

ACO Water Management: Civils + Infrastructure

Uniclass L7315 + L2123 + L71121+ L731	EPIC J3413 + Q11
CI/SfB (52.5)	

ACO Multiline Sealin



NEW RANGE

ACO Multiline Sealin

Integrated seal medium-duty channel system



Introduction to the ACO Group

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

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

ACO Technologies plc

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

There are now two core divisions, ACO Water management and ACO Building Drainage, that serve every sector of the construction industry, providing solutions for applications as diverse as rail, highways, airports, landscaping, retail, distribution centres and environmentally sensitive projects.



To help architects, designers and contractors meet the legal requirements that now tightly control the way surface water is managed, ACO has created its unique 'Surface Water Management Cycle' – Collect, Clean, Hold, Release – the four core processes now required for the complete and sustainable management of surface water drainage.



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Introduction to ACO Multiline Sealin

ACO Multiline Sealin is a high strength channel drainage system with an integrated seal as standard which allows easy installation and a tested solution for comprehensive groundwater protection.

The system is suitable for use in a wide range of applications including commercial and residential developments, pedestrian precincts, landscaping and parking areas for all vehicle types.

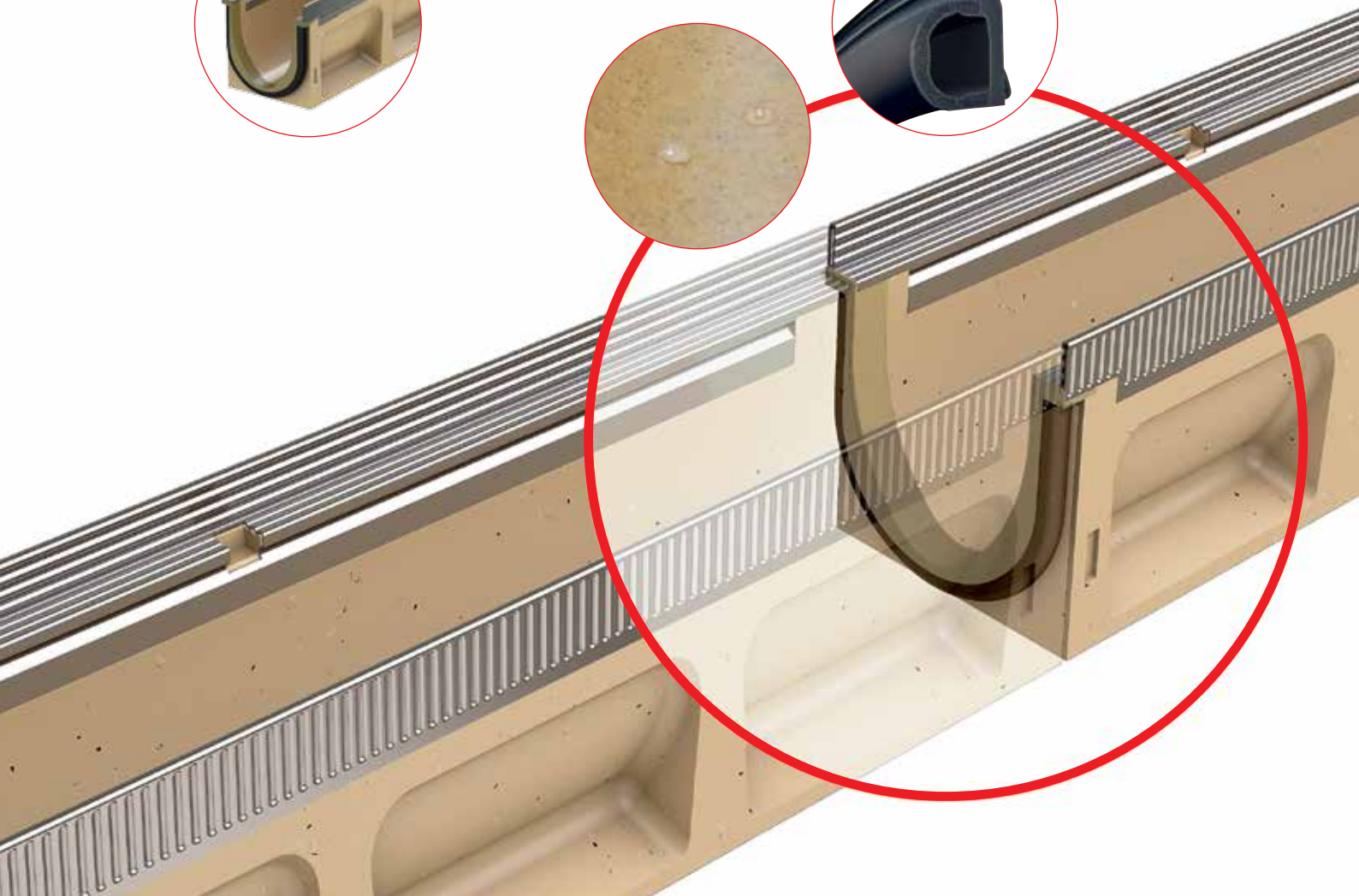
Compatible with a large range of MultiDrain® gratings, including Brickslot, which is a discreet choice for any building project.

The only grated channel with an integrated seal

Multiline Sealin joins ACO's acclaimed Qmax range, which is the only slot channel system with integrated seal. These options give water management solutions for D 400 and F 900 applications.

Half a million tests

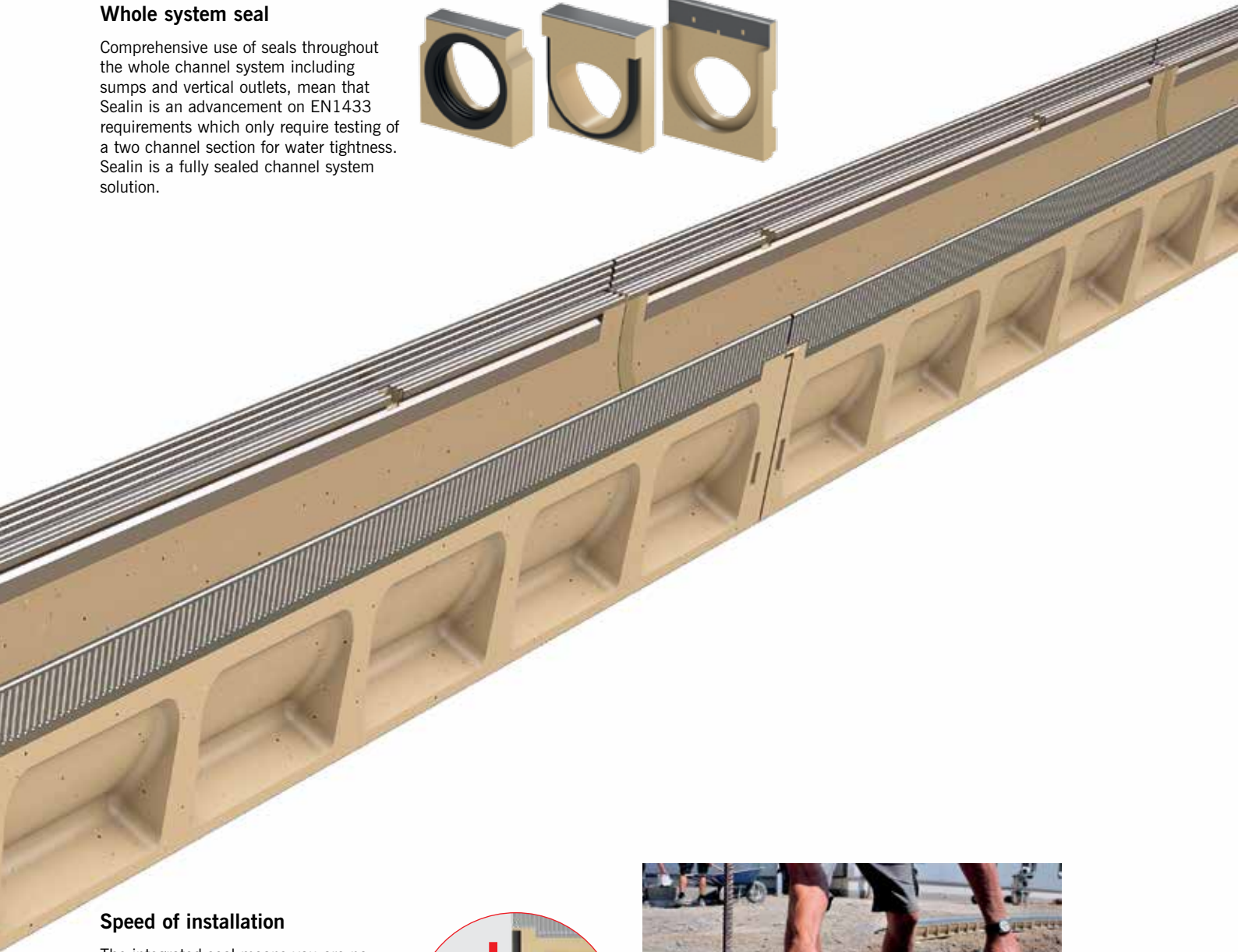
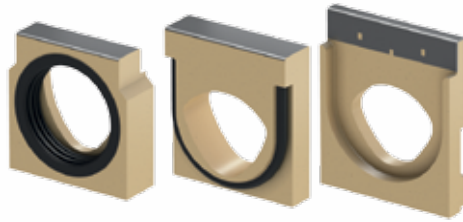
Channel not only meets but surpasses the requirement for water tightness under EN1433 and has been tested for 72 hours rather than the standard 30 minutes. The channel has also been tested under real life conditions, with 500,000 load cycles. After this rigorous testing the system was still water tight for 72 hours and achieved IKT approval* seal D00978.



Why choose Multiline Sealin?

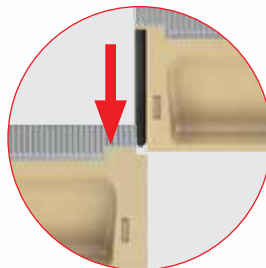
Whole system seal

Comprehensive use of seals throughout the whole channel system including sumps and vertical outlets, mean that Sealin is an advancement on EN1433 requirements which only require testing of a two channel section for water tightness. Sealin is a fully sealed channel system solution.



Speed of installation

The integrated seal means you are no longer reliant on a secondary sealant application during installation on site. Multiline Sealin requires only a traditional seal lubricant, which can be applied in seconds, as opposed to the time consuming seal gun application.



ACO MULTILINE SEALIN FEATURES OVERVIEW



Anti-shunt prevents grating movement once installed.



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



Easy installation, integrated seal with easy slot together action

Uniform consistent thickness of the seal compared to applied sealant.

Integrated seal made possible by a patented two-component manufacturing process which bonds the seal and channel as the polymer concrete is curing, thus creating a seamless and strong one-piece channel

Tested water tightness - tight after 72 hours of testing compared to the 30 minutes standard compliance*

*For more info please go to page 11

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



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■■■

LOAD CLASSES



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



B 125
Pedestrian precincts, car parks and drives.

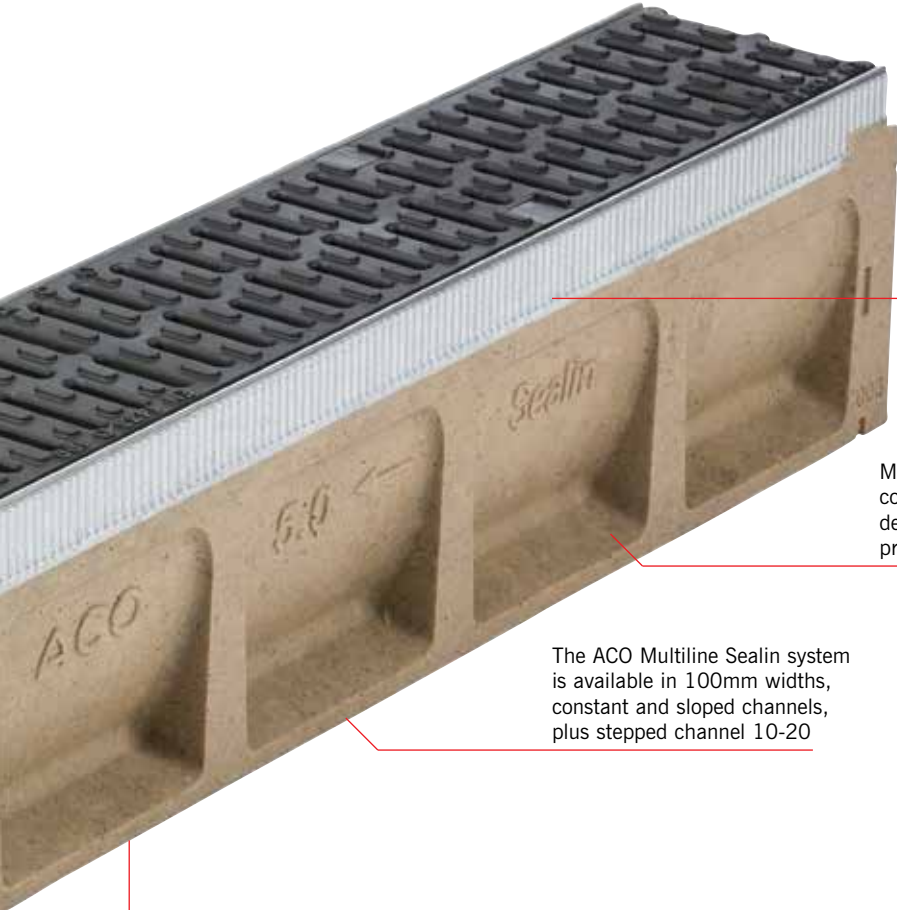


C 250
Parking areas, service stations (cars) and slow-moving light commercial vehicles.



D 400
Parking areas for all types of vehicles**

**Not suitable for carriageways of public roads or motorways



Protective galvanised edge rails for improved strength and bonding between channel and surface materials

Manufactured from polymer concrete, strong and lightweight design, improves stability and anchors product into concrete surround

The ACO Multiline Sealin system is available in 100mm widths, constant and sloped channels, plus stepped channel 10-20

Parking areas for all types of vehicles**



Channels available with integrated seal vertical outlets (image shown with corner invisible, to view the integrated seal)



Gratings

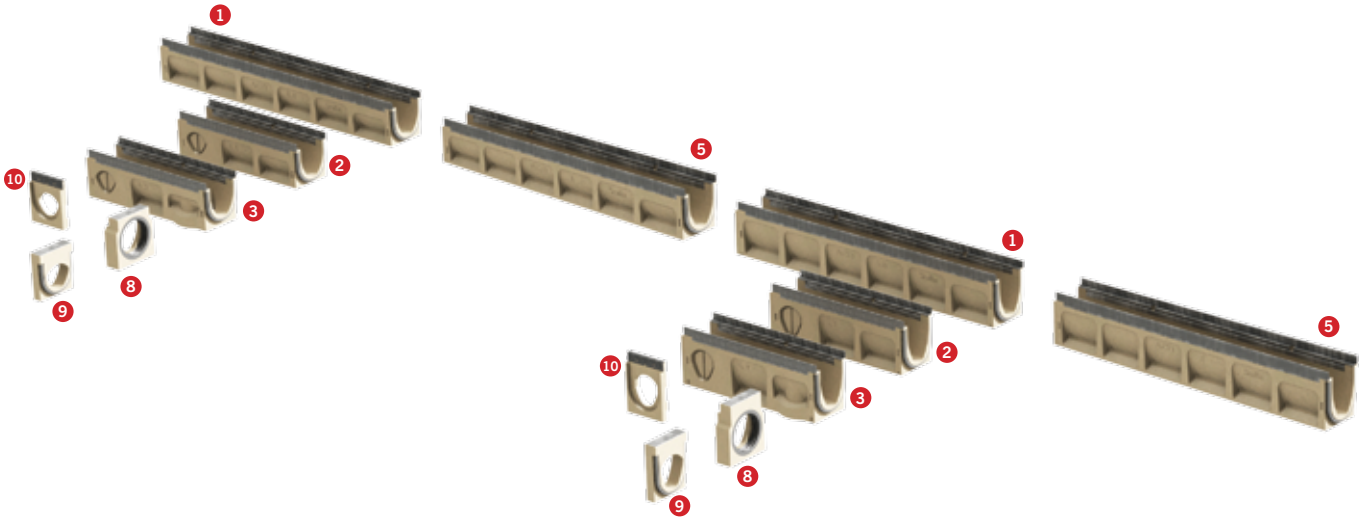
ACO Multiline Sealin System has a wide variety of gratings available that include cast iron, galvanised steel and plastic slotted gratings, heelguard options (including the new ATec coated heelguard grating), solid covers and brickslot gratings. See pages 22 and 23 for further details.

ACO Multiline Sealin range layout

The Multiline Sealin range is available in four constant depths and sloping channels to suit a wide range of applications and hydraulic requirements.

The layout below illustrates the channels and accessories available within the ACO Multiline Sealin range and to aid product selections, a summary of the function and features of each component is provided.

ACO Multiline Sealin channels can be purchased with galvanised steel edge rails.



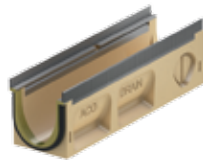
1 Constant depth channels



100mm wide bore: Four constant depth channel units are available in 1m lengths with overall depths ranging from 150mm to 250mm.

These channels do not include a vertical knockout. Step channel available between 10 to 20.

2 Constant depth channels – 0.5m



100mm wide bore: Four 0.5m constant depth channel units are available with overall depths ranging from 150mm to 250mm.

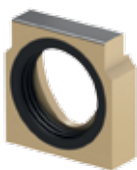
These channels do not include a vertical knockout. Step channel available between 10 to 20.

3 Constant depth channels—Vertical outlet



100mm wide bore: Four 0.5m constant depth channel units are available with overall depths ranging from 150mm to 250mm. Channel incorporates a sealed vertical outlet.

8 Outlet



Ø110mm outlets, available in four depths.

9 Flow direction adaptor



Adaptors to change the flow direction, available in four depths.

10 T or cross connection adaptor



Adaptor for corner, T or cross connection, available in four depths.

4 Sumps



Sumps are available in two depths, 460mm and 610mm. With the option of a 110mm or 160mm outlet.

5 Sloping depth channels



100mm wide bore: Ten 1m sloping channels with 0.5% fall in depths from 150mm to 250mm. Fully compatible with constant depth channels at given depths.

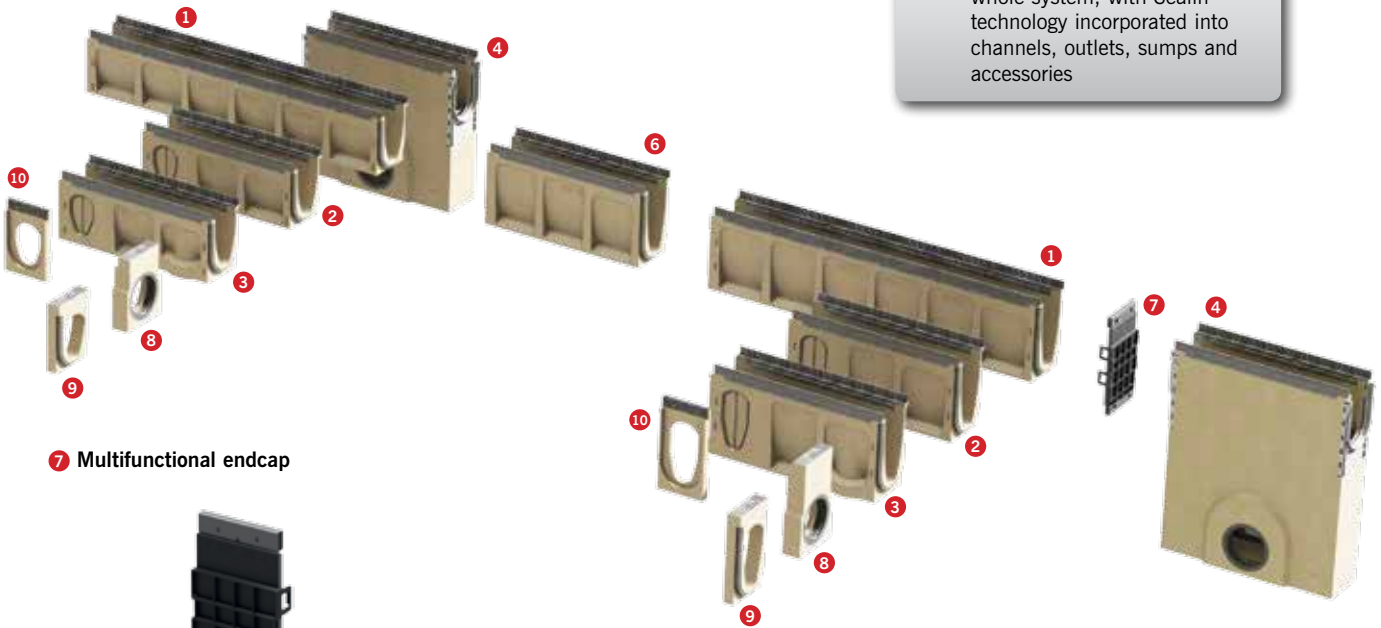
6 Step Channel



Step channel provides smooth transition between 10 –20 constant depth channels.



Multiline Sealin water tightness extends to the whole system, with Sealin technology incorporated into channels, outlets, sumps and accessories



7 Multifunctional endcap



One plastic endcap, integrated seal and galvanised steel top edge. Provides a closing option for all Sealin.

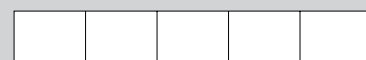


Guidance for using the ACO Multiline Sealin parts tables

The ACO Multiline Sealin parts tables are shown on the following pages. The product information is split down by channel depth. This is to enable quick and simple product identification and selection.

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

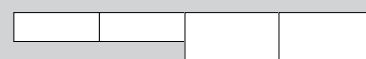
Channel invert types



1 Constant Depth Invert



2 Sloping Invert



3 Stepped Invert

Suitability of a sealed system

Surface Water Constituents

Transport

Rainwater that runs off from trafficked areas often contain lots more impurities than one would expect. Heavily frequented roads are exposed to harmful substances from tyres (wear), brake dust and exhaust emissions.

Environmental

One of the main considerations when considering a sealed system is the affect of de-icing products used during the winter months. When it rains these salts inevitable get washed into structures and groundwater, where they can potentially cause damage. ACO's polymer concrete channels and EPDM seal have good resistance to Sodium Chloride (de-icing salt). Concrete scaling or spalling is sometimes associated with salt¹⁵ according to The Salt Association UK, this is an exacerbation of the freeze/thaw effects of temperature related expansion and contraction. A sealed channel will help promote the efficient removal of surface water and captured salts within the water system and this can be fed into the rainwater treatment system.

Installation Benefits

With Multiline Sealin you can be confident that when installed according to our details, the system will have superior water tightness, as shown by our test results. The channel system has a superior consistent seal on installation, without relying on a secondary process to apply traditional sealant after fitting.



“We were initially sceptical about the new ACO Multiline Sealin as we feared there would be additional installation costs. However, this was all put into perspective once we had used the solution. This new approach by ACO with sealing as standard, leads to a permanently protected structure”

Volker Brandt MD Stahlbeton and Tiefbau, Construction Company



Comprehensive system testing

Proven standard compliant quality

It goes without saying that the new channel system meets the current product requirements of the latest industry standards BS EN1433/DIN 19580. Two independent testing institutes from both Germany and the United Kingdom have confirmed this through successful type testing for the load classes A 15 – D 400. All relevant test criteria were met and documented.



What does “water tightness” mean?

According to BS EN 1433/DIN 19580, Section 9.3.6, the tightness test must show that when wet, the cross section provided by the design in question remains waterproof for 30 minutes ± 30 seconds. This compliance with the tightness requirements is surpassed many times over by the Multiline with Sealin technology as standard, and approved by the IKT approval seal D00978.

The test confirms sustained tightness over 72 hours after 500,000 load cycles. The load cycles simulate the conditions experienced by the channel connections after being travelled over for many years.

Tightness over 72 hours was successfully proven for the entire system including all accessories such as inlet shafts and end caps.

Whenever we refer to “tightness”, “tight” and “waterproof” in this brochure, it is always in the sense of meeting waterproof demands according to BS EN 1433/ DIN 19580. Section 9.3.5 and the IKT certificate.



ACO Hydraulic Design Software

Register online for our free, secure online design software:

- ▶ All designs are securely stored and easily accessed online
- ▶ Data always up-to-date
- ▶ Proven calculation methodology - more accurate and efficient designs
- ▶ Flexible catchment design
- ▶ Integrated rainfall data
- ▶ Automated product optimisation
- ▶ PDF summary documents



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Surface design detail

Explore the world's largest range of grating styles

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

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



Multi applications provided for by ACO Multiline Sealin

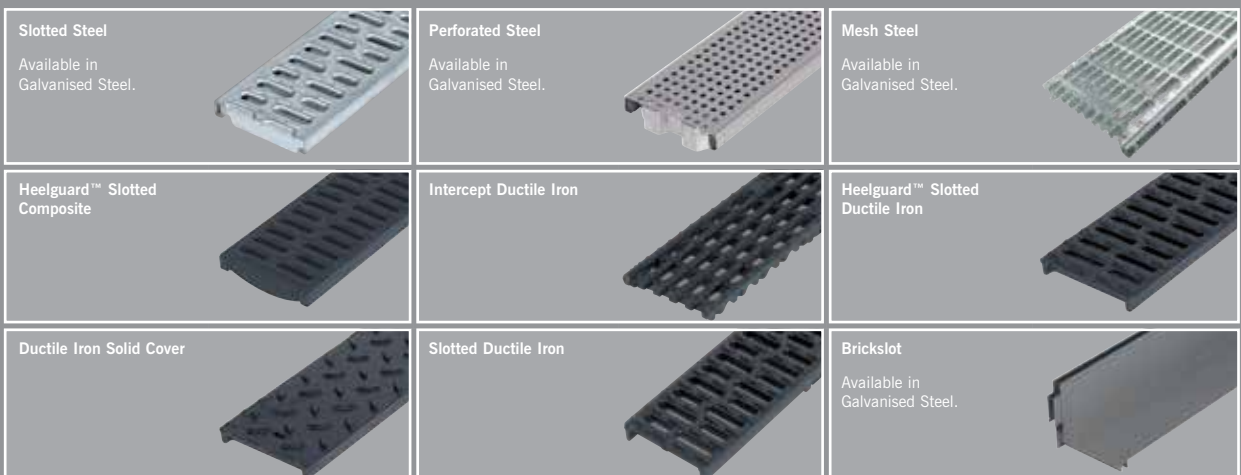
The breadth of the ACO Multiline Sealin grating range provides designers with a wide choice of styles to complete their surface water drainage system.

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

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

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

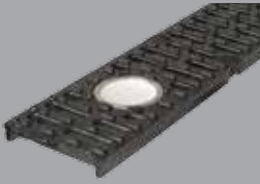
To suit a range of hydraulic requirements, these grating styles are available for use with 100mm, 150mm and 200mm wide channels.



Lighting & bespoke solutions

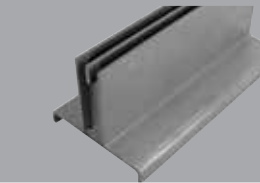
Lighting Solutions

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



Bespoke Slot Solutions

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



Bespoke Freestyle Solutions

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



Surface + Grating Visualiser

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



To make specification easier, the software will suggest our most suitable ranges based on the project requirements.

You can then select from the available options and visualise how these may look in different surface finishes. Once a choice is made, a simple, yet detailed specification sheet provides full product information.



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

New grating styles

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

Intercept Profile Galvanised steel



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

Heelguard™ Mesh Galvanised Steel



The stylish tight mesh design has special Heelguard™ technology for pedestrian safety.'

Mosaic



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

Leaf



The leaf grating can provide a pleasing alternative design to many urban landscape designs.

Flag



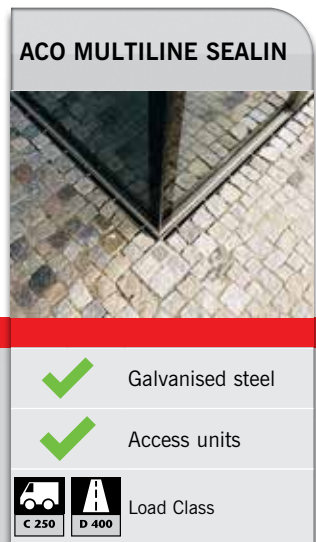
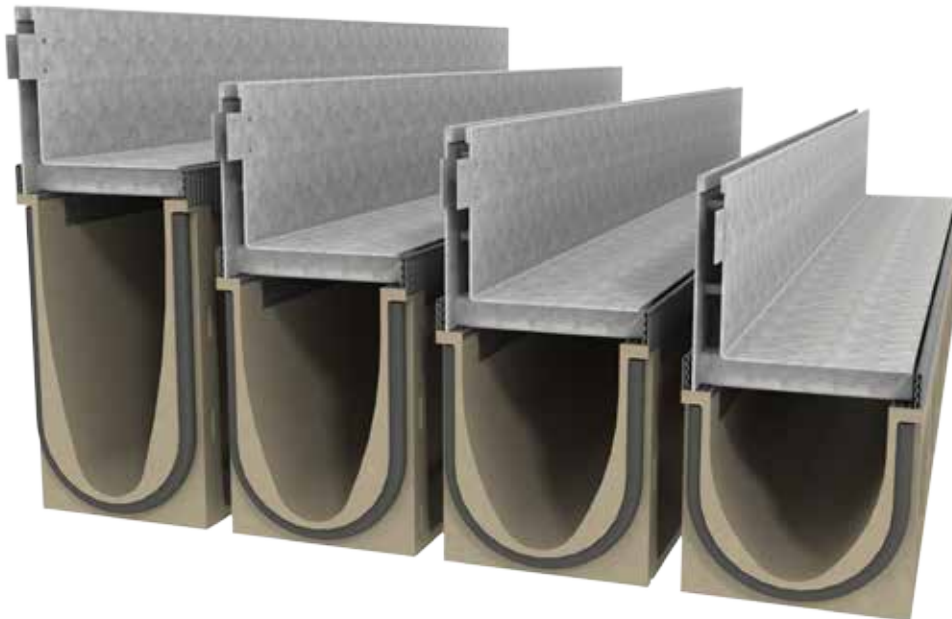
The unusual character of the Flag design provides a fun alternative to traditional slotted gratings.



Gratings

ACO Multiline Sealin system has a wide variety of gratings available that include cast iron, stainless steel and plastic slotted gratings, heelguard options (including the new ATec coated heelguard grating), solid covers and brickslot gratings.

Surface design detail



Discrete slot drainage

ACO Multiline Sealin has a range of gratings to complement installations which require discreet slot drainage.

Designed as standard with a heelguard 10mm off set drainage inlet, ACO Brickslot is a subtle and unobtrusive grating which when combined with an ACO Multiline Sealin channel, can be used as a solution to complement discreet drainage applications and is ideal for use against buildings facades.

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

The channel and ACO Brickslot grating together provide an unobtrusive continuous slot drainage system, with high hydraulic efficiency for fast removal of surface water. ACO Brickslot gratings in galvanised steel 100mm are compatible with ACO Multiline Sealin V100S channels.

The system includes an ACO Brickslot access unit to ensure easy maintenance and access to the drainage system.

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

For the range of Brickslot gratings please go to page 24-25.

Applications

- Threshold drainage
- Public landscaping
- Car parking
- Light industrial
- SuDS



Surface design detail

Creating bespoke gratings

Multiline Sealin channels are compatible with a wide range of grating designs including a new bespoke grating service from ACO.

Introducing the new ACO Freestyle

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

Who is Freestyle for?

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

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

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

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



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



ACO. The future of drainage.

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

ACO Multiline Sealin V100S with galvanised edge rails

Product benefits

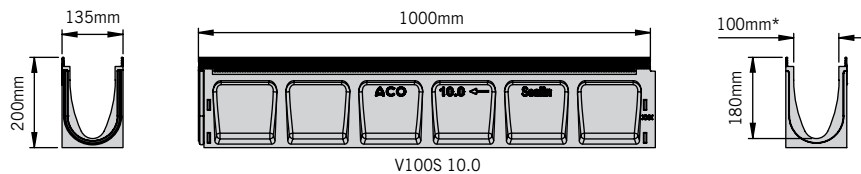
- ▶ Watertight channel body due to Sealin technology (in accordance with IKT certificate D00978)
 - channel joint with integrated EPDM seal
 - made of water resistant ACO polymer concrete
 - simple to install
- ▶ Better self-cleaning due to V-profile and smooth channel body surface
 - ▶ Robust channel body
 - ▶ Compatible with Drainlock grates
- ▶ Channel system in accordance with EN 1433/DIN 19580
 - ▶ Nominal width 100mm
 - ▶ Load classes A 15 - D 400
 - ▶ Available with galvanised steel edge protection

Constant depth channels with galvanised steel edge rails 1000mm

- ▶ Constant depth channels can be used in conjunction with sloping channels, refer to page 18
- ▶ Stepped invert can be achieved from 10.0-20.0 using a channel with built in step connector, see page 18



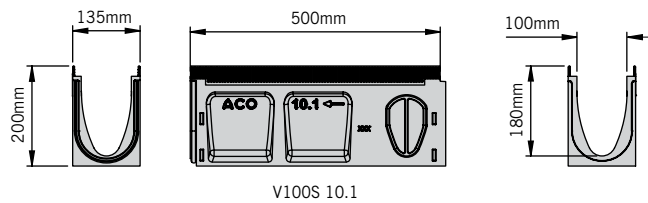
Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Invert Depth (mm)	Invert type	Weight (kg)
132330	Multiline Sealin V100S 0.0	1000	135	150	130	1	15
132340	Multiline Sealin V100S 5.0	1000	135	175	155	1	17.1
132350	Multiline Sealin V100S 10.0	1000	135	200	180	1/3	19.6
132370	Multiline Sealin V100S 20.0	1000	135	250	230	1/3	22.3





Constant depth channels with galvanised steel edge rails 500mm

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Invert Depth (mm)	Invert type	Weight (kg)
132332	Multiline Sealin V100S 0.1	500	135	150	130	1	8.5
132342	Multiline Sealin V100S 5.1	500	135	175	155	1	9.4
132352	Multiline Sealin V100S 10.1	500	135	200	180	1/3	10.4
132372	Multiline Sealin V100S 20.1	500	135	250	230	1/3	12.3

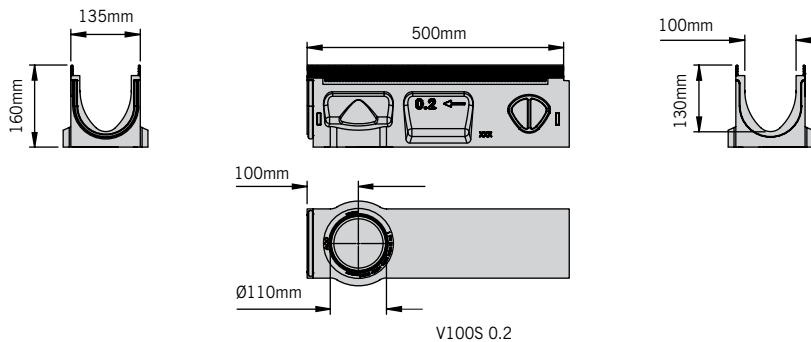


With Vertical Outlet (LLS pipe connection DN/OD 110mm)

- ▶ Design with vertical, liquid-tight pipe connection with lip labyrinth seal (LLS) made of NBR
- ▶ With side pre-mouldings for corner, T- and cross connections



Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Invert Depth (mm)	Invert type	Weight (kg)
132333	Multiline Sealin V100S 0.2	500	135	150	130	1	9.1
132343	Multiline Sealin V100S 5.2	500	135	175	155	1	10.2
132353	Multiline Sealin V100S 10.2	500	135	200	180	1/3	11.3
132373	Multiline Sealin V100S 20.2	500	135	250	230	1/3	13.2



Not suitable for carriageways of public roads or motorways.

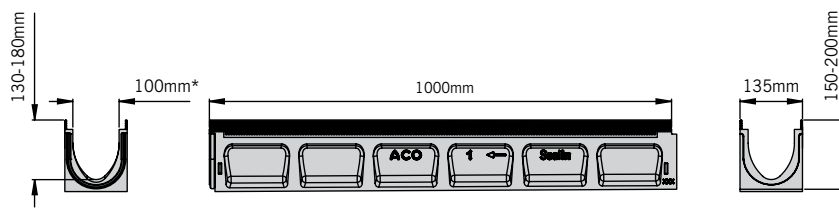
ACO Multiline Sealin V100S with galvanised edge rails

Sloping depth channels with galvanised edge rails 1000mm

- ▶ Invert gradient 0.5%
- ▶ Sloping depth channels can be used in conjunction with constant depth channels at 0.0, 5.0, and 10.0 depths
- ▶ All sloping depth channels are compatible with V100S sumps



Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Invert Depth (mm)	Invert type	Weight (kg)
132301	Multiline Sealin V100S No 1	1000	135	150/155	130/135	2	15
132302	Multiline Sealin V100S No 2	1000	135	155/160	135/140	2	15.5
132303	Multiline Sealin V100S No 3	1000	135	160/165	140/145	2	16
132304	Multiline Sealin V100S No 4	1000	135	165/170	145/150	2	16.5
132305	Multiline Sealin V100S No 5	1000	135	170/175	150/155	2	17
132306	Multiline Sealin V100S No 6	1000	135	175/180	155/160	2	17.5
132307	Multiline Sealin V100S No 7	1000	135	180/185	160/165	2	18
132308	Multiline Sealin V100S No 8	1000	135	185/190	165/170	2	18.5
132309	Multiline Sealin V100S No 9	1000	135	190/195	170/175	2	19
132310	Multiline Sealin V100S No 10	1000	135	195/200	175/180	2	19.5



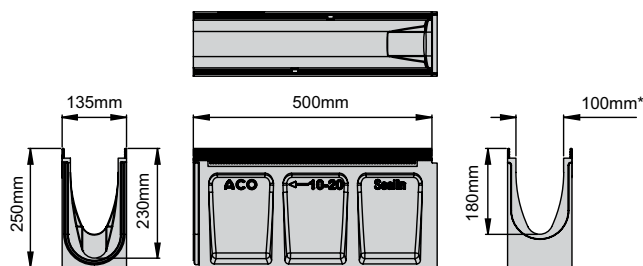
V100S Sloping Channel

Channel with built-in step connector (50mm) 500mm

- ▶ For bridging invert gradient when installing stepped system
- ▶ 50mm step suitable for 10.0 to 20.0 channels in a stepped system design
- ▶ Made of polymer concrete



Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Invert Depth (mm)	Invert type	Weight (kg)
132375	Multiline Sealin Step channel 10-20	500	135	250	180/230	3	15



V100S Step Channel

Not suitable for carriageways of public roads or motorways.



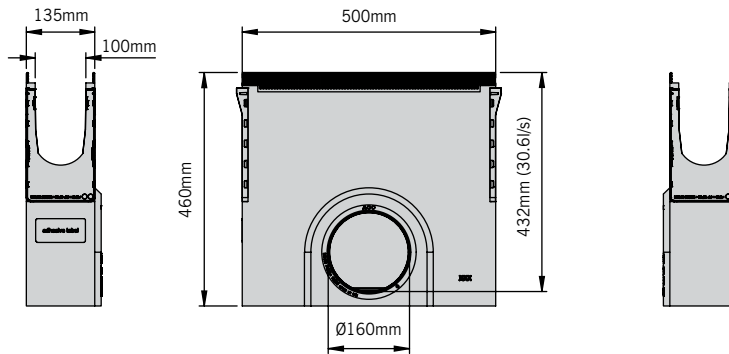
Sumps for channels 0-10, with galvanised edge rails

- ▶ With NBR lip labyrinth seal (LLS) for horizontal, liquid-tight pipe connection
- ▶ With connection adapter for liquid-tight channel connection
- ▶ With end cap (1 piece) for closing inlet shaft liquid-tight
- ▶ With plastic (PP) silt bucket
- ▶ Design: short form (SF) for channel height 0 - 10 or long from (LF) for channel height 0-20



Sumps for channels 0-10, with LLS pipe connection

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Invert Depth (mm)	Invert type	Weight (kg)
132391	ACO Multiline Sealin Sump 0-10, 110mm outlet w. bucket	500	135	460	431	-	26.9
132398	ACO Multiline Sealin Sump 0-10, 160mm outlet w. bucket	500	135	460	432	-	26.9

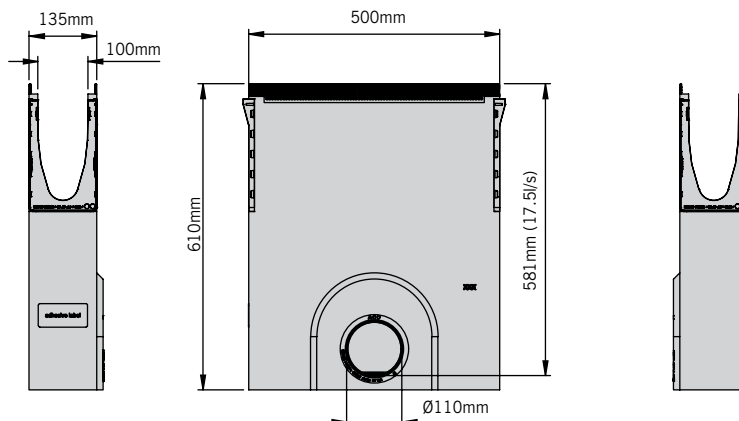


V100S SUMP 132398



Sumps for channels 0-20, with LLS pipe connection

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Invert Depth (mm)	Invert type	Weight (kg)
132392	ACO Multiline Sealin Sump 0-20, 110mm outlet w. bucket	500	135	610	581	-	34.7
132399	ACO Multiline Sealin Sump 0-20, 160mm outlet w. bucket	500	135	610	584	-	34.7



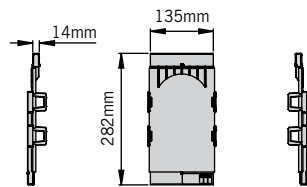
V100S SUMP 132392



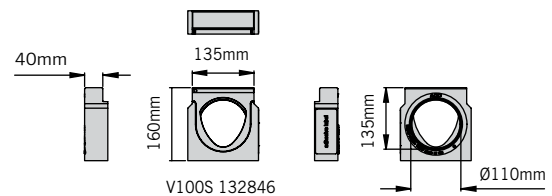
ACO Multiline Sealin V100S with galvanised edge rails

Endcaps, outlets and adaptors

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Invert Depth (mm)	Invert type	Weight (kg)															
132385	Universal closing endcap V100S 0-20	14	135	282	-	-	1.6															
132846	Outlet 110mm diameter V100S 0.	40	135	160	-	-	1.4															
132847	Outlet 110mm diameter V100S 5.	40	135	185	-	-	1.5															
132848	Outlet 110mm diameter V100S 10.	40	135	210	-	-	1.7															
132849	Outlet 110mm diameter V100S 20.	40	135	260	-	-	2.3															
132723	Adaptor for flow direction change V100S 0.	40	135	150	-	-	1.8															
132724	Adaptor for flow direction change V100S 5.	40	135	175	-	-	1.9															
132725	Adaptor for flow direction change V100S 10.	40	135	200	-	-	2.1															
132726	Adaptor for flow direction change V100S 20.	40	135	250	-	-	2.7															
132756	Adaptor for corner, T and cross connection V100S 0.	14	135	160	-	-	1															
132757	Adaptor for corner, T and cross connection V100S 5.	14	185	-	-	1.1	132758	Adaptor for corner, T and cross connection V100S 10.	14	135	210	-	-	1.3	132759	Adaptor for corner, T and cross connection V100S 20.	14	135	260	-	-	1.8
132758	Adaptor for corner, T and cross connection V100S 10.	14	135	210	-	-	1.3															
132759	Adaptor for corner, T and cross connection V100S 20.	14	135	260	-	-	1.8															

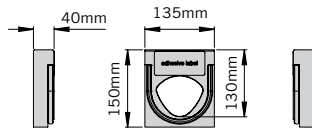


Universal closing endcap



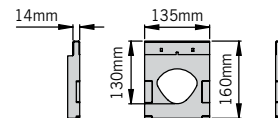
V100S 132846

Outlet endcap



V100S 132723

Direction change adaptor



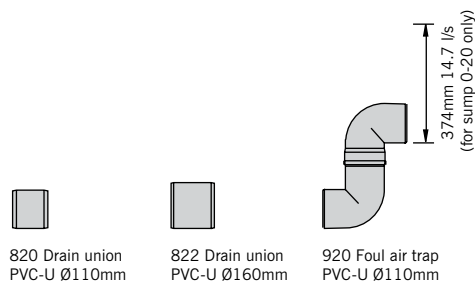
V100S 132756

Corner/T-cross connection



Drain unions and foul air-trap

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Invert depth (mm)	Invert Type	Weight (kg)
0056	820 Drain union PVC-U Ø110mm	100	110	-	-	-	0.1
0058	822 Drain union PVC-U Ø160mm	100	160	-	-	-	0.5
2640	920 Foul air-trap PVC-U Ø110mm	-	110	-	-	-	0.6
02769	Leaf trap	-	110	-	-	-	0.8



Silicone grease

- ▶ Complies with UBA guidelines for sanitary lubricants, food grade lubricant in accordance with EN ISO 21469, suitable for drinking water, suitable for O-ring
- ▶ Contains 23g
 - 0.0 circa 40 channel joints
 - 10.0 circa 30 channel joints
 - 20.0 circa 20 channel joints

Product code	Description	Weight (kg)
132495	Silicone grease	0.1



Accessories

Product code	Description	Weight (kg)
32599	Silicone grease	1.0†



Polymer concrete repair kit

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



Gratings for use with ACO Multiline Sealin V100S with galvanised edge rails



Gratings for Load Class A 15 applications

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Slot width / hole dia (mm)	Heelguard™	Intake area mm²/m	Anti-shunt feature	Weight (kg)
12610	Slotted galvanised steel 400DL	1000	123	21	10	Yes	25300	n/a	2.0
12611	Slotted galvanised steel 402DL	500	123	21	10	Yes	25300	n/a	1.0
12666	Perforated galvanised steel 12666DL	1000	123	21	6	Yes	16300	n/a	2.6
12667	Perforated galvanised steel 12667DL	500	123	21	6	Yes	16300	n/a	1.3



400DL / 402DL
Slotted galvanised steel

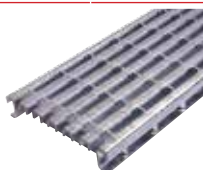


12666DL / 12667DL
Perforated galvanised steel



Gratings for Load Class B 125 applications

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Slot width / hole dia (mm)	Heelguard™	Intake area mm²/m	Anti-shunt feature	Weight (kg)
132555	Intercept Profile galvanised steel 132555DL	1000	123	21	29 x 8	Yes	44500	Yes	4.1
132550	Intercept Profile galvanised steel 132550DL	500	123	21	29 x 8	Yes	44500	Yes	2.0



132555DL / 132550DL
Intercept Profile galvanised steel



Gratings for Load Class C 250 applications

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Slot width / hole dia (mm)	Heelguard™	Intake area mm²/m	Anti-shunt feature	Weight (kg)
132720	Heelguard™ composite - black 522DL	6 500	123	21	8	Yes	28500	Yes	1.0
12673	Intercept ductile iron 507DL	500	123	21	31 x 12	No	40100	Yes	3.7
12614	Slotted galvanised steel 423DL	1000	123	21	10	Yes	25300	n/a	5.0
12615	Slotted galvanised steel 424DL	500	123	21	10	Yes	25300	n/a	2.5
12656	Perforated galvanised steel 12656DL	1000	123	21	6	Yes	16300	n/a	4.8
12657	Perforated galvanised steel 12657DL	500	123	21	6	Yes	16300	n/a	2.4
132880	Heelguard™ mesh galvanised steel grating 410DL	1000	123	21	29 x 9.5	Yes	79000	Yes	4.2
132881	Heelguard™ mesh galvanised steel grating 412DL	500	123	21	29 x 9.5	Yes	79000	Yes	2.1



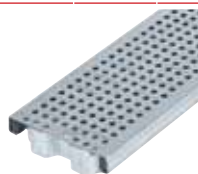
522DL
Heelguard™ composite Microgrip



507DL
Intercept ductile iron



423DL / 424DL
Slotted galvanised steel



12656DL / 12657DL
Perforated galvanised steel



410DL / 412DL
Heelguard™ mesh galvanised steel

6 Indicates security locking available.

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





Gratings for Load Class D 400* applications

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Slot width / hole dia (mm)	Heelguard™	Intake area mm ² /m	Anti-shunt feature	Weight (kg)
23405	Heelguard™ ductile iron 23405DL	500	123	21	8	Yes	23900	Yes	4.1
23406	Ductile iron solid cover 23406DL	500	123	21	n/a	No	n/a	Yes	4.5
23408	Slotted ductile iron 23408DL	500	123	21	12	No	35700	Yes	3.8
132042	Flag ductile iron 132042DL	500	123	21	8	Yes	30400	Yes	4.9
132043	Leaf ductile iron 132043DL	500	123	21	10	Yes	34700	Yes	4.7
132885	Heelguard™ mesh galvanised steel 132885DL	1000	123	21	28 x 8.5	Yes	69100	Yes	5.1
132886	Heelguard™ mesh galvanised steel 132886DL	500	123	21	28 x 8.5	Yes	69100	Yes	2.5



23405DL
Heelguard™ ductile iron



23406DL
Ductile iron solid cover



23408DL
Slotted ductile iron



132042DL
Flag ductile iron



132043DL
Leaf ductile iron



132885DL / 132886DL
Heelguard™ mesh galvanised steel

ACO ATec high performance finish

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



Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Slot width / hole dia (mm)	Heelguard™	Intake area mm ² /m	Anti-shunt feature	Weight (kg)
23409	ATec coated Heelguard™ ductile iron 23409DL	500	123	21	8	Yes	23900	Yes	4.1
23417	ATec coated Mosaic ductile iron 23417DL	500	123	21	10	Yes	28000	Yes	4.1



23409DL
Heelguard™ ductile iron



23417
Mosaic ductile iron



ACO ATec coating is a high performance finish designed for the most demanding of environments. The black corrosion resistant coating provides a strong durable finish which maintains the overall aesthetics of the grating. ACO ATec provides up to 10 times longer protection against corrosion than standard water-based surface coatings

Grating accessories

Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Invert depth (mm)	Invert Type	Weight (kg)
23415	Drainlock security locking assembly	n/a	n/a	n/a	n/a	n/a	0.1
23416	Drainlock security key	n/a	n/a	n/a	n/a	n/a	0.01
1367	Drainlock grating lifting tool 835	n/a	n/a	n/a	n/a	n/a	0.1



23415
Drainlock security locking assembly



23416
Drainlock security key



1367
Drainlock grating lifting tool 835

*Not suitable for carriageways of public roads or motorways



Discreet slot drainage gratings

The ACO Brickslot hot-dipped galvanised steel gratings are compatible with ACO Multiline Sealin V100S channels.

The off set grating has a heelguard 10mm drainage inlet, which is compatible with most types of pavements, setts, block and flags up to a maximum of 100mm depth.

The ACO Brickslot gratings are listed in the charts below and are sold separately to the channel units. For information on the ACO Multiline Sealin V100S channels. Please refer to pages 16 to 20.

ACO Brickslot gratings suitable for use with ACO Multiline Sealin

Gratings for Load Class C 250 applications



Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Slot width / hole dia (mm)	Heelguard	Intake area mm ² /m	Weight (kg)
23460	Brickslot galvanised steel 23460	1000	123	105	10	Yes	10000	6.6
23461	Brickslot galvanised steel 23461	500	123	105	10	Yes	10000	3.4

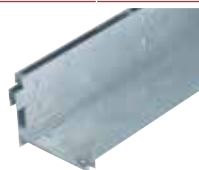


23462
Brickslot access unit galvanised steel.

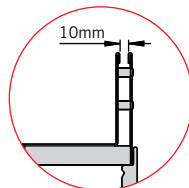
Gratings for Load Class D 400* applications



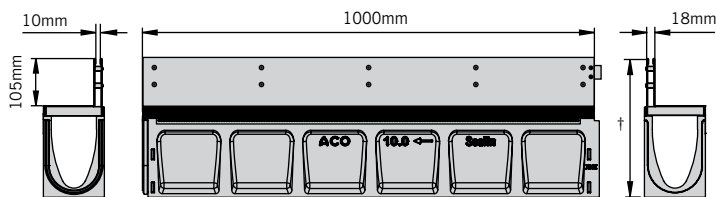
Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Slot width / hole dia (mm)	Heelguard	Intake area mm ² /m	Weight (kg)
23465	Brickslot galvanised steel 23465	1000	123	105	10	Yes	10000	6.7
23466	Brickslot galvanised steel 23466	500	123	105	10	Yes	10000	3.4



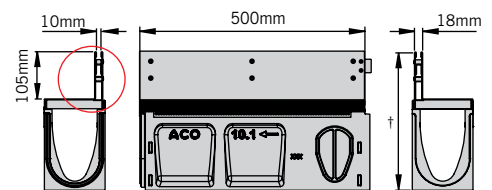
23465 / 23466
Brickslot galvanised steel



Slot detail



V100S 1m constant depth channel with ACO Brickslot grating



V100S 0.5m constant depth channel with ACO Brickslot grating

Note: To obtain the overall height (marked †) add 105mm to the overall channel depth. The overall depth of each channel can be found in the channel tables in this brochure.
*Not suitable for carriageways of public roads or motorways.



Discreet slot drainage gratings

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

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

The access unit is 0.5m in length and is available in galvanised steel and is suitable for use with any ACO Multiline Sealin V100S channels.

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

The ACO Brickslot access units are listed in the charts below and are sold separately to the channel units. For information on the ACO Multiline Sealin V100S channels. Please refer to pages 16 to 20.

ACO Brickslot Access covers suitable for use with ACO Multiline Sealin V100S

Access covers for Load Class C 250 applications



Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Slot width / hole dia (mm)	Intake area mm ² /m	Weight (kg)
23462	Brickslot access unit galvanised steel 23462	500	123	105	10	10000	6.6



23462
Brickslot access unit
galvanised steel.

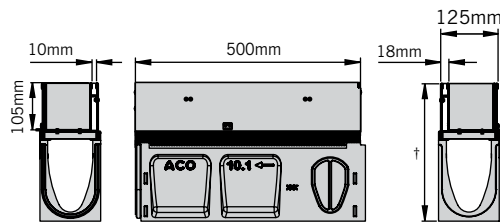
Access covers for Load Class D 400*



Product code	Description	Length (mm)	Width overall (mm)	Depth overall (mm)	Slot width / hole dia (mm)	Intake area mm ² /m	Anti-shunt feature	Weight (kg)
23467	Brickslot access unit galvanised steel 23467	500	123	105	10	10000	Yes	6.4



23467
Brickslot access unit
galvanised steel.



V100S 0.5m constant depth channel with ACO Brickslot access unit

Note: To obtain the overall height (marked †) add 105mm to the overall channel depth. The overall depth of each channel can be found in the channel tables in this brochure.
*Not suitable for carriageways of public roads or motorways.



Drainlock gratings

Grating selection

All channels within the ACO Multiline Sealin range are certified to BS EN 1433: 2002 Load Class D 400. The system has a wide range of gratings suitable for use in a variety of applications from Load Class A 15 to D 400. Refer to the chart on page 6 for load classes and typical applications. Please note when selecting a grating careful consideration should be given to the application requirement. Each grating has a certified load class which, once installed with the channel determines the system's load class.

ACO Drainlock™

ACO Multiline Sealin channels are compatible with ACO MultiDrain® grates.

Fitted as standard to ACO MultiDrain® MD gratings, this fast locking device removes the need for bolts and bars and improves the channels hydraulic capacity. The Drainlock™ mechanism simply clips into the channel edge rail for rapid installation. An installation guide is shown opposite.

Anti-shunt mechanism

A selection of the ACO Drainlock™ gratings are fitted with an anti-shunt mechanism that restricts unwanted grating movement when installed. This feature improves the durability and the aesthetics of the system. See figure 2 for details

Security Locking

In areas such as schools and prisons, where unwanted grating removal needs to be restricted, a security locking can be used in conjunction with the following gratings; on ACO V100S, 12680, 23405 and 23409. The system is fitted to the gratings by two M6 security screws and clamps the grating in place preventing removal. See figure 5 & 6 for details. Security locking key for installation and removal supplied separately.

Fitting the grating



1 To install, align the grating onto the channel



2 Align anti-shunt detail with recess



3 Push or stand on the grating until it clicks into place



4 ACO Drainlock™ locking mechanism fastens into channel

Security locking



5 Fix the M6 security screws and clamp the grating as shown.



6 Place grating into the channel and tighten the fixing using the security locking key

Removal of grating



7 Insert tool as shown. Drainlock™ lifting tool available part no 1367



8 Pull upwards to unlock grating



Heelguard™ applies to ACOs range of 'Heel-friendly' products with slot widths up to and including 10mm. Suitable for most pedestrian applications and compliant to BS EN1433:2002. For specific widths please refer to grating details.



Preparing the system for installation

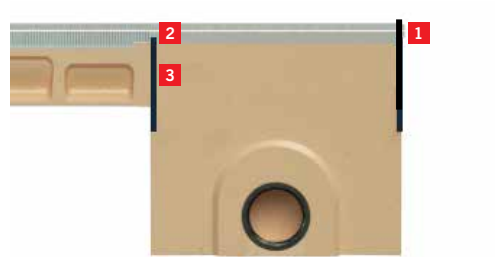
Contents

- A** Installation of the sump
- B** Installation of end caps
 1. Installation of universal end cap for male and female
 2. Assembly of end cap with lip labyrinth seal (LLS)
- C** Fabrication of fitting pieces or adapters to change flow direction
- D** Fabrication of corner, T or cross connection

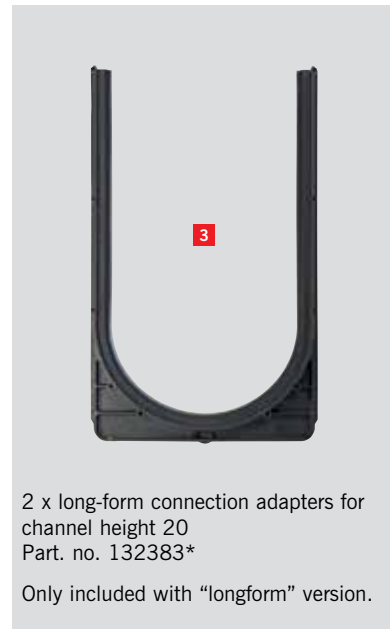
A Installation of the sump

Before installing the sump:

Prepare the relevant accessories as described below and fit them on the sump.



Accessories

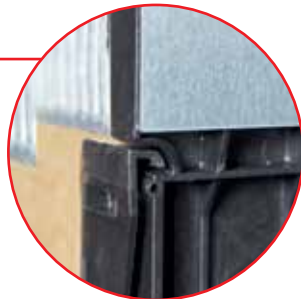


*Included with the sump.



A Installation of the sump

1 Installing the end cap on the sump



Push against the boundary point



Press on



End cap locked into place

If there is a side of the sump without a channel connected to it, this side must be sealed using the sump end cap (part. no. 132384).

It is important to ensure that the moulded seal lip always faces the sump.

Push the end cap as far as it will go against the upper boundary point of the moulded cut-out template.

When you then push it together the two parts, you will hear them lock into place.

2 Connecting a channel element, types 0-10, to the sump



Shorten using side cutters if necessary



The short-form connection adapter (Part. no. 132382) is required for connecting the channel, types 0-10.

When connecting types 0-9, the connection adapter needs to be shortened using the markings specified on both legs.

We recommend using commercial side cutters for this purpose. Shortening is not required for type 10.



Push all the way up



Press on



Connection adapter locked into place

When connecting a channel, it is important to ensure that the moulded seal lip on all the accessories is always facing the sump.

To install, push the connection adapter legs as far as they will go against the upper boundary point of the moulded cut-out template. When you then push together the parts, you will hear them lock into place.

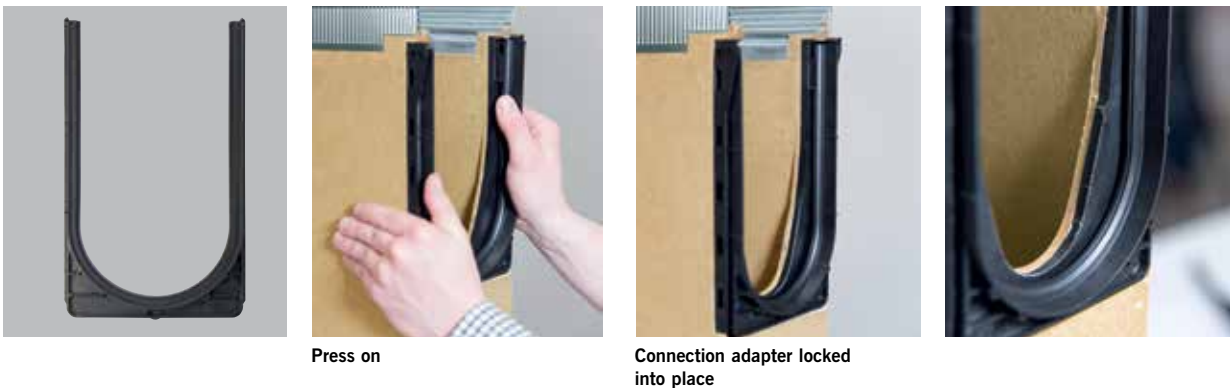


A Installation of the sump

3 Connecting a channel element, type 0-20, to the sump*



The long-form connection adapter (part. no. 132383) is required for connecting a channel, type 0-20. Prior to connection, the moulded cut-out template for the catch basin must be knocked out from the type 0-20 breaking edge specified, working from the outside to the inside.



Press on

Connection adapter locked into place

When connecting a channel, it is important to ensure that the moulded seal lip on all the accessories is always facing the sump.

When you push together the parts, you will hear them lock into place.

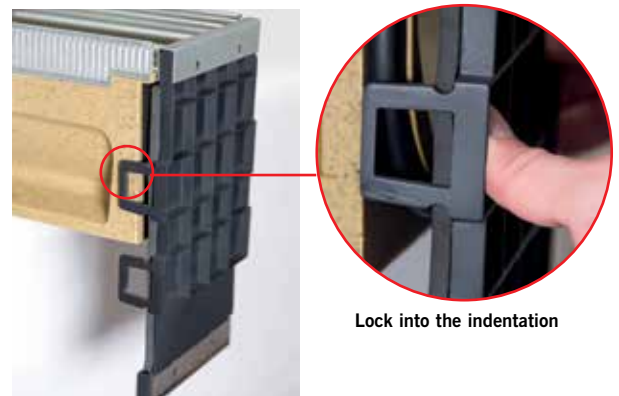
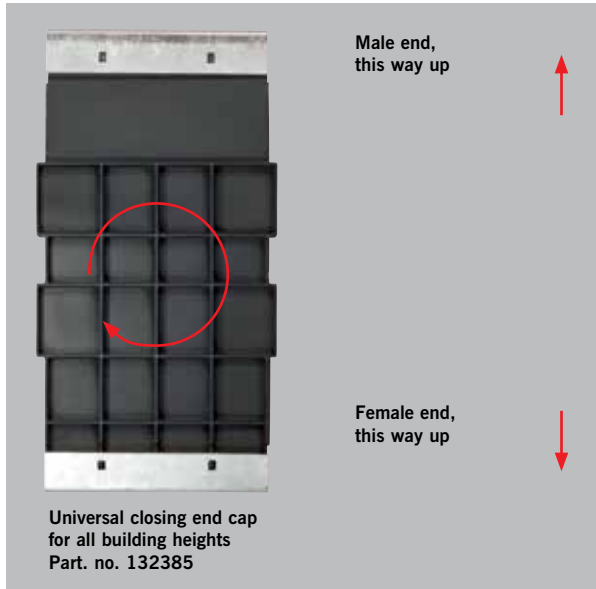
To install, push the connection adapter legs as far as they will go against the upper boundary point of the moulded cut-out template.

*Step 3 is only necessary with the “long-form” version



B Installation of end caps

1 Installation of universal end cap for male and female end



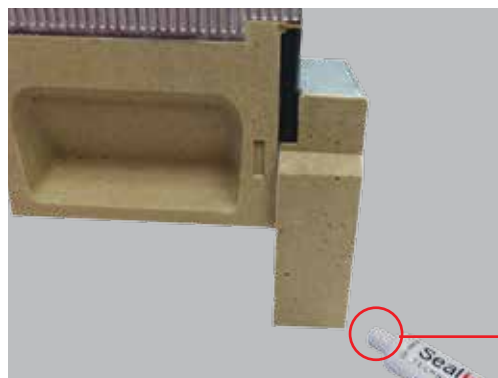
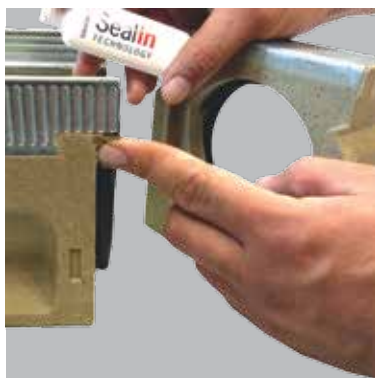
The universal closing end cap is suitable for male and female ends, all building heights and every channel type from the ACO Multiline Sealin product range.

On the inlet side, attached the universal closing end cap so that the inscription on the rear is facing up. For the female end (outlet side with integrated seal), the end cap must be rotated 180°. You will also find instructions on how to do this on the universal closing end cap.

The end cap has a side locking mechanism that enables attachment in the indentations provided on the side of the channel body. During installation, the locking piece always faces the channel and may need to be turned 180° depending on whether you are working at inlet or outlet side.

If necessary, the universal closing can be shortened at the side.

2 Assembly of the end cap with lip labyrinth seal (LLS)



usual installation from above

The end cap lip labyrinth seal is suitable for the channel end.

We recommend using our specially adapted silicone grease to install the channel. Please follow your site guidelines regarding wearing gloves, and if necessary apply silicone grease with a brush.



③ Fabrication of fitting pieces or adapters to change flow direction

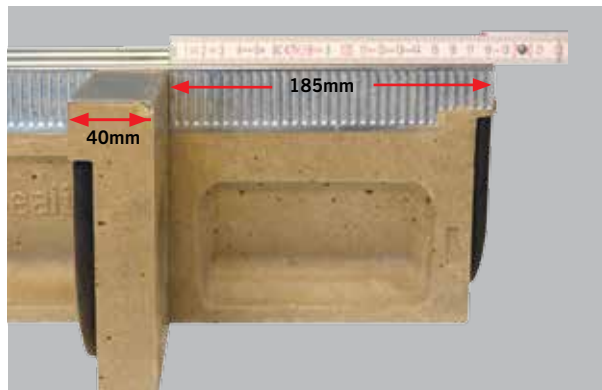
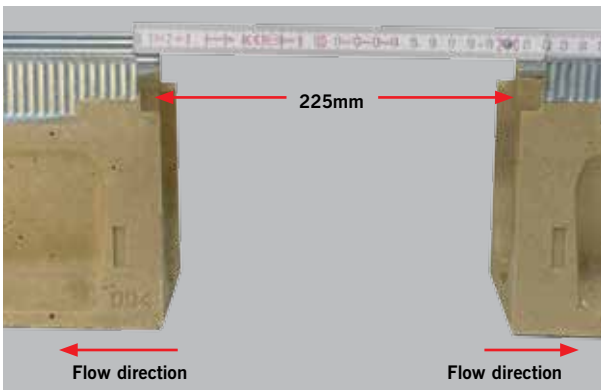
Required tools

- ▶ Folding ruler
- ▶ Polymer concrete repair kit (part no. 32599)
- ▶ Cup wheel or angle grinder
- ▶ Diamond cutting disk or angle grinder
- ▶ Spatula



To fabricate other longitudinal mitre cuts, cut the channel elements, grind then glue the surfaces according to the procedure described below. It must be ensured that the locking mechanisms and anti-shunt protection of the gratings remain functional.

Measuring the dimensions



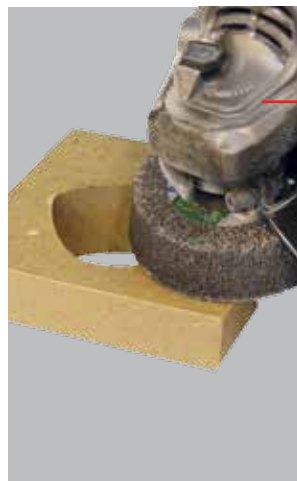
As shown by the example in the picture, a fitting piece or an adapter to change the flow direction can be used to bridge a gap of 225mm.

In this example:
 $225\text{mm} - 40\text{mm} = 185\text{mm}$

Cutting the channel body to length



cutting the channel body to size

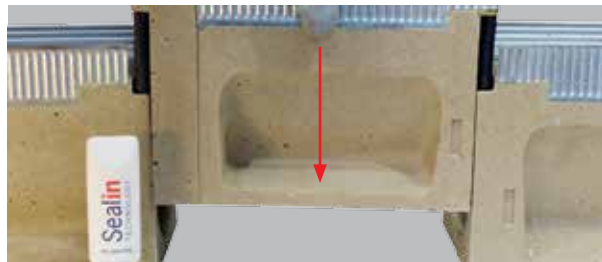


grinding the adhesive surfaces

Use a diamond cutting disc to cut the channel body to the measured dimension (in this case 185mm).

To obtain a grease-free and flat surface, we recommend grinding the adhesive surfaces with a cup wheel for stone.

Gluing and inserting the individual components



Afterwards, the components can be glued using a polymer concrete repair kit, and then pressed together firmly. Excess adhesive can be removed with a spatula. After a few seconds, both components are permanently glued and can be used again.

Now the glued fitting piece can be inserted, as shown in the picture, into the free space from above.



D Fabrication of corner, T or cross connection

Required tools

- ▶ Polymer concrete repair kit (part no. 32599)
- ▶ Cup wheel or angle grinder
- ▶ Drill with masonry bit
- ▶ Hammer and chisel
- ▶ Spatula



Knocking out the recess



pre-drilling



knocking out the recess

Pre-treating the adhesive surfaces



grinding the adhesive surfaces

To create the side opening on the half-metre element, drill along the pre-perforated recess using a drill with masonry bit (6mm). Please do not use the hammer drill function. Afterwards, the prepared recess can be knocked out using a hammer and chisel.

To obtain a grease-free and flat surface on the parts to be glued, we recommend pre-treating the adhesive surfaces with a cup of wheel for stone.

Gluing the individual components



Gluing should be performed as follows: mix the polymer concrete repair kit with the correct mixing ratio of the hardener, apply it to the adhesive surfaces, and finally glue both parts together (see enclosed instructions).



After the polymer concrete repair kit has hardened, the channel elements can be inserted from above as usual.

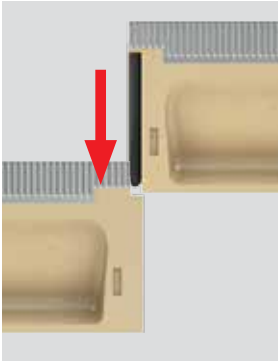


When creating a corner connection, make sure that the universal closing end cap is mounted **before** the components are glued with the polyester adhesive.



E Installation of channel and installation for asphalt, concrete and block pavements.

Installing the channel



The straightforward, tried-and-tested vertical method of installation is used in the new Multiline Sealin.

Installation requires installing the channel closely positioned on a compacted channel foundation (see detailed installation instructions), taking into account the moulded arrow direction on the channel body and the sequence of channel types in the case of sloping channels. Please follow your site guidelines regarding wearing gloves, and if necessary apply silicone grease with a brush. The quickest method to apply grease, is to apply the grease to all the channels when they are still on the pallet.

Installation must always begin at the lowest point; ie. at the transition point where the watercourse begins (eg. the pipe system or the sump).



Silicone grease for seal

The new EDPM seal, integrated as standard, requires the use of a commercial lubricant. To ensure the seal has maximum effect, we recommend using ACO silicone grease (part. no. 132495), which is specifically designed to meet the requirements of Sealin technology.



Designing an ACO Multiline Sealin drainage system

ACO Technologies online Hydraulic Design Software has been developed to give specifying engineers the option of designing and selecting the most appropriate channel drainage system for themselves, or using the tool in partnership with our dedicated Technical and Design Service. Using differential equations for spatially varied flow, this free online tool calculates the hydraulic capacity of channels accepting flow along their entire length. The software accurately analyses flow in the selected channel to check it has sufficient capacity. Furthermore it can optimise the selection and potentially downsize all or part of a channel run if it is oversized.



Designing a drainage system

The designer must input the rainfall intensity and total catchment area draining to each run of channel to calculate inflow to that channel system.

For normal situations Building Regulations (Approved Document Part H, 2015) suggests a default value of 50 mm/hour rainfall intensity should be an appropriate for catchments <4,000m². For larger drainage areas the designer should refer to BS 752

Where a specifier seeks to design their project in accordance with National Planning Policy Framework and to Sewers for Adoption (7th edition) they will need to manage rainfall runoff at source, and consider incorporating a Sustainable Drainage System in their design. They will also need to consider the effects of climate change on changing rainfall patterns and intensities over the lifetime of the development.

i It should be noted that other calculation methods will not give the correct results for channel drainage systems. In particular the use of equations of steady uniform flow, such as Manning's equation, is not appropriate for channel drainage design. They will not work with level channels and give grossly inaccurate results at shallow gradients.

Using Flood Studies Report procedures to analyse rainfall frequency, intensity and duration, the Design Software allows the specifier to change the selected storm intensity and duration to the required standard (e.g. to the 1 in 30 and 1 in 100 year return periods), and to make allowance for the effects of climate change on rainfall over the lifetime of the development.

The design software also allows the end user to estimate alternative storage requirements.

ACO can also provide specifiers with conduit files for use in proprietary software like Micro Drainage. Please contact the Design Services Team if you require any further information.

ACO Water Management Design Services Team

ACO has embraced the concept of value engineering as an approach to on-site construction that saves both time and money. ACO will review any design to minimise the total scheme and life cost of a proposal. By using ACO Multiline Sealin water can be contained and conveyed close to the surface, which accords with the principles advocated for Sustainable Drainage (SuDS Manual, 2015), by removing the need for pumping.

For detailed designs using the ACO Hydraulic Design Software, please contact the ACO Water Management Design Services Team. The team should also be consulted for advice where the inflow is not uniformly distributed along the channel.

To enable the designer to complete manual calculations ACO has published hydraulic performance tables within this document to facilitate a quick manual design method for the determination of your drainage requirements.

ACO Water Management Design Services Team

Tel: 01462 816666
Email: technical@aco.co.uk



ACO Hydraulic Design Software

Register online for our free, secure online design software:

- ▶ All designs are securely stored and easily accessed online
- ▶ Data always up-to-date
- ▶ Proven calculation methodology - more accurate and efficient designs
- ▶ Flexible catchment design
- ▶ Integrated rainfall data
- ▶ Automated product optimisation
- ▶ PDF summary documents



Register Now - It's Free
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Design method

ACO Multiline Sealin channels are available in 100mm width and is available in several depths of constant invert channel. The channels can be in runs of constant invert depth (Type 1) or in a stepped series of two depths (Type 3, 10-20 depth). The 100mm wide V100S channel is also available with a pre-sloped invert to form channel runs of 0.5% invert slope at up to 10m length (Type 2). The run lengths of pre-sloped invert can be extended by incorporating lengths of constant invert channel.

Whilst channel can be laid flat, where longitudinal falls do exist the hydraulic capacity of the system will be increased, therefore allowing greater spacing between outfalls.

Analysis of channel hydraulic capacity requires the use of a proprietary software programme like ACO Hydro, or ACO Technologies new online Design Software. Our new Design Software enables users to develop an optimised design of stepped 10-20 channels, increasing in size along the length of the channel run (step 10-20). For more information visit www.aco.co.uk

For detailed designs using ACO Hydro or Design Software, please contact the ACO Water Management Design Services team. The team may also be consulted for advice where the inflow is not uniformly distributed along the channel and for channels with pre-sloped inverts.

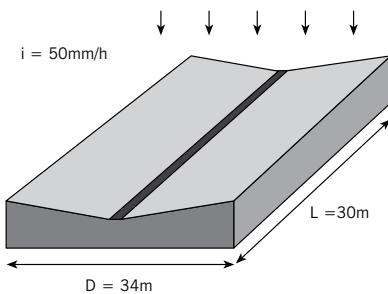
The tables on the following page have been produced from the ACO Hydro software to facilitate a quick manual design method for the determination of the drainage requirements.

The columns of drainage catchment area ($A \text{ m}^2$) are based on a rainfall intensity of 50mm/h, but can be adapted for use at any rainfall intensity. The columns of maximum flow rate ($Q \text{ l/s}$) and maximum lateral inflow ($Q \text{ l/s/m}$) can be used at any rainfall intensity. The table of sloping invert channel capacities can be used for the design of V100S sloping invert channels.

ACO Water Management Design Services Team

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DESIGN EXAMPLE



For a design of ACO Multiline Sealin V100S, assume the following figures:

- D = 15m (depth of catchment area)
- L = 30m (length of channel run = length of catchment)
- i = 50mm/h (design rainfall intensity)
- Ground slope = 0%

Note that any other rainfall intensity may be used. Typical intensities (from BS EN 752) are 50mm/h for areas where some ponding could be tolerated for a few minutes after heavy rainfall, or 75mm/h where ponding cannot normally be tolerated.

1. Determine the area

$$\text{Area} = L \times D = 30 \times 34 = 1020\text{m}^2$$

For a quick analysis, see the tables and the columns for Area.

1020m² is too large for one 30m run of ACO Multiline Sealin V100S 10.0

$$\text{Try } 1020 \times 1/2 = 510\text{m}^2$$

$$L \times 1/2 = 15\text{m}$$

One 15m run of ACO Multiline Sealin V100S 10.0 can drain approx 583m²
Hence two runs can drain the 1020m²

Or for a more detailed analysis, determine the total flow rate, as follows

2. Determine total flow (Q)

$$Q = (\text{Area} \times i) / 3600 = (1020 \times 50) / 3600 = 14.2 \text{ l/s}$$

3. Determine lateral inflow (q)

$$q = Q/L = 14.2 / 30 = 0.472 \text{ l/s/m}$$

4. Determine suitable channel sizes and lengths

For example, would a sump at 1/3 length work with a lateral inflow of 0.472 l/s/m?

1/3 L = 10m, ACO Multiline Sealin V100S 10.0 will be adequate

2/3 L = 20m, ACO Multiline Sealin V100S 20.0 will be adequate

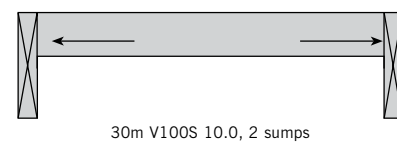
5. Check Outlet capacity

Ensure that the proposed outlet has sufficient hydraulic capacity by reference to the product technical pages.

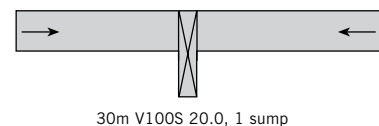
6. Solutions

Three options are sketched (right). There are other options, including V100S sloping invert channels.

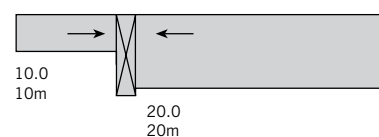
Option 1



Option 2



Option 3



X Denotes sump unit



Hydraulic Performance Tables (for lateral flow)

Notes for ACO Multiline Sealín V100S Hydraulic tables

Maximum capacities for each constant depth channel, assuming uniform lateral inflow to the channel.

Q (l/s) is the maximum total flow that the channel can carry.

q (l/s/m) is the maximum possible lateral inflow.

The maximum possible catchment depth is $q+i$, where i is the rainfall intensity

in l/s/m².

A (m²) is the maximum area that can be drained at a rainfall intensity of 50mm/h (0.014 l/s/m²).

At other rainfall intensities, the area can be determined by proportion, e.g. at 75mm/h, the maximum area drained will be the tabulated area x 50/75.

ACO Multiline Sealín constant depth channels

V100S 0.0 Overall depth 150mm									
Length to Outlet (m)	0%			0.5%			1%		
	Q (l/s)	q (l/s/m)	A (m ²)	Q (l/s)	q (l/s/m)	A (m ²)	Q (l/s)	q (l/s/m)	A (m ²)
5	5.3	1.05	378	5.3	1.05	378	5.9	1.18	425
10	4.9	0.49	353	5.5	0.55	396	6.6	0.66	475
15	4.8	0.32	346	5.7	0.38	410	7.1	0.47	508
20	4.5	0.23	324	5.9	0.30	425	7.4	0.37	533
25	4.3	0.17	307	6.1	0.24	437	7.8	0.31	558
30	4.2	0.14	302	6.2	0.21	449	8.0	0.27	572
35	4.0	0.12	290	6.3	0.18	454	8.1	0.23	580
40	4.0	0.10	285	6.4	0.16	461	8.2	0.21	590
45	3.8	0.09	275	6.4	0.14	463	8.3	0.19	599
50	3.8	0.08	270	6.5	0.13	468	8.5	0.17	612
55	3.6	0.07	261	6.5	0.12	471	8.5	0.15	612
60	3.6	0.06	261	6.5	0.11	471	8.5	0.14	612

V100S 5.0 Overall depth 175mm									
Length to Outlet (m)	0%			0.5%			1%		
	Q (l/s)	q (l/s/m)	A (m ²)	Q (l/s)	q (l/s/m)	A (m ²)	Q (l/s)	q (l/s/m)	A (m ²)
5	5.86	1.17	422	7.11	1.42	512	8.07	1.61	581
10	5.47	0.55	394	7.51	0.75	541	8.92	0.89	642
15	5.19	0.35	374	7.82	0.52	563	9.49	0.63	683
20	4.99	0.25	359	7.97	0.40	574	9.86	0.49	710
25	4.79	0.19	345	8.18	0.33	589	10.21	0.41	735
30	4.64	0.15	334	8.31	0.28	598	10.47	0.35	754
35	4.49	0.13	323	8.39	0.24	604	10.65	0.30	767
40	4.35	0.11	313	8.47	0.21	610	10.81	0.27	778
45	4.24	0.09	305	8.53	0.19	614	10.94	0.24	788
50	4.13	0.08	297	8.58	0.17	618	11.06	0.22	796
55	4.01	0.07	289	8.62	0.16	621	11.15	0.20	803
60	3.92	0.07	282	8.65	0.14	623	11.24	0.19	809

V100S 10.0 Overall depth 200mm									
Length to Outlet (m)	0%			0.5%			1%		
	Q (l/s)	q (l/s/m)	A (m ²)	Q (l/s)	q (l/s/m)	A (m ²)	Q (l/s)	q (l/s/m)	A (m ²)
5	9.0	1.80	648	9.0	1.80	648	10.0	2.00	720
10	8.4	0.84	605	9.4	0.94	677	11.0	1.10	792
15	8.1	0.54	583	9.8	0.65	702	11.6	0.77	832
20	7.7	0.39	554	9.8	0.49	706	12.0	0.60	864
25	7.4	0.30	531	10.0	0.40	720	12.5	0.50	900
30	7.2	0.24	518	10.2	0.34	734	12.6	0.42	907
35	7.0	0.20	504	10.3	0.30	743	13.0	0.37	932
40	6.8	0.17	490	10.4	0.26	749	13.2	0.33	950
45	6.6	0.15	476	10.4	0.23	745	13.5	0.30	972
50	6.5	0.13	468	10.5	0.21	756	13.7	0.27	983
55	6.3	0.11	451	10.6	0.19	764	13.8	0.25	990
60	6.1	0.10	441	10.7	0.18	769	13.8	0.23	994



V100S 20.0 Overall depth 250mm									
Length to Outlet (m)	0%			0.5%			1%		
	Q (l/s)	q (l/s/m)	A (m ²)	Q (l/s)	q (l/s/m)	A (m ²)	Q (l/s)	q (l/s/m)	A (m ²)
5	13.3	2.65	954	13.3	2.65	954	14.6	2.92	1051
10	12.5	1.25	900	13.6	1.36	979	15.8	1.58	1138
15	11.9	0.79	853	14.0	0.93	1004	16.7	1.11	1199
20	11.4	0.57	821	14.2	0.71	1022	17.2	0.86	1238
25	11.0	0.44	792	14.8	0.59	1062	17.5	0.70	1260
30	10.5	0.35	756	14.7	0.49	1058	18.0	0.60	1296
35	10.2	0.29	733	14.7	0.42	1058	18.2	0.52	1310
40	10.0	0.25	720	14.8	0.37	1066	18.4	0.46	1325
45	9.7	0.22	697	14.9	0.33	1069	18.5	0.41	1328
50	9.5	0.19	684	15.0	0.30	1080	19.0	0.38	1368
55	9.4	0.17	673	15.1	0.28	1089	19.2	0.35	1385
60	9.2	0.15	661	15.1	0.25	1089	19.3	0.32	1386

Sloping Invert Channels

0.5% invert slope provides positive drainage to outlet.

Sloping Invert, Level Ground

5m run starting from channel no. 1 gives total flow rate 6.7 l/s. Alternatively a 5m run starting from channel no. 6 would give 8.6 l/s

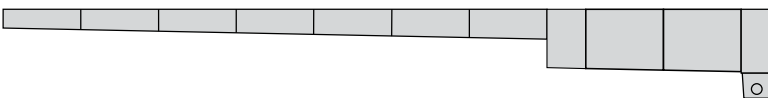


Sloping Invert, Level Ground

10m run starting from channel no. 1 gives total flow rate 7.8 l/s



Sloping Invert channels can be used with constant invert depth channels to extend the channel length. The below example shows a length of sloping channel which then steps down to a constant depth 20.0 channel using the 10-20 step channel.



Any sized channel, constant or sloping can be connected to the V100S sump.

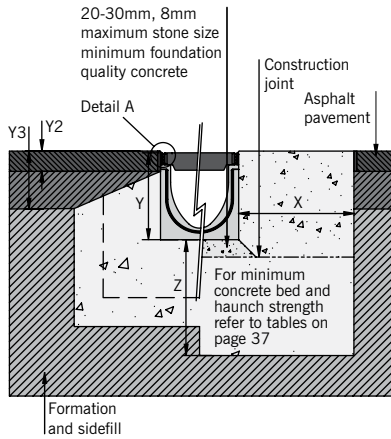
Where the run is laid with a longitudinal ground slope, the capacities can be considerably increased, or the length to outfall extended. Please contact ACO Water Management Design Services team



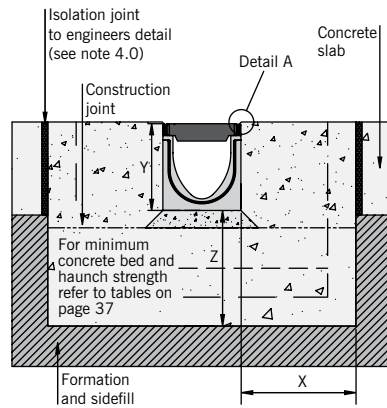
Installation detail

CHANNELS WITH TRADITIONAL GRATINGS

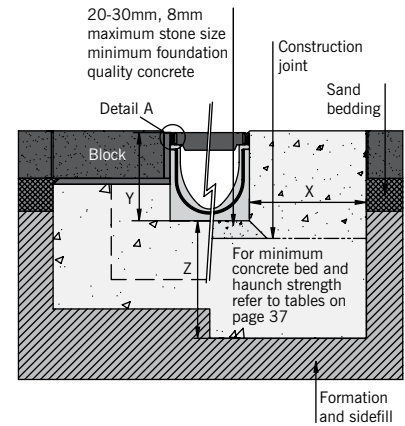
Asphalt pavement



Concrete pavement



Block pavement



1.0 Load Class

Installation recommendations shown are ACO minimum recommendations for BS EN 1433:2002 load class requirements.

2.0 Ground Conditions

The long term performance of a channel installation to sustain vertical and lateral loads depends upon a) ground conditions, b) stability of the adjacent pavement and c) a durable concrete bed and surround. The recommended installation detail may require the minimum dimensions to be revised to achieve site specific load class requirements (referred to in 1.0 above).

3.0 Cutting and Jointing

Mitre joints are formed by cutting the channels to the required angle and butting them together with the appropriate sealant (e.g. Sikaflex 11FC or similar) or ACO Repair Kit. Where possible 90° joints and T's should be formed so that gratings do not have to be cut. Angles can be formed by connecting them using proprietary PVCu pipework attached to the ACO inlet/outlet endcaps. For further details please contact ACO Design Services Team. Note: For load classes higher than C 250, mitred joints are not recommended in vehicular areas. Where requested ACO can custom manufacture angled joints to order.

4.0 Isolation Joints

The channel must be isolated from the surrounding environment. An isolation joint must be positioned up to 1500mm from the channel wall. Any dowel bars must be located no nearer than 150mm from the channel wall. Other isolation joints in surrounding slab must be continued through the channel. Additional crack control may be required to comply with specifier requirements.

5.0 Installation into in-situ slab

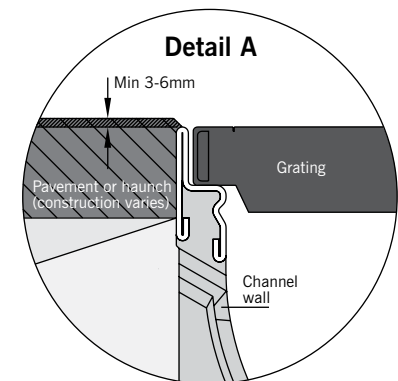
Where a channel is to be installed into an existing concrete slab it is necessary to cut a suitably sized pocket in the slab. The channel will then need to be bedded in polymer modified mortar of 25mm minimum thickness (this may vary depending on the type of mortar used). Engineering advice may be necessary.

6.0 Temporary installation

A channel installation is not complete until the final surfacing is laid. In any temporary condition, i.e., the channel walls projecting above adjacent ground, site traffic should not cross channels. Loose boards, stone fill or cover plates will not protect the channel walls or grating. A temporary channel crossing should be formed by raising the ground level locally, to 3-6mm above top of edge rail, either side of a channel for a distance of 750 to 1000mm, to form ramps. Note that the channel load class should be adequate to carry the site traffic.

7.0 Block pavements

The channel must be supported laterally. Blocks laid directly against the channel must be laid as a soldier course and restrained from movement by bedding securely on the concrete haunch e.g. by using a polymer modified mortar for bed and perpendicular joints (e.g., RONAFIX mortar mix C or similar). Blocks or slabs bedded on sand remote from the channel should be set at a higher level to compensate for possible settlement of the paving in service.



8.0 Grate locking system

Gratings should be securely fixed to the channel, where required, using an appropriate grate lock system (where available).

9.0 Channel protection

Avoid contact between compaction equipment and top of ACO channel edge rail. The installer must ensure that the finished surface level lies above the top of the edge rail (by at least 3-6mm). Covering or protecting the grating, before concreting the haunch or laying blocks, removes the time and cost associated with cleaning the channel and grating of cement material and embedded stones. (Please note that ACO channels must be installed with the grating in place to prevent deformation of the channel.)

10.0 Watertight installation to BS EN 1433:2002

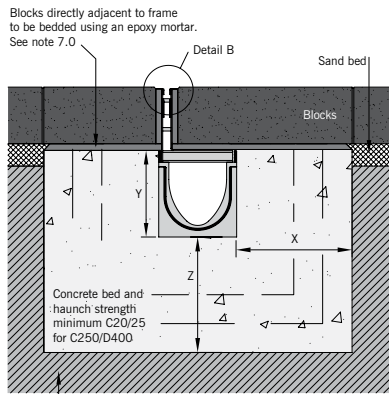
Multiline Sealin channels require the application of ACO silicone grease (part no. 132495).

See page 31 for typical method of water tight sealing.

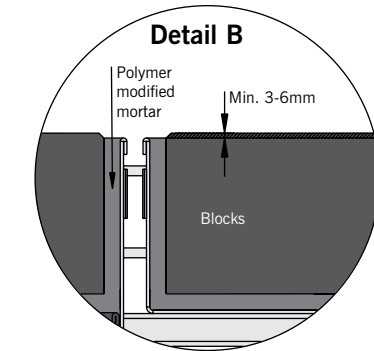


CHANNELS WITH BRICKSLOT GRATINGS

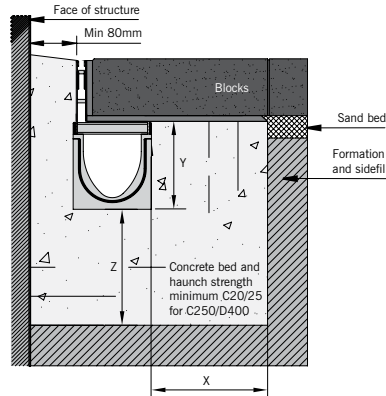
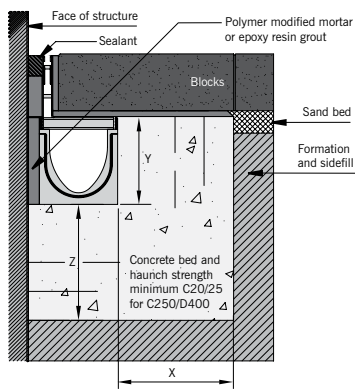
Standard Brickslot top



Adjacent to a structure - option 3



Adjacent to a structure - option 4



Best practice and workmanship

ACO can give guidance with respect to the most suitable methods of installation for each of the products in the ACO Multiline range. ACO Multiline should be installed using acceptable levels of workmanship and according to the National Code of Practice (UK: BS8000: Part 14: 1989) in keeping with EN 1433:2002 (Drainage channels for vehicular and pedestrian areas).

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

Note: Galvanised iron and steel products have good corrosion resistance to concrete and mortar products but may experience corrosion if high chloride an/or sulphate content is present. Use only good quality concrete and consider using corrosion inhibitors where necessary. The use of protective coatings, such as paint, can minimise the risk of corrosion.

For further information please contact our Design Services Team (technical@aco.co.uk) or the ACO website www.aco.co.uk



An electronic version of the ACO Multiline installation detail is available to download from the ACO website. Visit www.aco.co.uk.

11.0 Minimum Dimensions of Concrete Surround

Asphalt

Load Class	A 15	B 125	C 250	D 400*	
Minimum Dimensions (mm)	x	100	100	150	200
	y	Full channel height (less Y2 where applicable)			
	z	100	100	150	200
Maximum Dimensions (mm)	Y2	35	35	35	N/A
	Y3	100	60	60	N/A
Minimum compressive concrete strength (to BS EN-206:2013)	C12/15	C12/15	C12/15	C25/30	C30/37

Concrete

Load Class	A 15	B 125	C 250	D 400*	
Minimum Dimensions (mm)	x	150	150	150	200
	y	Full channel height			
	z	100	100	150	200
Minimum compressive concrete strength (to BS EN-206:2013)	C12/15	C12/15	C12/15	C25/30	C30/37

Block

Load Class	A 15	B 125	C 250	D 400*	
Minimum Dimensions (mm)	x	100	100	150	200
	y	Full channel height			
	z	100	100	150	200
Minimum compressive concrete strength (to BS EN-206:2013)**	C12/150	C12/15	C12/15	C25/30	C30/37

Brickslot

Load Class	A 15	B 125	C 250	D 400*	
Minimum Dimensions (mm)	x	100	100	150	200
	y	Full channel height (less Y2 where applicable)			
	z	100	100	150	200
Minimum compressive concrete strength (to BS EN-206:2013)	C12/150	C12/15	C20/25	C20/25	C20/25

* e.g. parking areas for all types of road vehicle. Not suitable for carriageway of roads or industrial areas.

**Where two concrete grades are indicated, the lower grade is the base concrete, the higher grade is for the top layer, please refer to Installation details www.aco.co.uk



Chemical resistance chart

ACO's high strength material, has a high resistance to dilute acids and alkalis, and are unaffected by road salt, fuel and oil, and other commonly encountered chemicals. Further details of the chemical resistance can be obtained from the ACO Water Management Design Services team or, for particular chemicals, samples of the polymer concrete can be supplied to customers for their own testing. The chemical resistance will also depend on the temperature of the effluent. Clean water should not exceed 80°C.

The resistance of the gratings and edge rails should also be considered.

This chemical resistance chart refers to chemicals at ambient temperatures (20°C) and the results are for general guidance only.

Chemical medium	% conc	Resistance: Polyester concrete
Acetic acid, glacial	100	No
Acetic acid	10	Yes
Acetic anhydride	100	No
Acetone	10	No
Acetone	100	No
Alum	100	Yes
Aluminium sulphate	100	Yes
Ammonium chloride	100	Yes
Ammonium nitrate	100	Yes
Ammonium phosphate	65	Yes
Ammonium sulphate	100	Yes
Aniline (aminobenzene)	100	No
Barium chloride	100	Yes
Benzaldehyde	100	No
Benzene	100	No
Benzyl alcohol	100	Yes
Benzyl chloride	100	No
Borax	100	Yes
Boric acid	100	Yes
Bromine	100	No
Bromine water	Saturated	No
Butyl acetate	100	No
Butyric acid	100	Yes
Calcium carbonate	100	Yes
Calcium chloride	100	Yes
Calcium chlorate	8	Yes
Calcium hydroxide	100	Yes
Calcium nitrate	100	Yes
Carbon disulphide	100	No
Carbon tetrachloride	100	Yes
Castor oil	100	Yes
Chlorine gas, wet	100	No
Chlorine water	Saturated	No
Chlorobenzene	100	Yes
Chloroform (trichloro-methane)	100	No
Chromic acid	12	Yes
Citric acid	100	Yes
Copper chloride	100	Yes
Copper nitrate	100	Yes
Cyclohexane	100	Yes
Diesel fuel (DERV)	100	Yes
Dimethyl formamide	100	No
Dimethyl phthalate	100	Yes
Diethyl phthalate	100	Yes
Ethanol	95	No
Ethanolamine	100	Yes
Ethyl acetate	100	No
Ethylene glycol	100	Yes
Ferrous chloride	100	Yes
Ferric chloride	100	Yes
Ferrous sulphate	100	Yes
Formaldehyde	30	Yes
Formic acid	10	Yes
Formic acid	100	No
Fuel oil	100	Yes
Gasoline	100	Yes
Glycerine	100	Yes
Hydrazine	50	No

Chemical medium	% conc	Resistance: Polyester concrete
Hydrobromic acid	48	Yes
Hydrochloric acid	10	Yes
Hydrofluoric acid	10	No
Hydrogen peroxide	30	Yes
Lactic acid	100	Yes
Lead acetate	100	Yes
Magnesium chloride	100	Yes
Magnesium sulphate	100	Yes
Maleic acid	100	Yes
Methyl ethyl ketone (MEK)	100	No
Motor oil	100	Yes
Nickel chloride	100	Yes
Nickel sulphate	100	Yes
Nitric acid	5	No
Nitrobenzene	100	No
Oleic acid	100	Yes
Oxalic acid	100	Yes
Perchloric acid	10	Yes
Perchloroethylene	100	Yes
Phosphoric acid	20	Yes
Phosphorus trichloride	100	No
Potassium carbonate	50	Yes
Potassium chloride	100	Yes
Potassium dichromate	100	Yes
Potassium hydroxide	10	Yes
Potassium nitrate	100	Yes
Potassium permanganate	10	No
Potassium sulphate	100	Yes
Pyridine	100	No
Sodium acetate	100	Yes
Sodium bromide	100	Yes
Sodium carbonate	35	Yes
Sodium chlorate	100	Yes
Sodium chloride	100	Yes
Sodium hydroxide (caustic soda)	50	No
Sodium hypochlorite	18	No
Sodium nitrate	100	Yes
Sodium nitrite	100	Yes
Sodium phosphate	10	Yes
Sodium sulphate	100	Yes
Sodium sulphide	100	Yes
Sodium sulphite	100	Yes
Sodium thiosulphate	100	Yes
Stearic acid	100	Yes
Styrene	100	No
Sulphuric acid	75	No
Sulphuric acid	50	Yes
Sulphuric acid at up to 40°C	10	Yes
Tetrachloroethylene	100	Yes
Thioglycolic acid	80	Yes
Thionyl chloride	100	No
Toluene	100	Yes
Toluene sulphonic acid (aqueous solution)	Saturated	Yes
Trichloroacetic acid	50	Yes
Turpentine	100	Yes
Water	100	Yes
Xylene	100	Yes
Zinc sulphate	100	Yes



Specification clause

The surface drainage system shall be ACO Multiline Sealin (insert channel description as appropriate e.g. ACO V100S) channel system as supplied by ACO Technologies plc; all materials and components within the scope of this channel system shall be obtained from this manufacturer. The system shall be CE marked and fully compliant with BS EN 1433:2002, certificated to Load Class (*) as defined in BS EN 1433:2002.

Declarations of Performance (DoP) shall be supplied to the Supervising Officer upon request. The system shall be of 100mm* nominal internal width, manufactured in ACO's high strength material with cast-in galvanised steel edge rails. The channels shall be installed with manufacturer's grating appropriate to the specified Load Class and locked securely in place using the manufacturer's Drainlock® boltless locking system.

The system shall be installed in accordance with the manufacturer's printed instructions, and the work carried out as specified in drawing no. (... ..) and in accordance with recognised good practice. Standards of workmanship shall generally be as specified in BS EN 752 and BS 8000:Part 14:1989.

* insert information C 250 or D 400 as appropriate.

Recycled content

ACO Technologies aim to incorporate as much recycled material or waste material as is practicable in their manufactured products. Typically, cast iron materials contain 40% to 90% recycled iron, and steel products contain 25% to 33% recycled steel.

The ACO Multiline Sealin products are themselves intended for a long life with low maintenance, to reduce the need to recycle, but when eventually they are no longer needed, much of their content can be readily recycled with a very low risk of pollution to the environment.

NBS Specifications

ACO Multiline Sealin should be specified in section Q10:180. Assistance in completing this clause can be found in the ACO Water Management entry in NBS Plus, or please contact the ACO Water Management Design Services Team.

Note: A specification in NBS format is available to download from www.thenbs.com or www.aco.co.uk

Conformity

The ACO Multiline Sealin System is fully certified to EN 1433:2002 and CE marked in accordance with the Construction Products Regulation.

Declarations of Performance are available via the CPR Zone on our website (www.aco.co.uk/DoP.php), or on request. Please contact ACO Water Management Design Services Team on 01462 816666 for further information.

EN 1433:2002



General information

ACO products are subject to weight and dimensional tolerances. The weights and dimensions shown in this document are for guidance purposes only. ACO products are made from naturally occurring materials and may be subject to variations in colour, texture and marking. These aesthetic variations do not affect the performance or functionality of our Goods. The appearance of products shown in our company documentation are for illustration purposes only.

ACO Technologies plc

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

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