

STORMWATER ATTENUATION AND INFILTRATION SYSTEM

Assembly and Installation Instructions







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ACO StormBrixx

Stormwater attenuation and infiltration system

This instruction document provides guidance on the installation of an ACO StormBrixx system.

Prior to installation remember:

- ACO StormBrixx units should be installed in accordance with the installation instructions and relevant legislation. Special attention should be paid to temporary work requirements in excavations.
- ACO can give guidance with respect to the most suitable methods of installation for the ACO StormBrixx range.
- ACO StormBrixx should be installed using acceptable levels of workmanship and according to the National Code of Practice (BS 8000-14:1989).
- Detailed installation statements and methodologies will vary for all sites as each will have different aspects deserving particular consideration. Consequently the relevant approvals should be sought from the consulting engineer and/or the installer.
- Full product technical data can be found in the ACO StormBrixx brochure visit
 www.aco.co.uk/products/stormbrixx/

Post installation protection of ACO StormBrixx

The ACO StormBrixx system is designed to withstand loadings from landscaped areas, car parks and service yards (subject to design criteria). However, after installation and backfilling, but prior to final surfacing, we recommend that the tank area is fenced off with high visibility fencing and traffic is prohibited from using the footprint area of the tank.

ACO StormBrixx is not designed to provide a load platform for construction traffic and should be treated accordingly. This action will protect the long term loading performance of the tank's structure.

The client should provide sign posts indicating maximum loads allowable over the tank footprint, to ensure the long term stability of the system is assured.

Overview of the ACO StormBrixx SD components







		Length	Width	Depth	Weight
Product	Description	[mm]	overall [mm]	overall [mm]	[kg]
314090	Half body/Layer piece manufactured from polypropylene (PP)	1200	600	494	9.41

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Product	Description	Length [mm]	Width overall [mm]	Depth overall [mm]	Weight [kg]
314091	Side plate made from polypropylene (PP)	907	592	104	3.13

Overview of the ACO StormBrixx SD components



Product	Description	Length [mm]	Width overall [mm]	Depth overall [mm]	Weight [kg]
314092	Top cover made from polypropylene (PP) – set of four	550	550	45	0.76





Product	Description	Length [mm]	Width overall [mm]	Depth overall [mm]	Weight [kg]
314094	Half cover layer plate	1200	600	94	-





Product	Description	Length [mm]	Width overall [mm]	Depth overall [mm]	Weight [kg]
314098	Half layer side panel	450	592	104	1.5



Product	Description	Length [mm]	Width overall [mm]	Depth overall [mm]	Weight [kg]
314093	Layer connectors	53.4	44.2	26.5	0.1



		Length	Width	Depth	Weight
Product	Description	[mm]	overall [mm]	overall [mm]	[kg]
27262	Horizontal pipe connectors*	595	Ø375**	910	5.4
27263	Horizontal pipe connectors*	595	Ø400**	910	6.0
27264	Horizontal pipe connectors*	595	Ø450**	910	6.84
27265	Horizontal pipe connectors*	595	Ø500**	910	7.44

*Other ancillaries can be found on page 5 ** Internal width shown here

Overview of the ACO StormBrixx HD components







Product	Description	Length [mm]	Width overall [mm]	Depth overall [mm]	Weight [kg]
314020	Half body/Layer piece manufactured from polypropylene (PP)	1200	600	305	10.0
314061	Half body/Layer piece manufactured from recycled polypropylene (PP)	1205	602	306	10.0





Product	Description	Length [mm]	Width overall [mm]	Depth overall [mm]	Weight [kg]
314021	Side plate made from polypropylene (PP)	580	578	35	1.6



		Length	Width	Depth	Weight
Product	Description	[mm]	overall [mm]	overall [mm]	[kg]
314022	Top cover made from polypropylene (PP) – set of four	550	550	43	0.8



		Length	Width	Depth	Weight
Product	Description	[mm]	overall [mm]	overall [mm]	[kg]
314023	Layer connectors	100	40	46	0.1



		Length	Width	Depth	Weight
Product	Description	[mm]	overall [mm]	overall [mm]	[kg]
27034	Remote access chamber module	594	594	610	32



		Length	Width	Depth	Weight
Product	Description	[mm]	overall [mm]	overall [mm]	[kg]
27105	Horizontal pipe connectors*	595	Ø375**	605	4.5
27101	Horizontal pipe connectors*	595	Ø450**	605	5.7
27102	Horizontal pipe connectors*	595	Ø500**	605	6.2

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Overview of the ACO StormBrixx SD and HD ancillaries







Product	Description	Width overall [mm]	Depth overall [mm]	Weight [kg]
27018	Vertical connector for inspection point	Ø225*	200	2.5

This product is only suitable for StormBrixx HD

Depth

Weight

Product	Description	Width overall [mm]	Depth overall [mm]	Weight [kg]
314057	Vented cover Ø600mm Load Class D 400	Ø745	102.5	41

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Product	Description	overall [mm]	overall [mm]	[kg]
314056	Access chamber Ø450mm ductile iron cover Load Class D 400	Ø528	110	38

Product	Description	Width overall [mm]	Depth overall [mm]	Weight [kg]
314055	Access chamber 450mm ductile iron vented cover Load Class D 400	Ø528	110	38

Product	Description	Length [mm]	Width overall [mm]	Depth overall [mm]	Weight [kg]
314045	Inspection point Ø225mm ductile iron cover Load Class D 400	410	410	180	52

This product is only suitable for StormBrixx HD, it is used in conjunction with 27018

Width

Product	Description	Length Width [mm] overall [mm		Depth overall [mm]	Weight [kg]
314075	Remote access plate	650	650	120	4.74



Product	Description	Width Depth Effective depth overall [mm] overall [mm] when connected [mm]		Effective depth when connected [mm]	Weight [kg]
314038	Inspection/rising shaft	437	350	250	2.6

ACO StormBrixx

Product	Description	Length [m]	Nominal width overall [mm]	Thickness [mm]	Mass per unit area [g/m²]	Weight [kg]
27044	ACO double sided butyl mastic tape	15	100	605	605	0.75
27045	Ø110 flexible top hat	-	Ø110	605	605	1.25
27046	Ø160 flexible top hat	-	Ø160	605	605	1.40
27047	Ø225 flexible top hat	-	Ø225	605	605	1.75
27048	Ø300 flexible top hat	-	Ø300	605	605	1.75

Geotextiles and geomembranes: specification and performance data

ACOTex plus protection fleece



Manufactured from polypropylene this thick non-woven protection fleece is used to protect a geomembrane from mechanical damage due to ground and thermal movement. The protection fleece is placed on the outer side of the geomembrane. ACOTex Plus can be used with ACOWrap or with a welded geomembrane system.

Product Code: 27041

Description		Mechanically bonded continuous filament non-woven sheet
Material		100% UV stabilised polypropylene
Sheet dimensions	Length [m]	100
	Width [m]	4
Material thickness (for 2 kPa)	[mm]	2.9
Material mass per unit area	[g/m²]	325
CBR puncture resistance	[N]	3850
Strip tensile strength	[md] kN/m	24
	[cd] kN/m	24
Elongation at maximum load	[md]	100%
	[md]	40%
Cone drop test	[mm]	15
Opening size	μm	90
Permeability vertical	l/m²/s	60
Opening size Permeability vertical	μm l/m²/s	90 60

ACOWrap

Product Code: 27042

Description		Geomembrane suitable for taped joints
Sheet dimensions	Length [m]	12.5
	Width [m]	4
Material mass per unit area	[g/m²]	460
Colour		Black

ACOTex infiltration geotextile



A polypropylene permeable non-woven geotextile, for use in infiltration applications. ACOTex permits the passage of water into and out of ACO StormBrixx system, and also prevents the entry of sediment into tanks incorporating sediment forebays.

Product Code: 27038

Description		Mechanically bonded continuous filament non-woven sheet
Material		100% UV stabilised polypropylene
Sheet dimensions	Length [m]	100
	Width [m]	4
Material thickness (for 2 kPa)	[mm]	1
Material mass per unit area	[g/m ²]	125
CBR puncture resistance	[N]	1500
Strip tensile strength	[md] kN/m	9
	[cd] kN/m	10
Elongation at maximum load	[md]	90%
	[md]	65%
Cone drop test	[mm]	24
Opening size	μm	105
Permeability vertical	l/m²/s	115



An impermeable self-install geomembrane using taped joints for 'non sensitive' attenuation applications. For sensitive applications ACO recommends the ACO StormBrixx system is installed by ACO recommended lining contractors using a geomembrane system with 100% watertight welded joints.

How to build a StormBrixx system

This page will demonstrate:

- How to construct a single StormBrixx unit
- How to build a StormBrixx system
- Brick and cross bonding

An installation video and further system configurations including perimeter and concentric ring examples can be found on the StormBrixx website.

Visit www.aco.co.uk/products/stormbrixx/

The images below demonstrate how to build a simple ACO StormBrixx system utilising the brick and cross bonding feature. This patented bonding feature provides unparalleled stability in the construction of the tank and the ability to create a single layer of interlocked units.

Constructing a single unit

- 1 A single tank body consists of eight columns, four with spigots and four with sockets
- 2 Invert second tank body and place on top of the first
- 3 Align spigots and sockets and push bodies together ensuring all columns are engaged

Note: Once engaged the two bodies are designed to stay connected



Recommended installation

Concentric ring layout

A series of ever decreasing rings converging towards the centre of the system. Place in a brick bonded method. Repeat for subsequent layers using the connectors to bond layers to one another.







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Installation of the access chamber

This page will:

- Give an overview the access chamber module features and pipe connections
- Explain how to build the StormBrixx access chamber

Building the StormBrixx access chamber

- **1** Cutting the unit for pipe connections Pipe connections are provided on each side of the access chamber. Recessed cutting lines are provided for guidance.
- 2 Removing the base for multi-layered systems If using more than one access chamber module in a stack, remove the base from all modules except the base unit. Cut along the recessed cutting line provided and remove base.
- 3 Adding StormBrixx modules and main unit connection Once the bases of the upper module(s) have been removed, simply stack the units on top of each other ensuring that each module is clipped to the main structure using the ACO StormBrixx layer connectors. Remove 375mm panel from each module.



Access chamber module overview

- Each module has 150mm, 225mm, 300mm and 375mm inlet and outlet pipe connections
- A 375mm cut out for access
- 100mm or 150mm cut outs for ventilation
- A Load Class D 400 ductile frame and cover available
- Inspection points can be added for remote CCTV and jetting equipment access



An example ACO StormBrixx system complete with access chambers

----- Perimeter of the ACO StormBrixx access chamber



Guide to installing an ACO StormBrixx attenuation system

General advice

If the ACO StormBrixx system is to be located in areas of high groundwater table, contaminated land, close proximity to buildings, or where the risk of contamination from surface water is high, ACO strongly recommend that the lining system is installed by a competent, qualified geomembrane lining contractor. Please consult the ACO Water Management Design Services Team on 01462 816666 for further advice.

Installation guidance

ACO can give guidance with respect to the most suitable methods of installation for the ACO StormBrixx range. ACO StormBrixx should be installed using acceptable levels of workmanship and according to the National Code of Practice (BS 8000-14:1989).

Detailed installation statements and methodologies will vary for all sites as each will have different aspects deserving particular consideration, consequently the relevant approvals should be sought from the consulting engineer and/or the installer.

Manhole and inspection covers should be fitted in accordance with the relevant section from the Manual of Contract Documents for Highways Work (MCHW), and ACO's installation recommendations

Step 1

Excavate the pipe trench and lay the inlet pipe to the required fall and invert level, install silt traps in appropriate locations in the pipe run or use the ACO StormBrixx access chamber.





Step 2

Excavate the hole or trench to the required dimensions to receive the ACO StormBrixx tanks, and any external inspection chamber(s), silt trap(s) and/or low flow channels & distribution pipes.

Step 3

Ensure that the base plan dimensions of the hole allow a minimum of 300mm working space on all sides for the site operatives to manoeuvre the ACO StormBrixx units, geotextile and geomembrane into position. Ideally mark out the plan area with spray paint or chalk line.

Ensure that the base of the excavation is smooth and level and capable of withstanding the design loads, batter back the sides of the excavation to a safe angle, and ensure that safe access is provided for the site operatives. The excavation should be carried out in accordance with BS 6031:2009 with particular attention paid to safety procedures.

Step 5

Ensure that ground bearing capacity at formation level is adequate for design loads (min 5% CBR). Remove any soft spots from the excavation and replace with compacted granular material.

Step 6

Lay 100-150mm of 10/20mm single size stone to the base of the excavation and level. It is essential that the bedding layer is correctly levelled, smoothed and well compacted.



Step 7

Lay the geotextile over the bedding and up the sides of the excavation with minimum 300mm overlap joints between strips. Inspect geotextile for damage.





Step 8

Fabricate the geomembrane liner, bearing in mind the general advice above and the specifications in the ACO StormBrixx brochure, and ensure all joints or welds are tested. If in doubt please consult the ACO Water Management Design Services Team for further advice.



Step 9

Assemble the ACO StormBrixx modular units to the plan size and unit configuration required and place on the geomembrane. Ensure any loose complete units are fixed together using the ACO StormBrixx layer connector. Examples of system configurations can be found in the ACO StormBrixx brochure.

If a sediment tunnel has been specified, lay the units with two side panels directly inline with the inlet and outlet pipes and encapsulate in ACOTex geotextile. Place the remainder of the ACO StormBrixx units either side of the sediment tunnel. Where necessary, insert ACO StormBrixx connectors between the layers of the ACO StormBrixx units. At the perimeter of the tank construction use side panels on all external boxes of the sediment tunnel to create a rigid sidewall.





If a low flow drain down facility has been specified it will be necessary to install a row of ACO StormBrixx units in a trench below the main attenuation volume in line with the inlet & outlet connections. This row needs to have side panels on all outer edges and to be enveloped with a protection fleece and geomembrane on three sides.



Step 11

Form hole(s) in the side panel of ACO StormBrixx unit using a hole saw and jigsaw to receive the inlet pipe (outlet/inspection/vent pipe if required). Insert tank connector together with geomembrane top hat if required. Ensure top covers are installed on the top layer of the system.

Step 12

Carefully cut geomembrane around pipe protrusions and weld top hat to the geomembrane tank liner. Then seal geomembrane top hat to the pipe or tank connector. Test all joints for leaks.

Step 13

Continue with the geomembrane encapsulation using welded or taped joints as appropriate. If protrusions exist for venting then repeat step 12.



Check for leaks and test seals.

Step 15

Continue with the outer protection encapsulation of the geomembrane and ACO StormBrixx system. Fold the corners of the protection fleece over-run at each end of the attenuation tank.





Step 16

Complete the encapsulation by wrapping the protection fleece horizontally round the tank and tape into position.

Step 17

Connect inlet/outlet/vent pipe and access chamber using appropriate adaptors. One \emptyset 110mm vent pipe is required per 7500m² of the area to be drained.

Step 18

Backfill the sides of the tank with a minimum of 100-150mm 10/20mm stone, for protection of the geomembrane. Side backfill outside of this is site specific and as per the Geotechnical Engineers requirements. Protection board may be required for deeper excavations and larger particle sizes.

Step 19

Use either 150mm 6H Sharp sand or 10/20mm single size stone to cover the exposed surface of the tank. This acts as a further protection layer and following completion of this, selected backfill material should be installed in layers of 150mm. These layers should not be vibrated until 450mm from the soffit of the tank is reached. Within 450mm of tank a small roller or excavator may be used to gently compact the materials.

Step 20

The area should then be compacted using suitable compaction equipment in accordance with the Manual of Contract Documents for Highway Works (MCHW) volumes 1 & 2:

Trafficked areas (eg restricted access car parks):

Type 1 or 2 sub-base material compacted in 150mm layers in accordance with MCHW Volumes 1 & 2. Compaction plant over top of system should not exceed 2300kg per metre width. Where the units are to be installed beneath a paved area the pavement sub-base may form part of the backfill material provided minimum cover depths are maintained (refer to page 18 of the ACO StormBrixx brochure).

Landscaped and non-trafficked areas:

Selected as-dug material with size of particles less than 40mm within 300mm of the top of the units. Above this level selected as-dug material may be used. Place backfill and compact in layers no greater than 300mm. Compaction plant over top of system must not to exceed 2300kg per metre width.

Guide to installing an ACO StormBrixx infiltration system

General advice

The ACO StormBrixx units should be installed in accordance with the installation instructions and relevant legislation. Special attention should be paid to temporary work requirements in excavations. Please consult the ACO Water Management Design Services Team on 01462 816666 for further advice.

Installation guidance

ACO can give guidance with respect to the most suitable methods of installation for the ACO StormBrixx range. ACO StormBrixx should be installed using acceptable levels of workmanship and according to the National Code of Practice (BS 8000-14:1989).

Detailed installation statements and methodologies will vary for all sites as each will have different aspects deserving particular consideration, consequently the relevant approvals should be sought from the consulting engineer and/or the installer.

Manhole and inspection covers should be fitted in accordance with the relevant section from the Manual of Contract Documents for Highways Work (MCHW), and ACO's installation recommendations

Step 1

Follow steps 1-7 from the Guide to installing an ACO StormBrixx attenuation system (page 8)

For infiltration applications use coarse sand or class 6H selected granular material in accordance with the Manual of Contract Documents for Highway Works (MCHW) Volumes 1 & 2. It is essential that the bedding layer is correctly levelled and smooth.



Step 8

Assemble the ACO StormBrixx modular units to the plan size and unit configuration required and place on the geotextile. Ensure any loose complete units are fixed together using the ACO StormBrixx layer connector.



Where a sediment forebay has been detailed, form the forebay containment structure around the pipe inlet using side panels on the correct units to the dimensions specified. Ensure top covers are installed on the top layer of the sediment forebay. Encapsulate using ACOTex. Example of system configurations can be found in the ACO StormBrixx brochure.

Visit www.aco.co.uk/products/stormbrixx/

Step 10

Form the remainder of the ACO StormBrixx units to complete the overall dimensions specified.



Step 11

Where necessary insert ACO StormBrixx connectors between layers of the ACO StormBrixx units. At the perimeter of the tank construction use side panels on all external boxes to create a rigid sidewall. Ensure top covers are installed on the top layer of the system.

Step 12

Form hole(s) in the side panel of the ACO StormBrixx unit using a hole saw or jigsaw to receive the inlet pipe (and outlet/inspection/vent pipe if required). Insert tank connector and using ACOTex geotextile form a wrap around apron of the tank connector spigot and secure using tape or jubilee clip. Ensure a minimum 50mm of spigot remains exposed.



Step 13

Continue with the geotextile encapsulation of the ACO StormBrixx system

Step 14

Connect inlet/outlet/vent/inspection using the appropriate adaptors. One 110mm vent pipe is required per 7500m2 of area drained.

Backfill the sides of the tank with a minimum of 100-150mm 10/20mm stone, for protection of the geomembrane. Side backfill outside of this is site specific and as per the Geotechnical Engineers requirements. Protection board may be required for deeper excavations and larger particle sizes.



Step 16

Use either 150mm 6H Sharp sand of 10/20mm single size stone to cover the exposed surface of the tank. This acts as a further protection layer and following completion of this, selected backfill material should be installed in layers of 150mm. These layers should not be vibrated until 450mm from the soffit of the tank is reached. Within 450mm of tank a small roller or excavator may be used to gently compact the materials.

Step 17

The area should then be compacted using suitable compaction equipment in accordance with Manual of Contract Documents for Highway Works (MCHW) Volumes 1 & 2:

Step 18

The pavement construction or landscaping is completed over the ACO StormBrixx system. Please read Postinstallation protection of ACO StormBrixx below.

Trafficked areas (eg restricted access car parks):

Type 1 or 2 subbase material compacted in 150mm layers in accordance with MCHW volumes 1 & 2. Compaction plant over top of system should not exceed 2300kg per metre width. Where the units are to be installed beneath a paved area the pavement sub-base may form part of the backfill material provided minimum cover depths are maintained (refer to page 18 of the ACO StormBrixx brochure).

Post-installation protection of ACO StormBrixx

The ACO StormBrixx system is designed to withstand loadings from landscaped areas, car parks and service yards (subject to design criteria). However, after installation and backfilling, but prior to final surfacing, we recommend that the tank area is fenced off with high visibility fencing and traffic is prohibited from using the footprint area of the tank.

ACO StormBrixx is not designed to provide a load platform for construction traffic and should be treated accordingly. This action will protect the long term loading performance of the tank's structure.

The client should provide sign posts indicating maximum loads allowable over the tank footprint, to ensure the long term stability of the system is assured.

Landscaped and non-trafficked areas:

Selected as-dug material with size of particles less than 40mm within 300mm of the top of the units. Above this level selected as-dug material may be used. Place backfill and compact in layers no greater than 300mm. Compaction plant over top of system must not exceed 2300kg per metre width.



- ACO Water Management Civils + Infrastructure Building + Landscape
- ACO Building Drainage
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