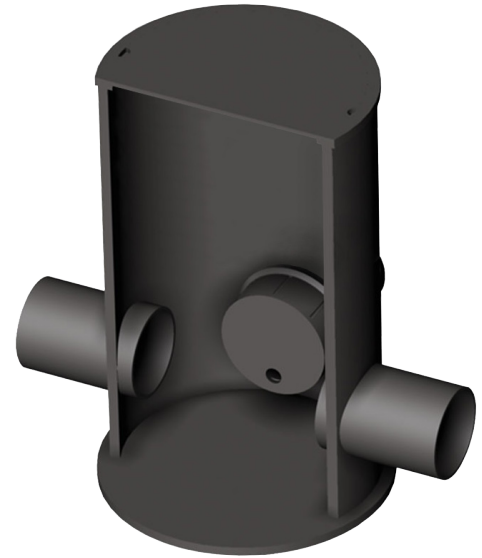
Applications: permeable paving, filter drains and other shallow SuDS elements.

The Controflow Micro 315mm offers simple, cost-effective intermediate flow control for small sub-catchments. Suitable for filtering SuDS elements, notably permeable paving, it incorporates 110mm pipe connections for depths up to 700mm.

A standardised shallow flow control chamber with an un-guarded single orifice (to specified diameter), designed to manage outflows from permeable paving or other filtering SuDS elements. Its design assumes that the 'protected orifice principle' is provided upstream in the SuDS feature, to prevent blockage of the flow control chamber by silt or other debris.

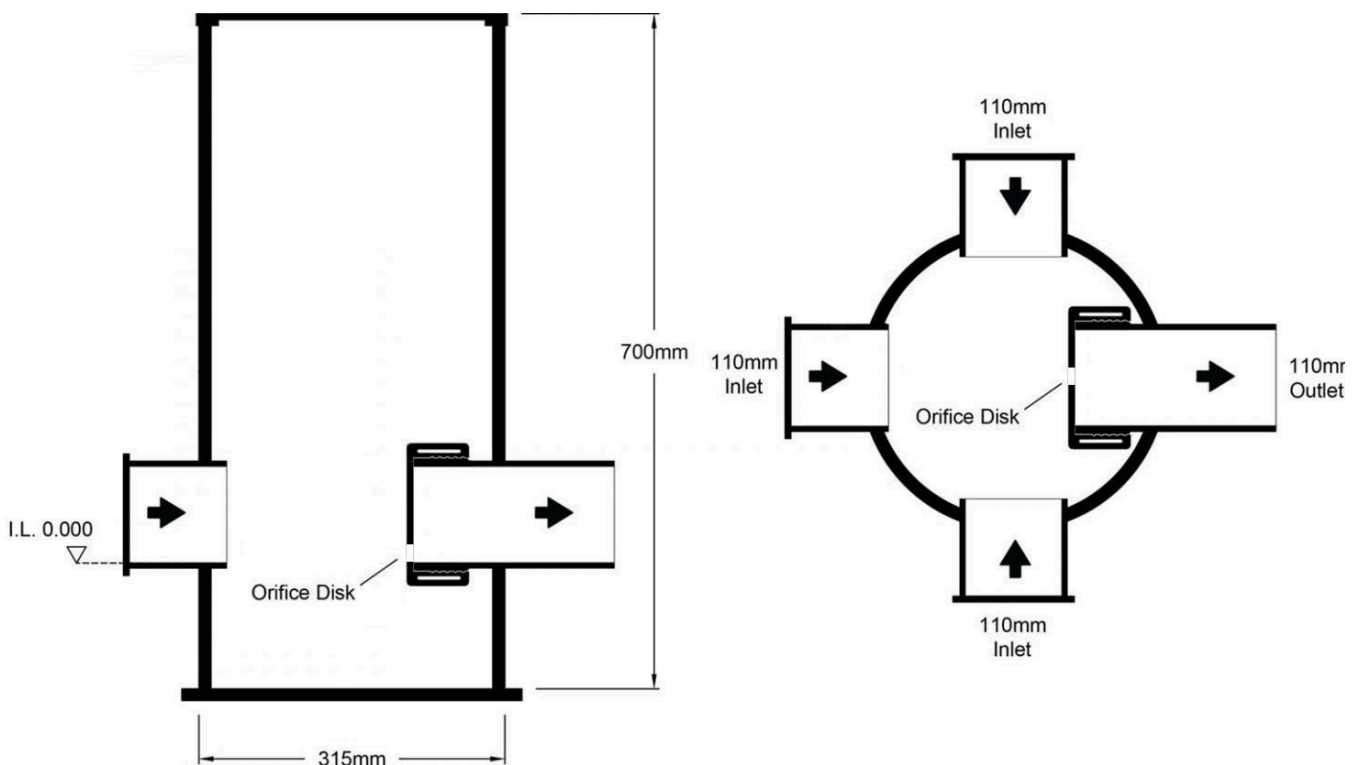
The small size and low cost enable multiple Controflow Mini chambers to be deployed for simple intermediate flow control throughout management trains, such as check dams between permeable paving compartments. A Controflow Universal chamber should be used as the final flow control in any sequence of SuDS features.

Three 110mm diameter inlet pipe connection stubs offer layout flexibility. Manufactured with a depth of 700mm, the chamber can be cut on site or at the factory to order, as required (min 330mm depth). Supplied with a temporary protective site cover (permanent cover and frame not included).



Please specify:

- Orifice diameter



Controflow Domestic

SUDS01101

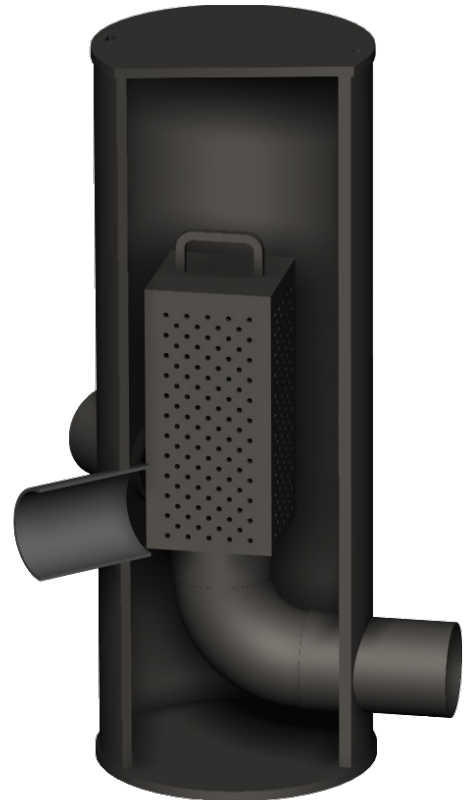
Applications: permeable paving, shallow underground storage structures or where haunching or other underground obstruction prevents the use of the shallow Micro level invert chamber.

The Controflow Domestic 315mm offers simple, cost-effective intermediate flow control for small sub-catchments. Suitable for filtering SuDS elements, notably permeable paving, it incorporates 110mm pipe connections for depths up to 782mm.

A small flow control chamber with a 110mm diameter inlet and protected orifice located at the base of a removable flow control tube. The flow control tube allows access to a deeper chamber where pipe inlet depth is obstructed by other construction factors like kerb haunching or existing pipe work.

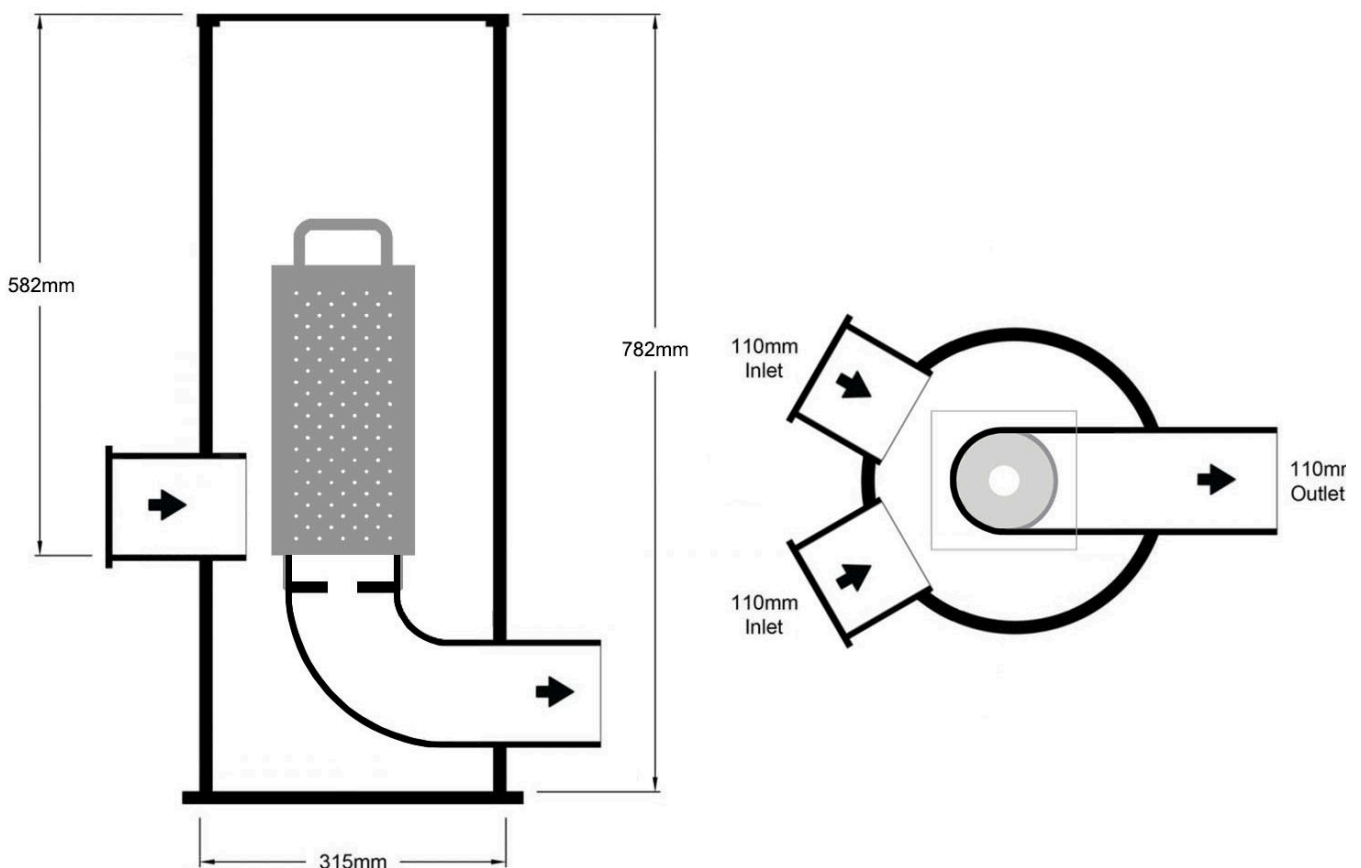
The removable flow control tube is perforated to protect the orifice in the base of the tube. The handle to the tube provides access by hand for inspection and cleaning. This product does not incorporate an internal overflow (if required, use Controflow Mini or Universal).

Two 110mm diameter inlet pipe connection stubs offer layout flexibility. Supplied with a temporary protective site cover (permanent cover and frame not included).



Please specify:

- Orifice diameter
- Depth of cover/frame to be used



Controflow Housing

SUDS02008

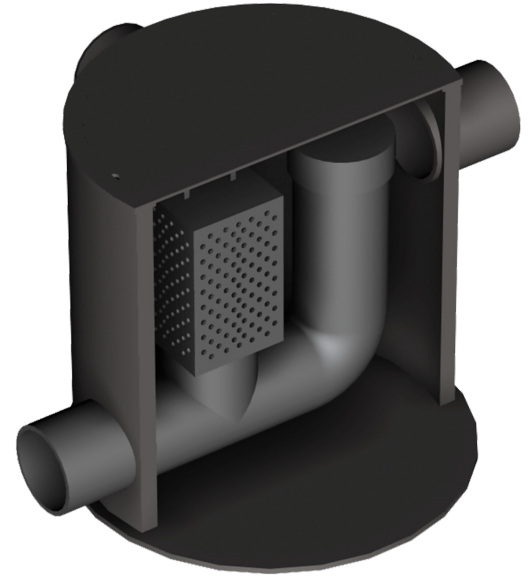
Applications: commercial permeable paving.

The Controflow Housing 500mm offers simple, cost-effective intermediate flow control for larger sub-catchments. Suitable for filtering SuDS elements, notably permeable paving, it incorporates 110mm pipe connections for depths up to 566mm.

A standard flow control chamber with a single, guarded orifice (to specified diameter), designed to manage outflows from permeable paving or other open graded sub-base construction. Stepped inverts simplify the construction of transitions from shallow permeable paving to deeper constructions.

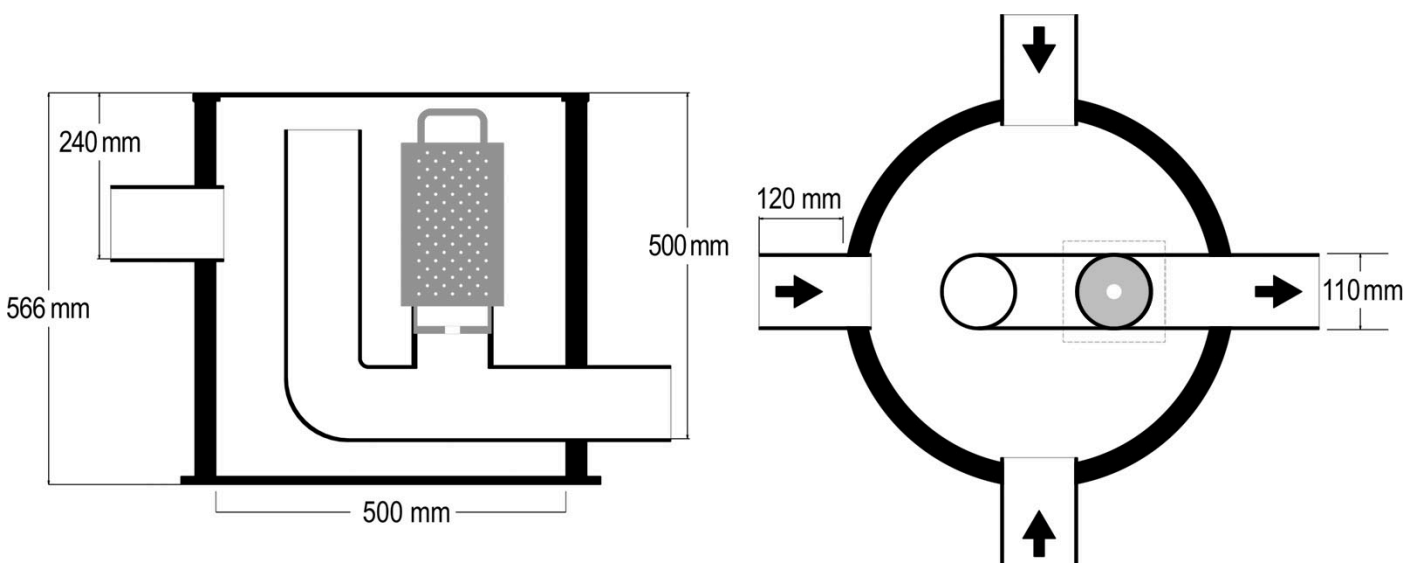
The protective guard and orifice cap are removable, and the rodding access upstand can act as an overflow with its cap removed. Three inlet pipe connection stubs offer layout flexibility. Supplied with a temporary protective site cover (permanent cover and frame not included).

Bespoke flow control chambers can be manufactured to suit specific requirements.



Please specify:

- Orifice diameter



Controflow Commercial

SUDS03001

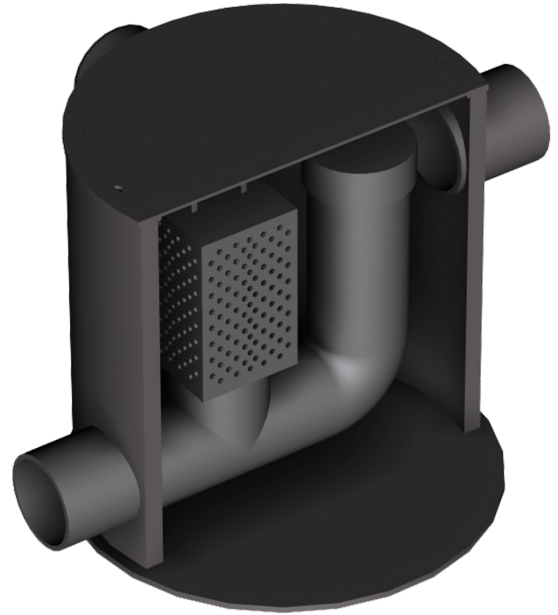
Applications: commercial permeable paving.

The Controflow Commercial 600mm offers simple, cost-effective intermediate flow control for large sub-catchments. Suitable for filtering SuDS elements, notably permeable paving, it incorporates 160mm pipe connections for depths up to 612mm.

A standard flow control chamber with a single, guarded orifice (to specified diameter), designed to manage outflows from permeable paving or other open graded sub-base construction. Stepped invert simplifies the construction of transitions from shallow permeable paving to deeper constructions.

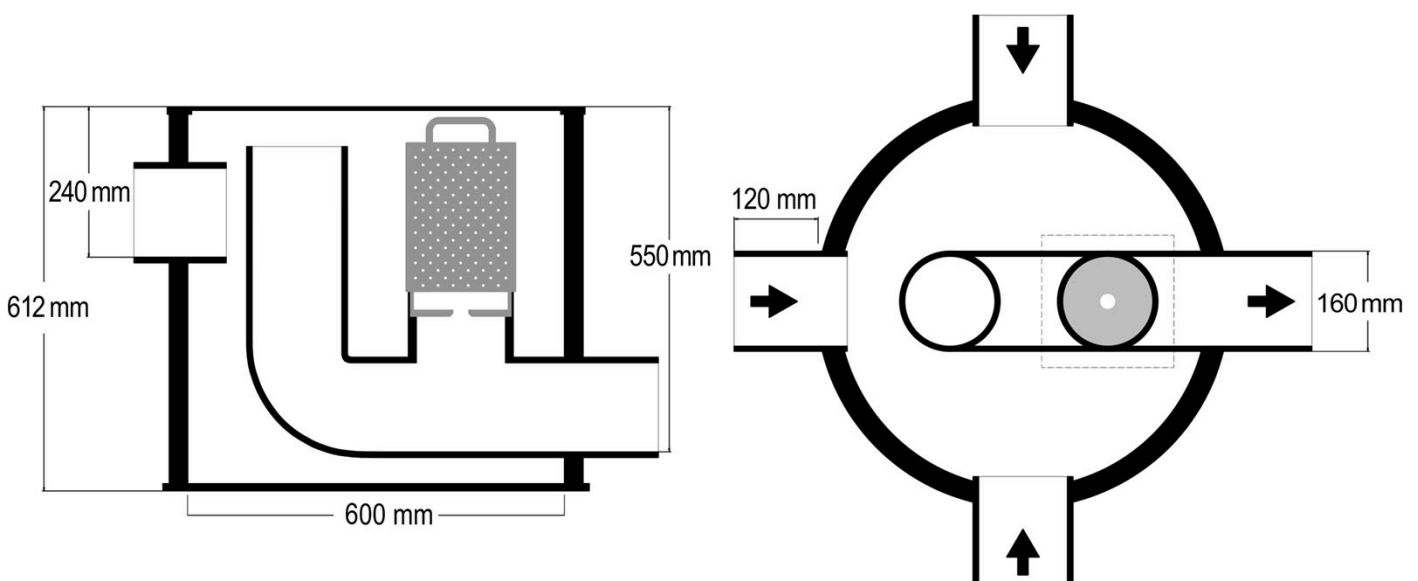
The protective guard and orifice cap are removable, and the rodding access upstand can act as an overflow with its cap removed. Three inlet pipe connection stubs offer layout flexibility. Supplied with a temporary protective site cover (permanent cover and frame not included).

Bespoke flow control chambers can be manufactured to suit specific requirements.



Please specify:

- Orifice diameter



Controflow Combi

SUDS2009

Applications: for connecting SuDS features to combined sewers, such as retrofit raingardens and at the end of the management train.

The Controflow Combi 500mm features a slide-out plate with orifice and a non-return valve. For connections to combined sewers, it offers design flexibility, with 110mm or 160mm pipe connections, for depths up to 1.2m.

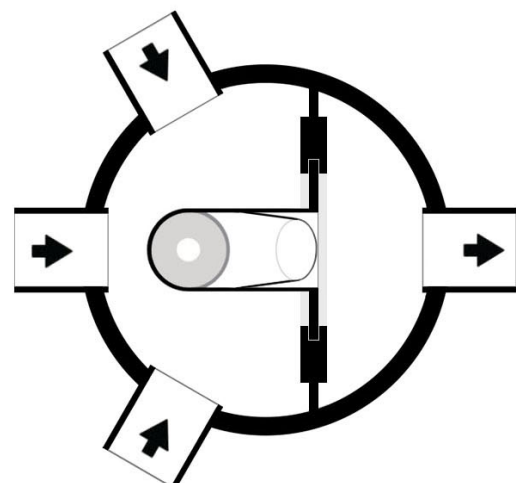
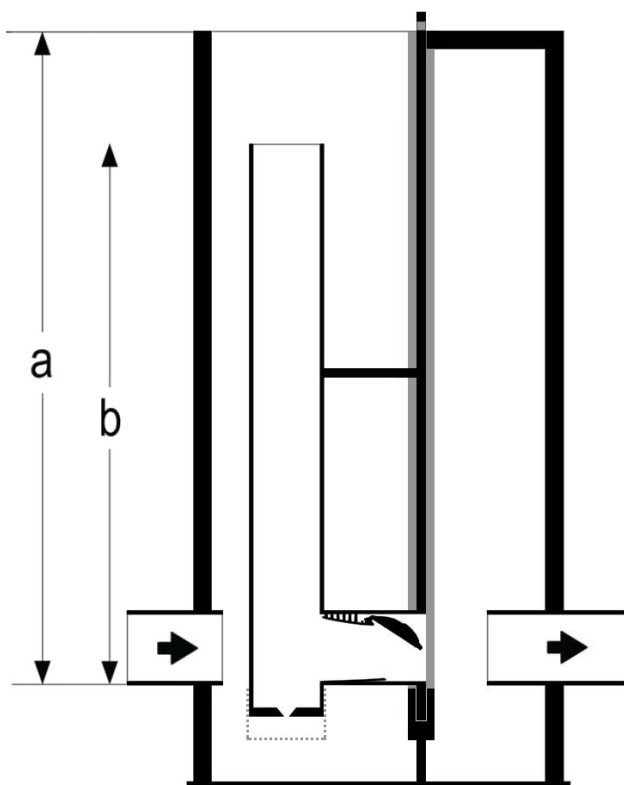
The Controflow Combi is a flexible flow control chamber specifically for connection of SuDS features and site outfalls to combined sewers. The slide-out centre plate assembly includes a vertical pipe with an orifice control (optional stainless steel 10mm mesh guard available) and overflow, protected by a non-return valve outlet.

Three inlet pipe connection stubs, either 110mm or 160mm diameter, offer layout flexibility. Supplied with a temporary protective site cover (permanent cover and frame not included). An optional foul air trap is available for use when connected to combined sewers. The chamber is fully compatible with 'Cloud Water Control' wireless SuDS monitoring systems to remotely monitor live and historical stormwater performance.



Please specify:

- Cover to inlet depth 'a'
- Weir to inlet depth 'b' (Head Driving Flow)
- Type/depth of cover/frame to be used
- If foul air trap is required
- Orifice diameter



Controflow Inlet/Outlet Baskets

SUDS08401 / SUDS08402

Applications: diffuse inbound or outbound flows for landscaped SuDS systems

Controflow Inlet/Outlet SuDS Baskets are manufactured from stainless steel mesh for filling with 80mm - 150mm stone* and act as protective pipe inlets or outlets. Each basket is supplied flat with crimp clips (fitted at 200mm centres) and a geotextile liner for the sides, base and (temporary) lid.

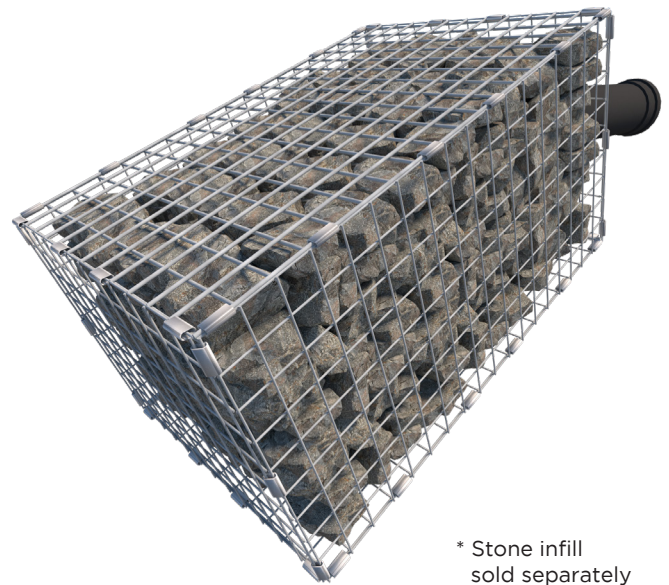
Laying Instructions are available.

Used as attractive pipe inlet or outlet units within landscaped SuDS features such as swales, ponds and basins. They diffuse inbound and outbound flows, and conceal and protect the pipe. Each basket is supplied with a stainless steel mesh pipe guard. The pipe exit location is flexible but should avoid the box hinge and can be determined on site depending on local requirements.

Please specify:
• Pipe diameter



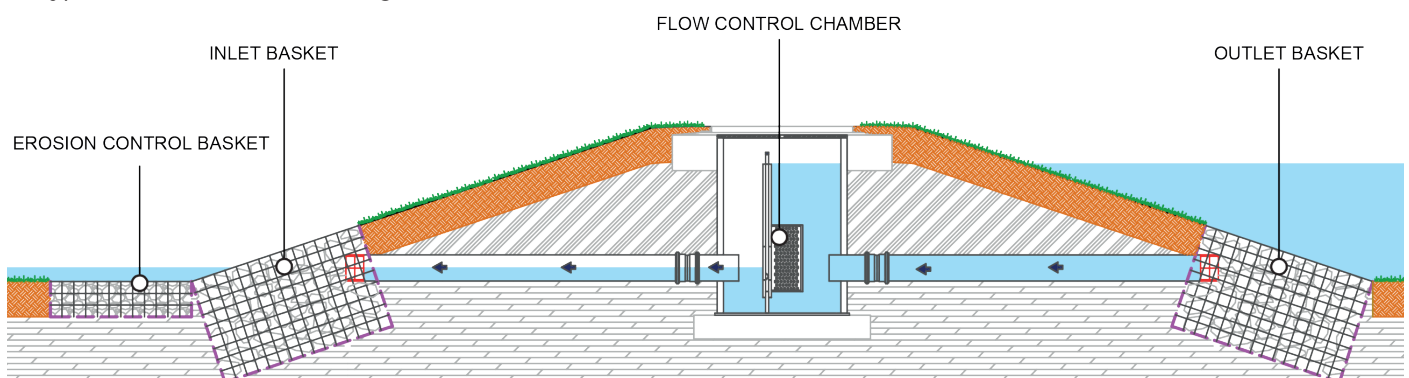
750x600x450mm SUDS08401
– ideally suited to 100mm pipe



* Stone infill
sold separately

900x600x450mm SUDS08402
– ideally suited to 150mm pipe

A Typical Basin to Swale Arrangement



Controflow Erosion Control Baskets

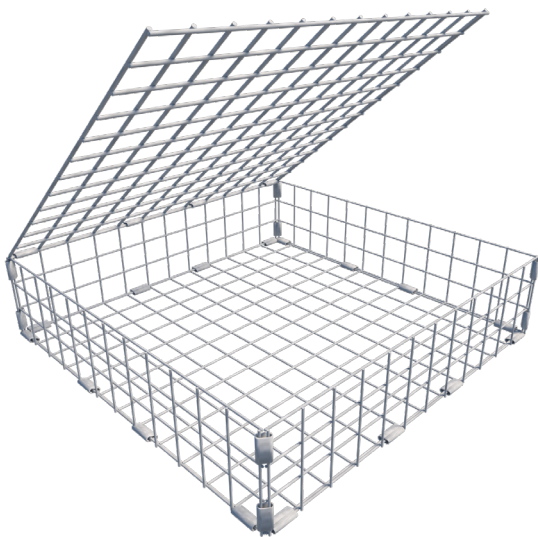
SUDS08100 / SUDS08101

Applications: protect soil surfaces from pipe outlets and low flow channels on slopes

Controflow Erosion Control SuDS Baskets are manufactured from stainless steel mesh for filling with 80mm - 150mm stone* and enable diffuse water flows down slopes to avoid erosion. Each basket is supplied flat with crimp clips (fitted at 200mm centres) and a geotextile liner for the sides, base and (temporary) lid.

Laying Instructions are available.

Used where pipe outfalls and low flow channels deliver water down slopes from SuDS features. The shallow basket is laid dry onto subsoil with a geotextile surround to each basket to prevent erosion of soil. The surface face is left open to allow water to flow in the basket or for vegetation cover.



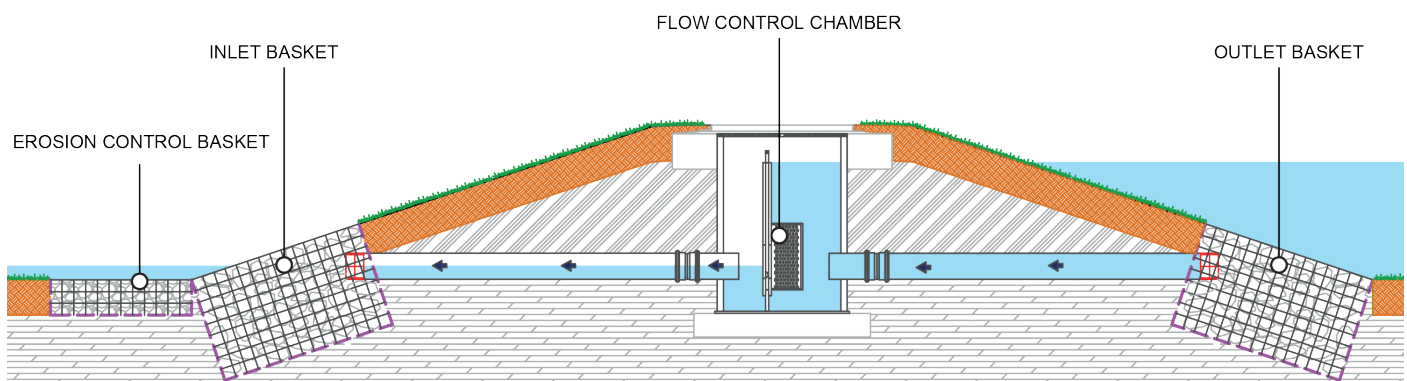
600x600x150mm SUDS08100



* Stone infill
sold separately

600x300x150mm SUDS08101

A Typical Basin to Basin Arrangement





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