The channel system for civil engineering and landscaping

ACO DRAIN® Multiline Seal in

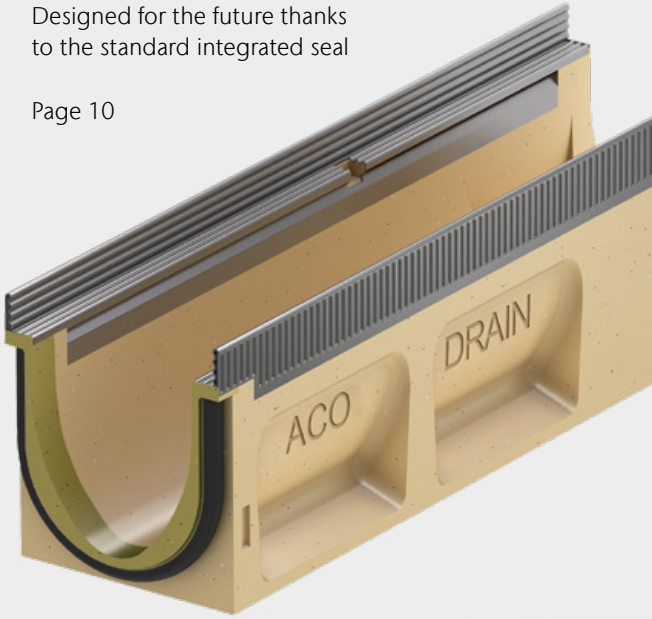
ACO DRAIN® Multiline with Seal in Technology

Water tightness and water quality to meet the demands of tomorrow: By combining the standard integrated seal with the polymer concrete material, the channels of the ACO Multiline Seal in product range securely seal the key points of a linear drainage system.

Seal in Technology

Designed for the future thanks to the standard integrated seal

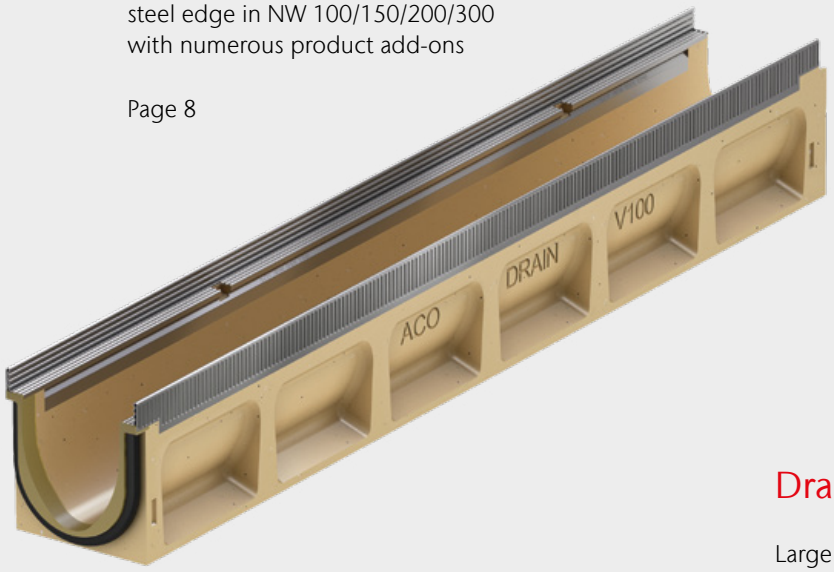
Page 10



Modular Multiline Seal in

Stainless steel edge and galvanised steel edge in NW 100/150/200/300 with numerous product add-ons

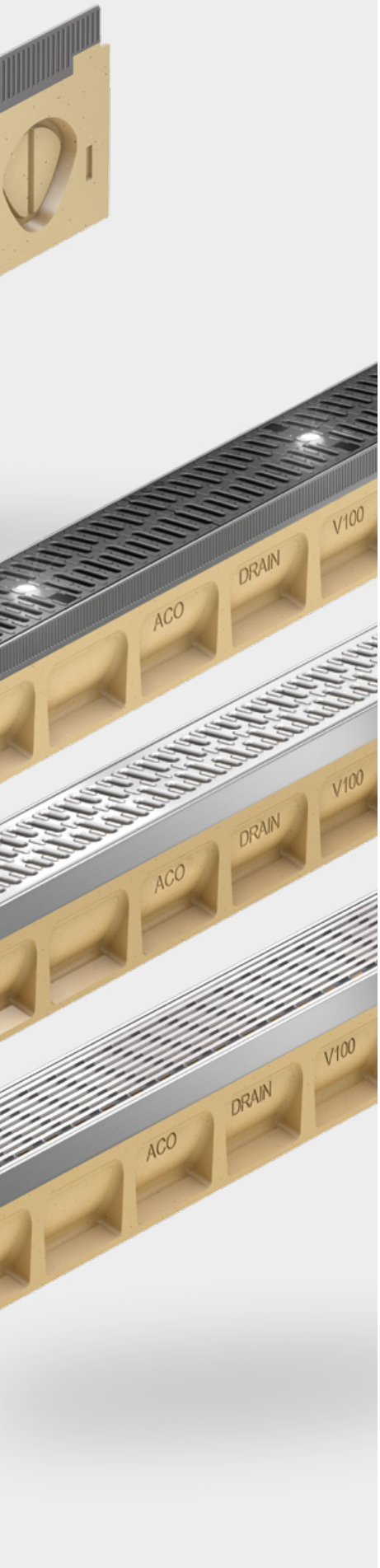
Page 8



Drainlock grating

Large selection of covers suitable for the Multiline product range

Page 14



Note

Any more questions?
askACO – your local
ACO team is proud to offer
experience and service

www.aco.com/en/products-and-services/askaco

ACO. creating the future of drainage
ACO Group 04

1 **The Multiline product range**
The channel system for civil engineering and landscaping 06
Typical areas of use 08
Multiline Sealin system overview 09
Product advantages at a glance 10
Reliable thanks to tested watertightness 12
Versatile gratings for attractive projects 14
The choice is yours! Drainlock grating overview 16

2 **Handling of system components** 19
Multiline in use 20
Handling of components 22
Hydraulic dimensioning 24
Installation 26
Quality starts with the material 28
Expertise in landscaping 30

3 **ACO Service**
Your questions – our answer:
the ACO system chain 32
Our service offer 34
Any questions? askACO 35

ACO. creating the future of drainage

The worldwide ACO Group. A strong family you can build on

The ACO Group is a world market leader in drainage technology. Climate change sets us a challenge to react effectively with innovative solutions to new environmental conditions. With its integrated approach, ACO stands for professional drainage, efficient cleaning, and the controlled discharge or reuse of water. Products include drainage channels and drains, oil and grease separators, backflow stop systems, pumps and pressure-water-tight cellar windows and light shafts.

The family-owned company headquartered in Rendsburg/Büdelsdorf, Germany, was founded in 1946 on the site of the Carlshütte foundry – Schleswig-Holstein's first industrial company. It still has very strong roots in the region. The innovation strength of the ACO Group is built on intense research and development, and its technical expertise in processing polymer concrete, plastic, cast iron, stainless steel and reinforced concrete.

www.aco.com

Headquarters of the ACO Group
in Rendsburg/Büdelsdorf

5,000

Employees in more than 46 countries (Europe, North America and South America, Asia, Australia, Africa)

900 Mio.

Euro Sales 2020

36

Production sites in 18 countries

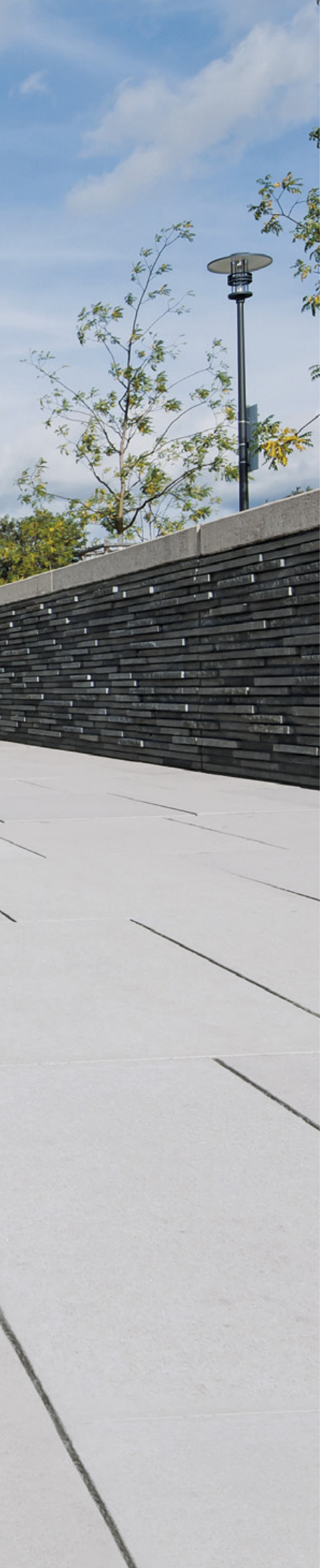
ACO Academy
for practical training

Holder
Iver and Hans-Julius Ahlmann

1

The channel system for civil engineering and landscaping

ACO DRAIN®
Multiline Seal in



The Multiline product range

ACO DRAIN® Multiline Sealin is based on a system concept which provides advantages for everyone: planners, dealers, contractors and building owners. **Planners** save time in the tendering process as the Multiline system concept allows interfaces to be standardised to a high degree. **Dealers** benefit from the streamlined product range. **Building owners** enjoy sophisticated solutions for both design and construction – Multiline combines stylistic diversity and high functionality with extreme durability.

Any more questions?
askACO – your local ACO team is proud to offer experience and service

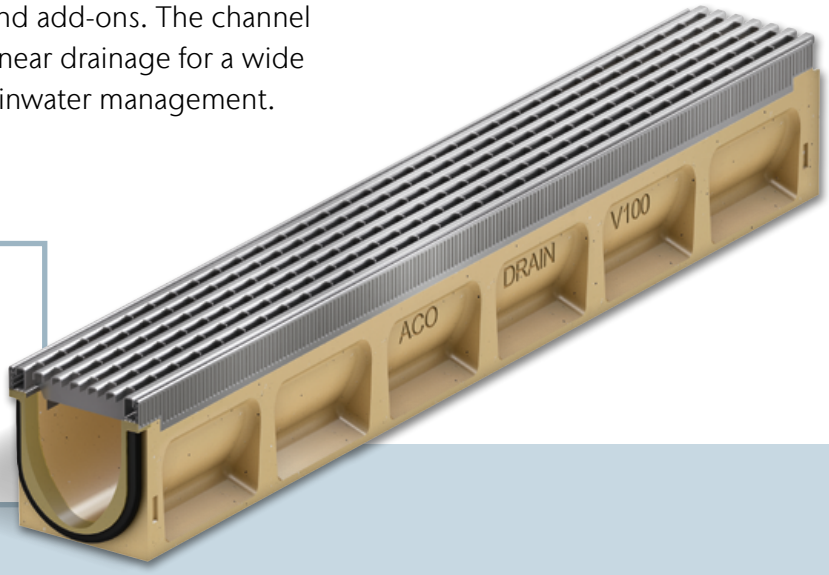
www.aco.com/en/products-and-services/askaco

Multiline Sealin – drainage channel made of polymer concrete

The extensive product range of Multiline Sealin creates plenty of scope for intelligent design and construction solutions. You can choose from a variety of materials for frames and gratings, various nominal widths and add-ons. The channel system therefore enables flexible linear drainage for a wide range of applications in modern rainwater management.

ACO product advantages

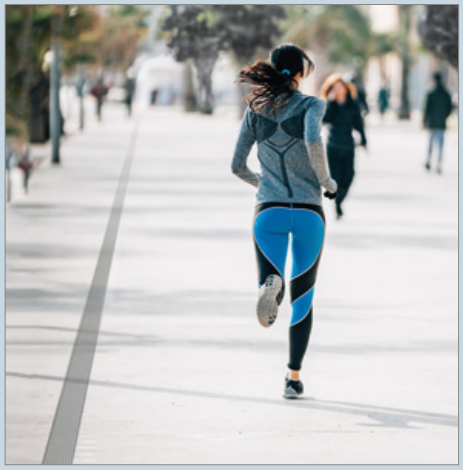
- integrated seal
- reinforced channel body
- Galvanised steel edge and stainless steel edge
- Drainlock grating

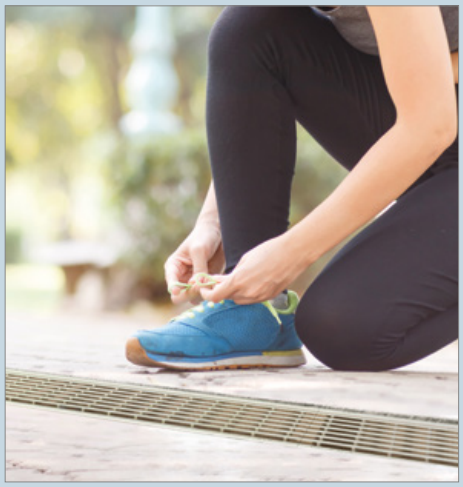


Typical areas of use

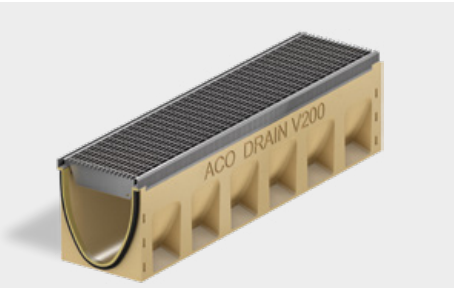
Application	Multiline Sealin Gratings of classes A 15 - E 600
Seal type at channel joint	Sealin
Railway platforms	■
Design and light	■
Façade drainage	■
Pedestrian zones and streets	■
Landscaping	■
Warehouse gates	please use our technical service to support your planning*
Truck car parks	please use our technical service to support your planning*
Logistics areas and roads	please use our technical service to support your planning*
Public paths and spaces	■
Car parking spaces	■
Petrol stations and service stations	please use our technical service to support your planning*
Underground car parks	please use our technical service to support your planning*
Car wash and yards	please use our technical service to support your planning*

* please use our technical service to support your planning
www.aco.com/contact



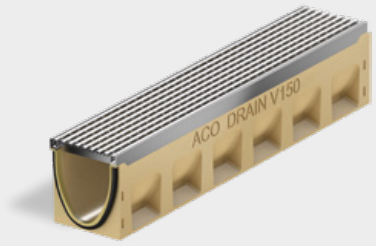


Multiline Sealin system overview



Galvanised steel

Flexible solution for a wide range of use cases



Stainless steel

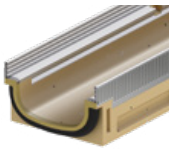
For high demands on aesthetics, functionality and load capacity

	Multiline Sealin Steel, galvanised	**Multiline Sealin Stainless steel**
NW 100		
NW 150		
NW 200		
NW 300		

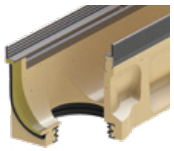
More nominal widths will become available

Additions to the product range

- Channel body with liquid-tight pipe connection
- Half-metre channels
- Slope channels
- Inlet chambers
- Shallow channels



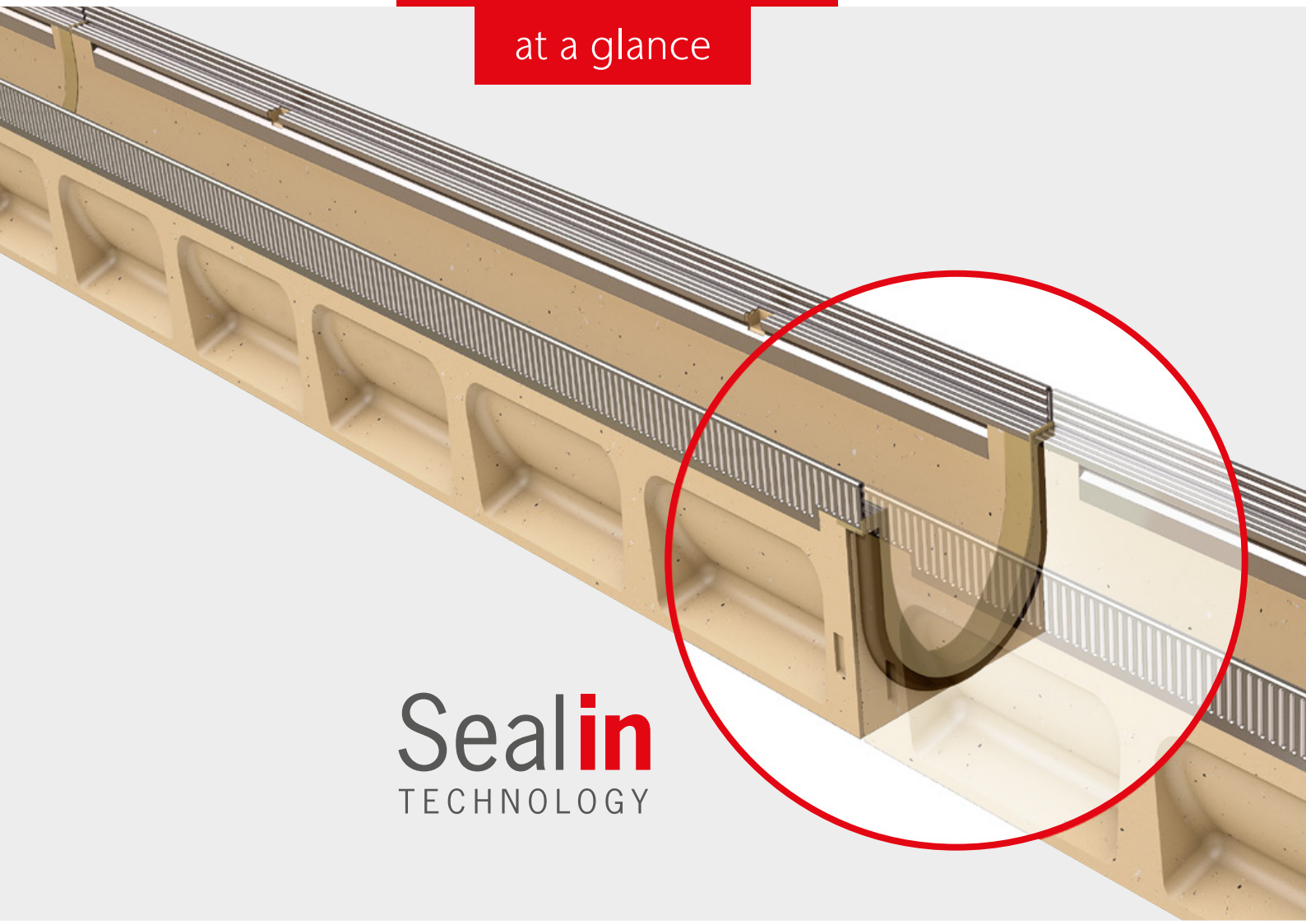
Shallow channel



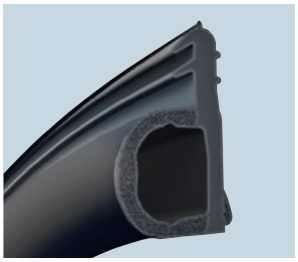
Channel body with lip labyrinth seal connection

Short or long form sump unit

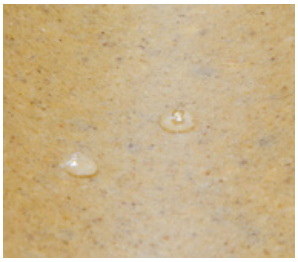
Product advantages at a glance



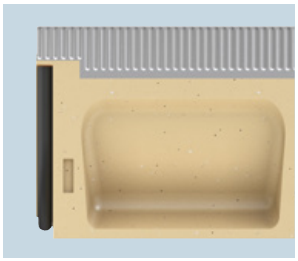
Video animation



The **EPDM seal integrated as standard** connects two channel bodies to form a watertight connection.



Thanks to **ACO polymer concrete**, a material with a water penetration depth of 0 mm, the entire channel run is watertight.



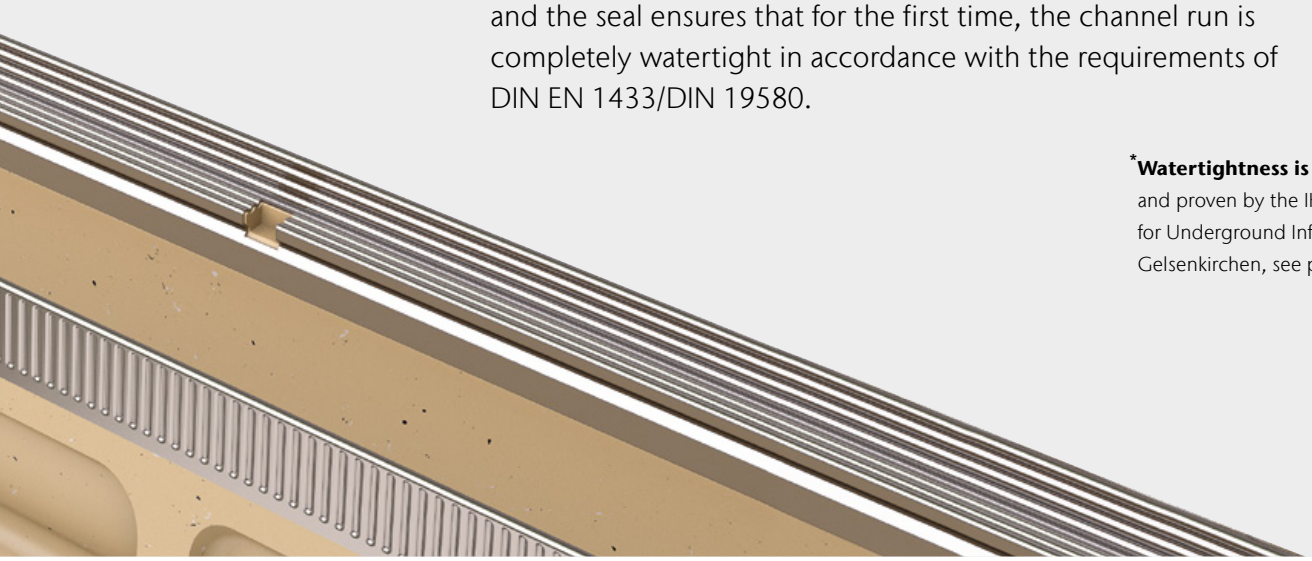
Robust channel body
The improved geometry makes the channel body more robust. This is reflected in the optimised, application-specific installation recommendations. The concrete quality for the foundation concrete has now been reduced to C 12/15 throughout for load classes A15 to C250.

Watertight* channel run

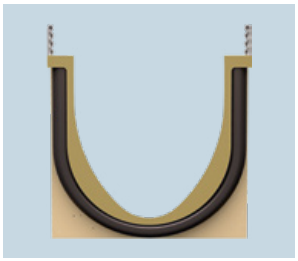
Channel joint with seal and dense material

ACO Multiline is the channel equipped with a seal as standard. Using Sealin technology, ACO securely seals the key points of linear drainage systems. This means that ACO Multiline already meets future requirements in terms of water-tightness and water quality.

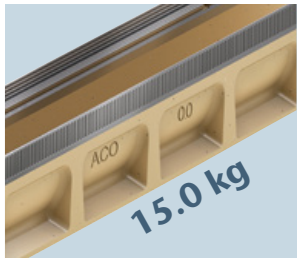
The unique combination of the ACO polymer concrete material and the seal ensures that for the first time, the channel run is completely watertight in accordance with the requirements of DIN EN 1433/DIN 19580.



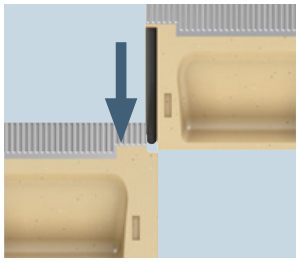
***Watertightness is certified** and proven by the IKT, Institute for Underground Infrastructure, Gelsenkirchen, see page 12 f.



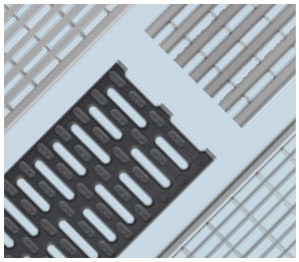
Improved self cleaning
Due to the even transition elements at the channel joint and the smooth surface of the ACO polymer concrete, the self-cleaning capability of the channel now works even better.



Proven, easy handling
ACO polymer concrete products are lighter than concrete products with the same load-bearing capacity: providing a significant advantage during handling, transport and installation.

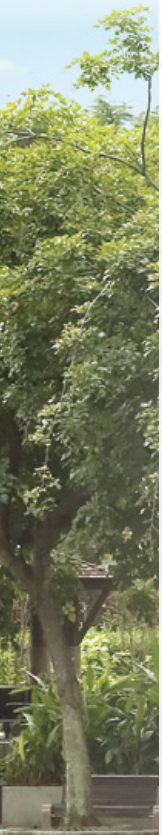


Easily installed from above
The simple plug-in system stays the same - nothing about the tried-and-tested installation has changed.



Grate variety for your ideas
In combination with the different ACO Drainlock gratings, landscaping can be given a unique character.

Reliable thanks to tested watertightness



Surface water management expert!

That is the motto of Michael Müller, Surface water management expert for ACO DRAIN® drainage channels. Right from the product development stage, the aim was to prevent irreversible damage to *nature, the environment and buildings*.

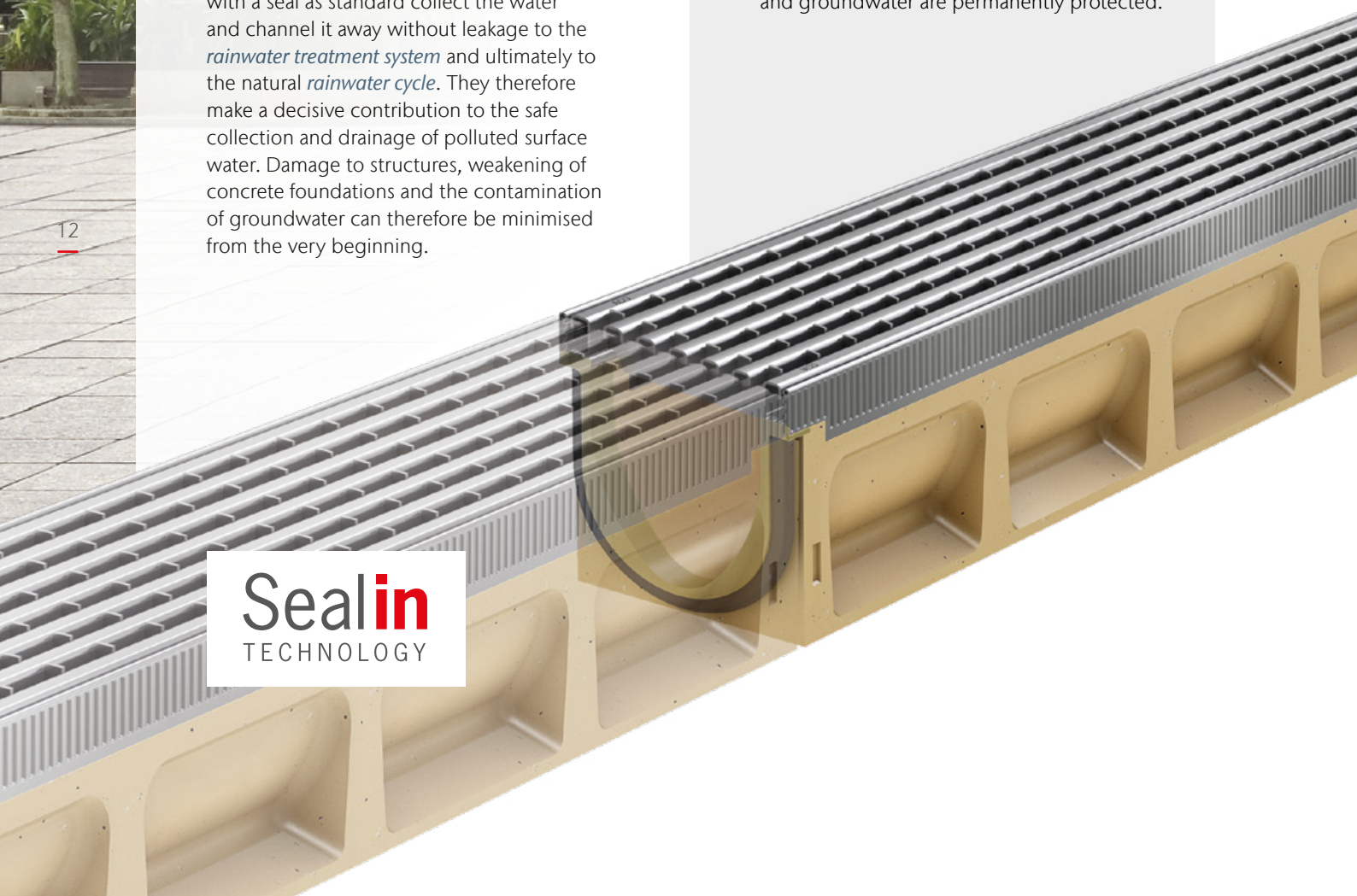
Surface runoff contains more contaminants than one might assume. Roads with heavy traffic are heavily polluted. These contaminants are washed into structures and *groundwater* when it rains and can cause a great amount damage. Road salt, for example, can cause corrosion and weaken foundations.

ACO DRAIN® drainage channels equipped with a seal as standard collect the water and channel it away without leakage to the *rainwater treatment system* and ultimately to the natural *rainwater cycle*. They therefore make a decisive contribution to the safe collection and drainage of polluted surface water. Damage to structures, weakening of concrete foundations and the contamination of groundwater can therefore be minimised from the very beginning.

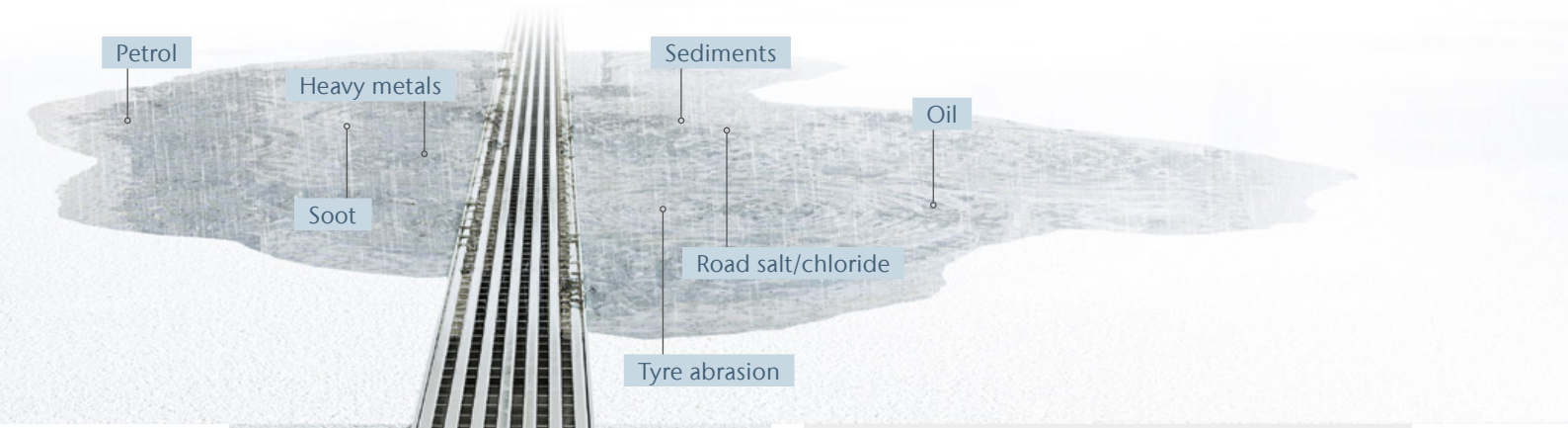
ACO makes the channel run watertight*

This is made possible by the channel joint with seal and the dense material: the unique combination of the integrated EPDM seal and the watertight ACO polymer concrete ensures a continuously liquid tight channel run in accordance with the requirements of DIN EN 1433 / DIN 19580. In addition to the ACO polymer concrete, the loss-proof two-component seal is an essential component of the **Sealin technology.**

The channel body is also produced in a special two-component process. This creates a liquid-tight channel run which transfers the collected surface runoff to the ACO system chain without any losses. Through targeted rainwater management, the structure and groundwater are permanently protected.



IKT - Institute for Underground Infrastructure, Gelsenkirchen



*Watertight – certified through long-term simulation

The ACO Multiline with integrated Sealin technology as standard exceeds the requirements for watertightness according to DIN EN 1433 / DIN 19580, section 9.3.6 (duration of watertightness at least 30 min. +/–0.5 min.) many times over. During the leak test according to IKT certification procedure DO1185, a permanent tightness was proven for 72 hours after cyclic loading. The load cycles used here simulate years of traffic crossing the channel joint.

Versatile gratings for attractive projects

A wide range of covers creates creative scope for individual planning and design. All covers are equipped with the Drainlock screwless locking system.
Further design options are created by discreet brickslot grating, the unmistakable grating designs of the Freestyle covers and the striking illumination provided by Sideline, Eyeleds or Lightspot.

Design freedom with ACO DRAIN® Design
ACO Drainlock gratings can be combined with the ACO DRAIN® channel systems Multiline Sealin and PowerDrain Sealin up to class E 600 as well as XtraDrain and Deckline up to C 250. This means that a wide range of covers in many shapes, colours and materials - made of cast iron or stainless steel, hot-dip galvanised steel or plastic - are available. It meets every requirement in terms of aesthetics, functionality and load capacity.

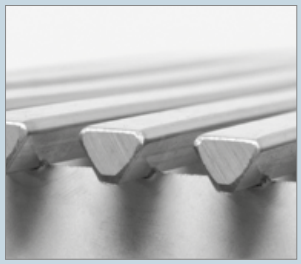
All Drainlock grates in the overview
see page 16/17

Highlights from the grating range A-E

Mesh grating Q+
Galvanised steel
Stainless steel

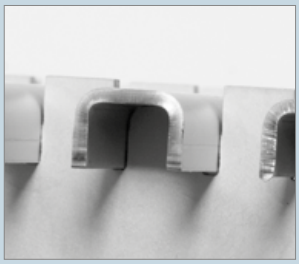
Hydraulics:
optimised inlet cross-section

Longitudinal bar grating
Galvanised steel
Stainless steel



Heelguard:
Slot width max. 10 mm

Longitudinal profile grating
Galvanised steel
Stainless steel



Heelguard:
Slot width max. 10 mm
Slip resistant:
according to DIN 51130
at least R 11

Discreet Brickslot grating
Galvanised steel
Stainless steel

Heelguard:
Slot width max. 10 mm

Composite grating with Microgrip
anti-slip plastic

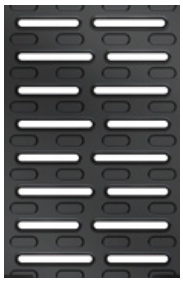
Heelguard:
Slot width max. 10 mm
Slip resistant:
according to DIN 51130
at least R 11

Drainlock grating

Slotted grating
Galvanised steel
Stainless steel

Slotted grating
Cast iron

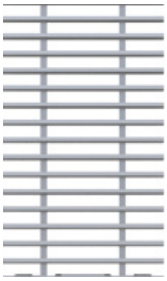
Slotted grating
Heelguard:
Cast iron



Composite grating
black Plastic

Composite grating
silver-grey Plastic

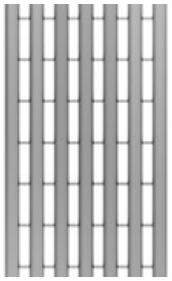
Crosswise rod grating
Stainless steel



Longitudinal bar grating
Galvanised steel
Stainless steel

Longitudinal bar grating
Stainless steel

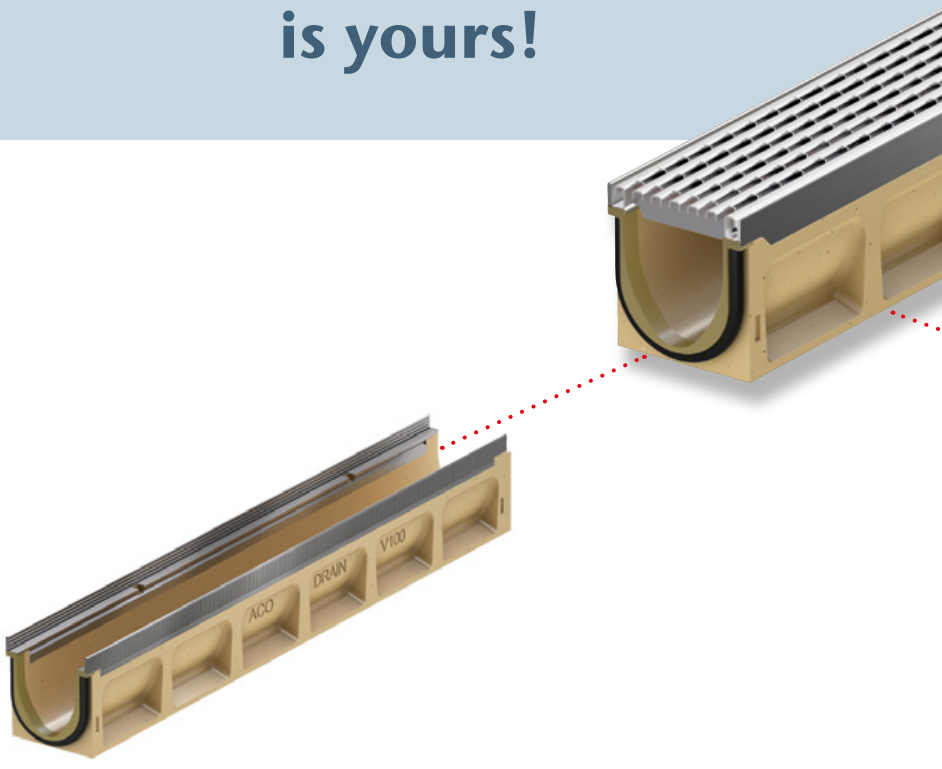
Longitudinal profile grating
Galvanised steel
Stainless steel



Sealin TECHNOLOGY

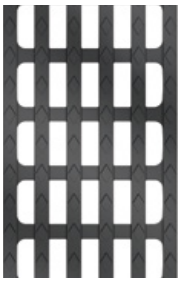
The choice is yours!

ACO DRAIN® Multiline Sealin channel bodies

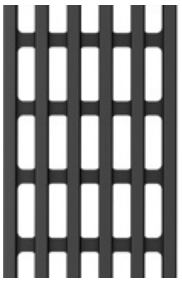


Multiline Sealin
Frame: galvanised steel

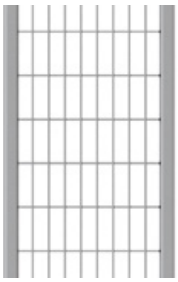
Longitudinal bar grating
In mesh design
Cast iron



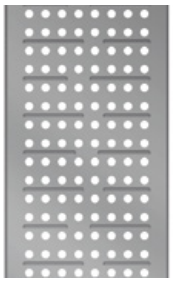
Longitudinal bar grating
Design Ray
Cast iron



Mesh grating Q+
Galvanised steel
Stainless steel



Perforated grating
Galvanised steel
Stainless steel



Brickslot grating
Galvanised steel
Stainless steel

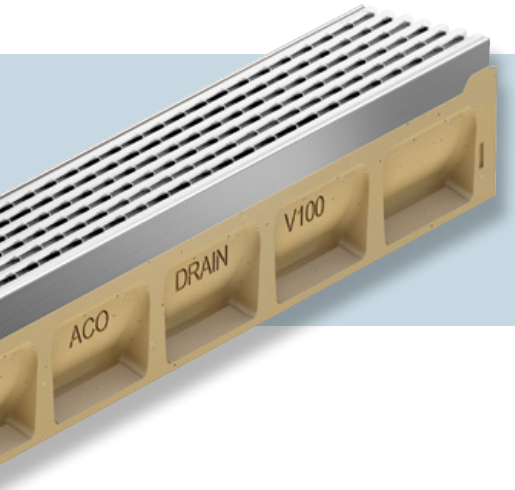
Light point
Cast iron
LED lighting

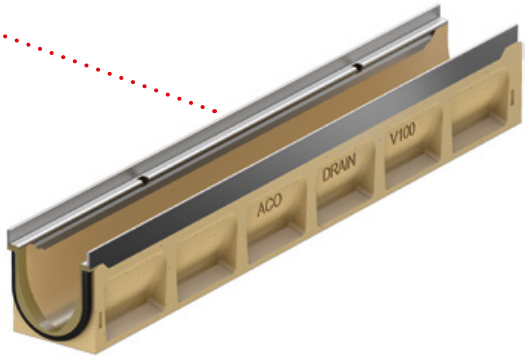
Sideline
Stainless steel
LED lighting

Eyeleds
Plastic
LED lighting

Freestyle
Cast iron grating
Customised design

Solid cover
Cast iron





Multiline Sealin
Frame: stainless steel

The complete grating product range in the grating configurator
The configurator makes it possible to select gratings and covers according to visual criteria in different scenarios. Technical information can be downloaded or saved in the object file.
www.draindesign.aco

2

System elements and their handling in practice

Multiline Seal in

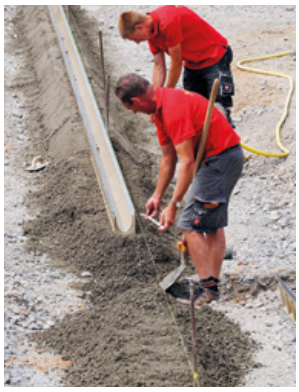
Multiline Seal in system consists of thoughtfully designed components with some refinements for quick installation. Our ACO sales and consulting team is always available to answer any further questions you may have. You can find your point of contact at under:
www.aco.com/contact

System elements in practice

The ACO DRAIN® Multiline System can be used in a variety of applications. The drainage system offers reliable solutions both in inner-city areas as well as out of town.

Volkach in Bavaria

- Parking space drainage
- 30 metres of ACO Multiline Sealin



Application examples


Flughafenfeuerwehr Leipzig
ACO Entwässerung für die Sicherheit

Tip

Top references of the ACO Group you find on:

www.aco.com/en/products-and-services/references-world-wide

Weinheim in Baden-Württemberg

- Parking area around the administration building
- 750 metres of ACO Multiline Sealin

ACO technical service provides you with support for your construction project: **www.aco.com/contact**

Handling of ACO Multiline components in detail

Installing the channel

During installation apply special ACO silicone to the integrated EPDM seal to ensure a watertight connection

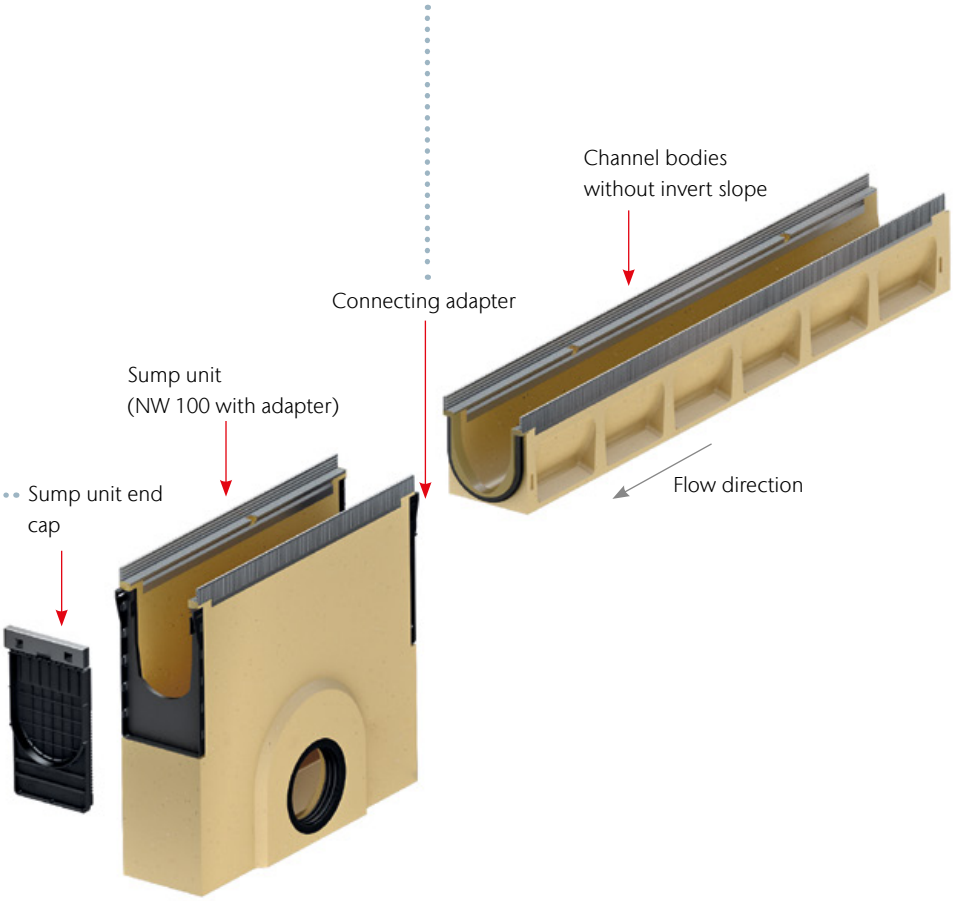
- ACO silicone grease for the seal

Connecting a channel to the sump unit (NW 100)

Connection adapter is included in the delivery of the sump unit. NW 150/200 use sump units without adapters.

- Shorten the connection adapter according to the type of channel being connected.

- push all the way up
- press on and snap into place



Installing the end cap on the sump unit (NW 100)

The end cap for the sump unit is included as part of the delivery of the sump unit. If one side of the sump unit is not connected to a channel it must be closed off with an end cap.

- push all the way up
- press on and snap into place

Making fitting pieces

For custom construction lengths, channel bodies can be cut to size with a diamond cutting disc. Polyester adhesive permanently bonds the cut pieces. The same applies to the adapter for changing the flow direction.

End cap for channel end with lip labyrinth seal (LLS) for horizontal watertight pipe connection

Adapter for change of flow direction

shortened channel body

Channel body
Half metre without base slope

Universal closing end cap made of plastic, from NW 150 made of polymer concrete

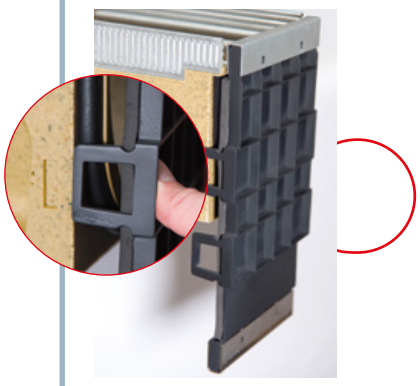
Adapter for corner, T- and cross-connections

How to prepare a cross section

Pre-drill the side opening on the half-metre element and knock it out with a hammer and chisel. Then glue the channel and adapter together.

Multifunctional closing end cap for channel start and end

Turn the end cap by 180 degrees to ensure an exact fit on the inlet and outlet side.



- snap into recess
- for all heights

Hydraulic dimensioning

Calculating the total water volume

Use the universal formula on the right to determine the rainfall runoff and calculate the water volume that accumulates on your catchment area. Use the value Q (l/s) to find the nearest value in the table and therefore the suitable channel system.

The catchment area is the area that slopes towards the channel. Specialist planners take the amount of rainfall from the KOSTRA data of the German weather service or from DIN 1986. Roughly speaking, 300 l/(s ∗ ha) can be used. The runoff coefficient is to be set at 1.0 or according to DIN 1986.

$$Q = \frac{A \times r_{t(n)} \times \Psi}{10{,}000}$$

A = Catchment area [m²]
$r_{t(n)}$ = Quantity of rain [l/(s ∗ ha)]
Ψ = Runoff coefficient [–]
Q = Water volume [l/s]

Choosing a channel type

Use the calculated proportional water quantity (l/s) and the hydraulic channel run (m) to determine the channel system you need from the table.

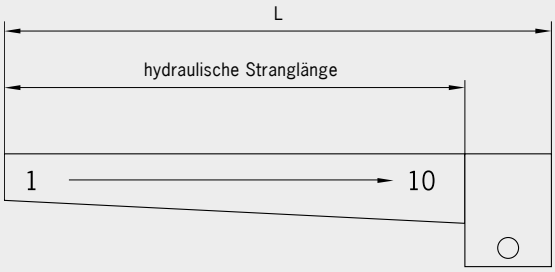
The values in the table are selected on the assumption that there is a connection pipe at the sump unit with a DN ≥ the channel width and are based on a **horizontal channel installation.**

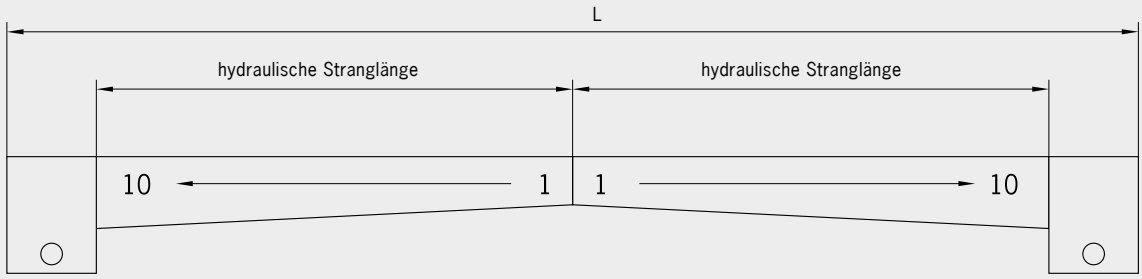
In order to take pollution into account, the values are calculated using an **80 %** hydraulic capacity utilisation of the channels.

Hydraulic channel run	Slope type	Channel system ACO DRAIN® Multiline Sealin			
		V 100	V 150	V 200	V 300
[m]		[l/s]	[l/s]	[l/s]	[l/s]
up to 10 m	Water surface slope type 0.0	2.7	7.9	16.8	47.0
	Water surface slope type 10.0	5.2	12.4	23.8	60.0
	Base slope type 1 -10	5.0	11.5	20.0	70.0
up to 20 m	Water surface slope type 0.0	2.4	7.4	15.6	45.0
	Water surface slope type 10.0	4.8	11.6	22.0	58.0
	Base slope type 1 -10 and type 10.0	5.7	15.0	27.0	82.0
up to 30 m	Water surface slope type 0.0	2.0*	6.2*	13.0*	43.5*
	Water surface slope type 10.0	3.8	9.8	18.6	55.5
	Base slope type 1 -10 and type 10.0	6.9	14.8	25.5	81.0

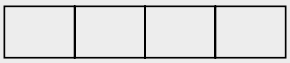
* We recommend type 10.0 for longer hydraulic channel runs

Determining the hydraulic channel run

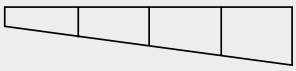




Slope types



Water surface slope/ slope in the terrain



Base slope as sloped system in the bottom of the channel 0.5 %.

Bottom slope as sloped system in the bottom of the channel 0.5 % and water surface slope

Additional information

- Please contact our technical service for a detailed calculation with regard to the respective sump units.
- Please note that the values are based on a sufficiently dimensioned connection line. This pre-dimensioning only includes the required nominal width of the channel system.

Service

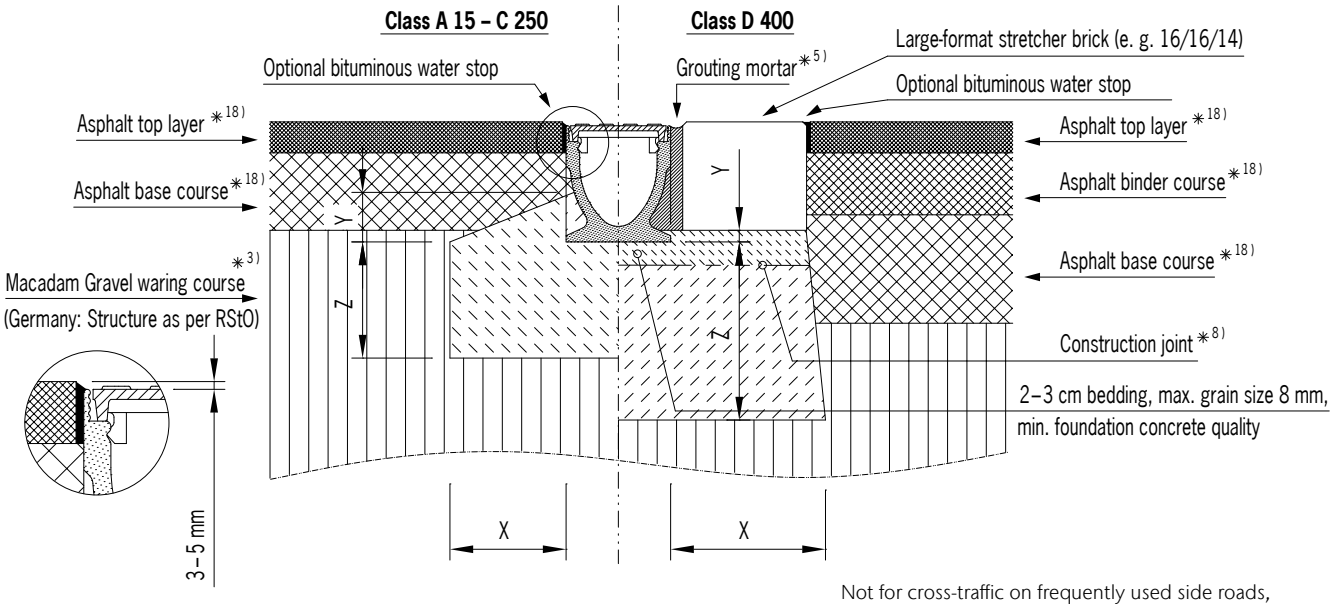
ACO technical service will help you find the best solution.
www.aco.com/contact

Channel body installation with steel and stainless steel edges

Examples from the installation instructions

Installation in asphalt – Class A 15 to D 400

for extreme loads see index list *7 and installation E 600



Not for cross-traffic on frequently used side roads, in residential areas, on motorways and dual carriage-ways and at level crossings.

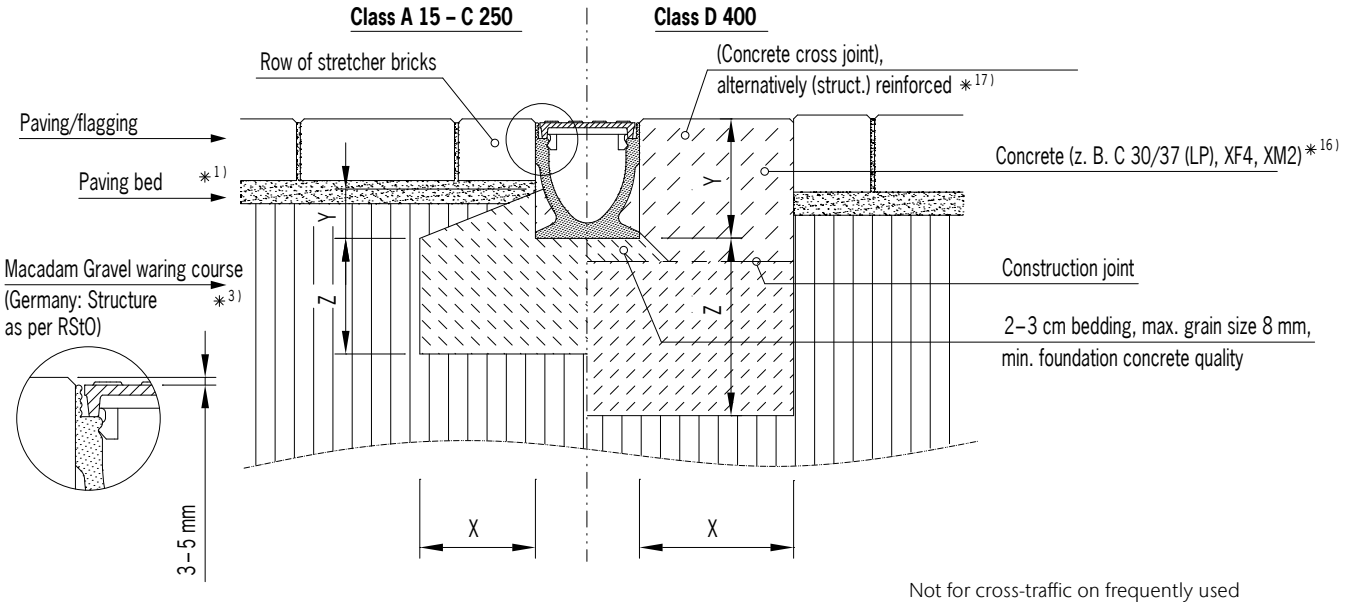
Class			A 15	B 125	C 250	D 400	E 600
Compressive strength class for foundation concrete	(according to BS EN 1433)		≥ C 12/15	≥ C 12/15	≥ C 12/15	≥ C 25/30	object-specific
Exposure class of foundation concrete * 16)	(according to BS EN 206 -1)		(X0)	(X0)	(X0)	(X0)	on request
Foundation dimensions– type M	(according to BS EN 1433)	**x [cm]**	≥ 10	≥ 10	≥ 15	≥ 20	
		y [cm]	Half height channel element			Lower edge of the stretcher brick	
		z [cm]	≥ 10	≥ 10	≥ 15	≥ 20	

Applies only in combination with the general preliminary remarks and the index list of our installation instructions!

Drawing G1-E01-770-3 and 773-3.1, as at May 2016
* from NW 300 ≥ C 20/25

Installation in pavement – Class A 15 to D 400

for extreme loads see index list *7



Not for cross-traffic on frequently used side roads, in residential areas and at level crossings.

Class			A 15	B 125	C 250	D 400	E 600
Compressive strength class for foundation concrete	(according to BS EN 1433)		≥ C 12/15	≥ C 12/15	≥ C 12/15*	≥ C 25/30	object-specific
Exposure class of foundation concrete * 16)	(according to BS EN 206 -1)		(X0)	(X0)	(X0)	(X0)	on request
Foundation dimensions– type M	(according to BS EN 1433)	**x [cm]**	≥ 10	≥ 10	≥ 15	≥ 20	
		y [cm]	Half height channel element			Overall height of the channel element	
		z [cm]	≥ 10	≥ 10	≥ 15	≥ 20	

Applies only in combination with the general preliminary remarks and the index list of our installation instructions!

Drawing G1-E01-770-3 and 773-3.1, as at May 2016
* from NW 300 ≥ C 20/25

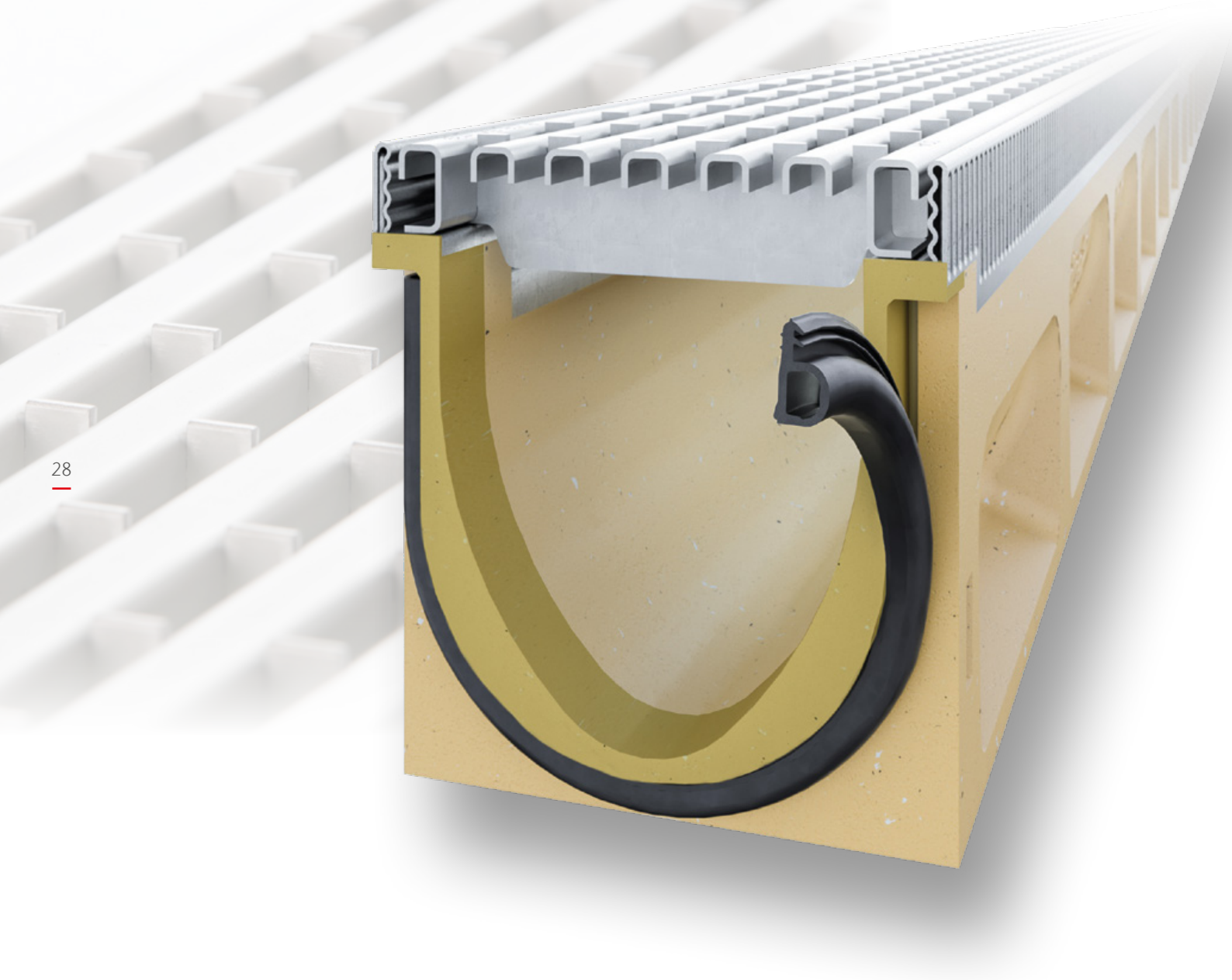
Note

Any more questions? askACO – your local ACO team is proud to offer experience and service

www.aco.com/en/products-and-services/askaco

Quality starts with the material

When designing building elements and technical details, the choice of the right material determines aesthetics and functionality. The materials used by ACO are characterised by their strength, their ageing resistance and their resistance to aggressive media, frost, heat and sunlight. Thanks to their long service life and recyclability, they are equally sustainable and environmentally friendly and are used in a manner appropriate to the application.



Polymer concrete

One step ahead

The special material composition and state-of-the-art production technologies provide ACO polymer concrete with its outstanding property profile. The ACO polymer concrete products have high strength values and a lower weight. ACO polymer concrete is impermeable to water. Water dries off quickly. Frost damage is excluded. The smooth surface area of ACO polymer concrete enables water and dirt particles to flow off quickly and is easy to clean. In addition, polymer concrete is resistant to aggressive media even without additional coatings and is also versatile and durable even under extreme conditions.

Steel/stainless steel

Sophisticated components

Both the processing of steel as well as stainless steel is a core competence of ACO in the various production facilities of the ACO Group worldwide. High investment sums ensure that our production facilities are always state of the art. The high qualification of the skilled workers ensures high product quality. Our own systems for surface protection and surface refinement are used, for example, in the production of ACO Drainlock gratings.

EPDM – for the seal

Durable and secure

A wide variety of weather conditions, such as heat exposure, can cause conventional materials and systems to age quickly. This is where synthetic ethylene propylene diene monomer rubber, or EPDM for short, shows its strength. Due to the molecular network structure, the material offers both flexibility and durability. The process for producing EPDM was justifiably awarded a Nobel Prize in 1963.

Plastic

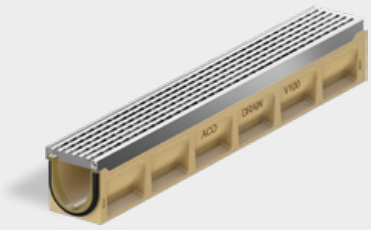
Innovative and flexible

Construction elements and technical details made of plastic offer the greatest possible design freedom in terms of form and function. We use this potential to avoid complex material combinations and joining processes and instead develop intelligent solutions "from a single mould" or solutions with great attention to detail - such as the composite grating with microgrip. The plastics utilised by ACO are characterised by their high breaking strength as well as their excellent resistance to environmental influences.

Expertise in landscaping

What are the drainage options? What should we take into account when dealing with areas with linear and point drainage? ACO`s technical service will be happy to advise you on the planning, design and calculation of your project.

1



Multiline
Seal in

2

XtraDrain
made of plastic

3

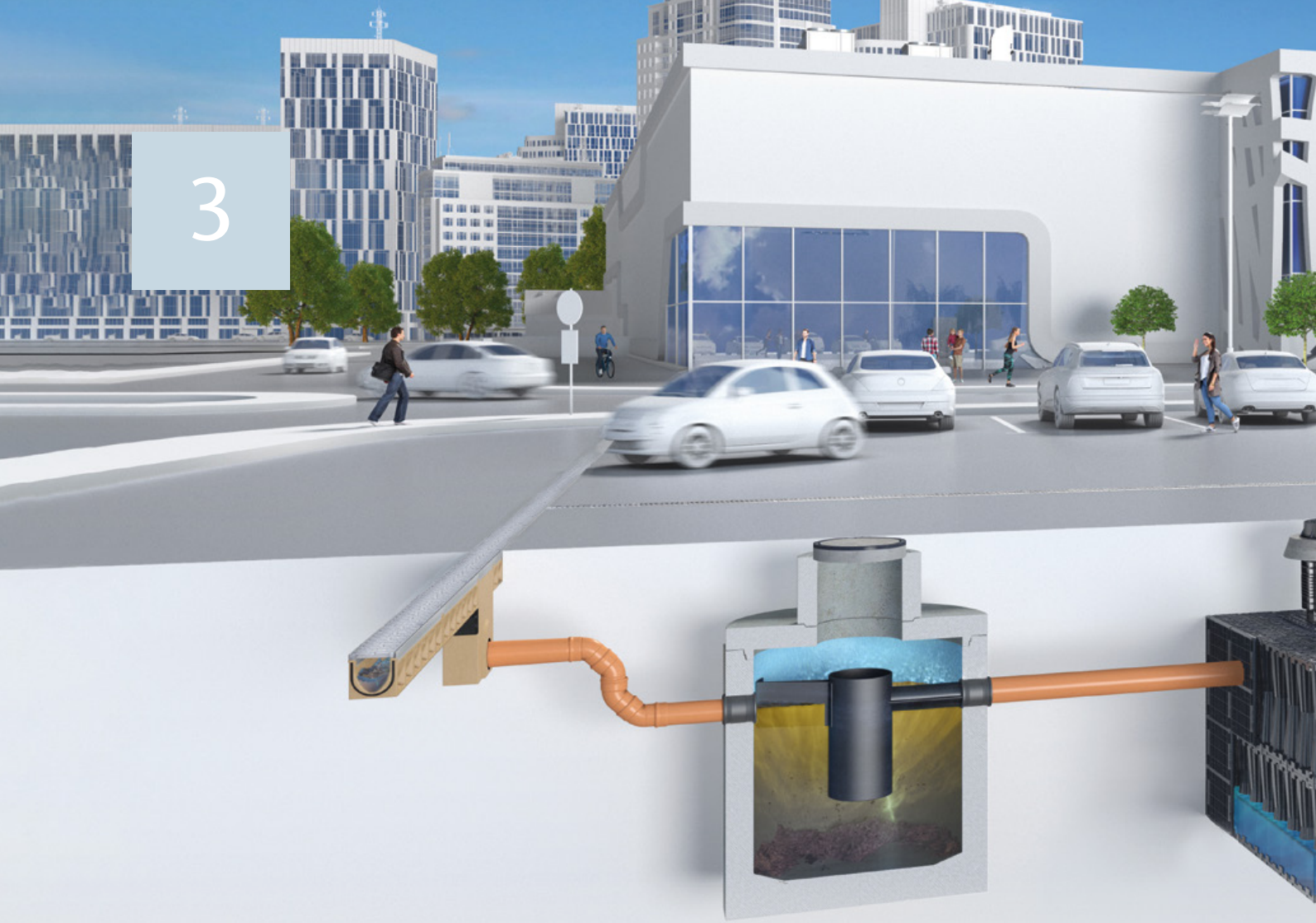
Multipoint
Yard drain

Design flexibility

is important in my planning

ACO offers numerous services to provide you with individual support when planning your drainage project:

www.aco.com/en/products-and-services/askaco



3

How does surface water management and water protection begin?

COLLECT

ACO surface drainage
- Drainage channels
- Road and yard gullies
- Gully tops
- Manhole covers

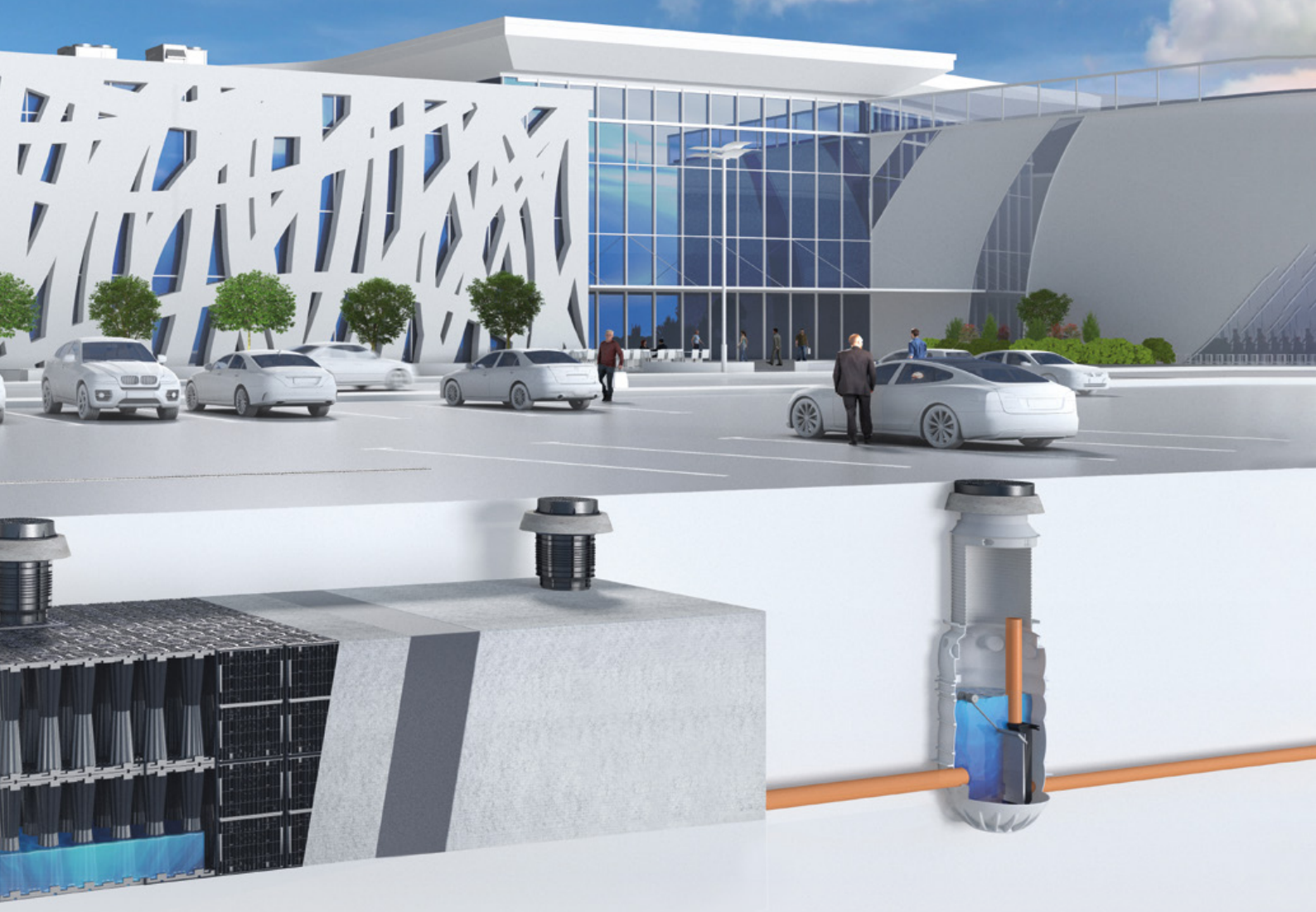
How to achieve the right water quality?

CLEAN

ACO cleaning systems
- Separators
- Sedimentation and filter systems

Your questions – our answer: the ACO system chain

The ACO system chain supports you at every stage of planning drainage, rainwater management and treatment.



How to reduce surface runoff to a natural level?

HOLD

ACO retention and storage systems

- Emergency systems
- Block infiltration drains for seepage and retention
- Surface water retention basin

How to control the discharge rate to the required level?

RELEASE

ACO control systems

- Flow restriction systems
- Pump stations

COLLECT CLEAN HOLD RELEASE

The **ACO system chain** creates the drainage solutions for the environmental conditions of tomorrow.

Our service offer

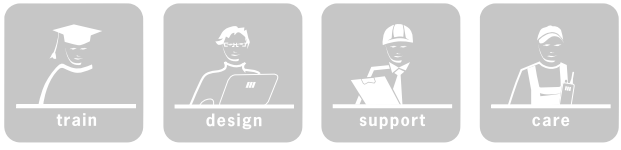
Each project is different and has its own specifications and challenges. Aside from our products, we can also offer you our know-how and services, so we can develop tailor-made solutions together – from planning to support after completion.

Information and Further Education
In the ACO Academy we share the know-how of the worldwide ACO Group with architects, planners, processors and traders, for whom quality is important. You are invited to share these benefits.

Planning and Optimisation
The specification and design of drainage solutions allows many variations. Yet which concept produces the most profitable and technically most reliable solution? We help you to find the right answer.

Construction consultation and support
To ensure that no unpleasant surprises occur between the planning and implementation of a drainage solution, we advise and assist you for a specific project on your construction site.

Inspection and Maintenance
ACO products are designed and produced for a long life. With our after-sales offers we ensure that ACO fulfils your high quality standards for many years.



ACO service chain

ACO is your first point of contact in all project phases.

Any questions?

askACO

Our invitation for you: askACO

Together we will find the right solution to your specific drainage requirements.
www.aco.com

ACO drainage systems for roads and highways

As a global market leader in drainage technology, ACO has set itself the challenge of developing special products for road and highway construction and its associated infrastructure. The diverse range of climatic conditions and the respective local variations require solutions that are both ecological and economical.
ACO drainage systems include not only standard products, but also solutions that are created specifically to suit the needs of particular projects. In addition to our products, we are proud to offer our experience and service, which allow us to work with you to develop customised solutions. ACO's technical expertise is always on hand when you need it. From the initial designs to commissioning and everything in between, our engineers are here to help you.

www.aco.com

ACO. creating
the future of drainage

2021856 engl. – 10/2021 – Subject to change

Every ACO product supports the ACO system chain

- Drainage channels
- Road and yard drains
- Gully tops
- Manhole covers
- Rainwater treatment
- Infiltration and attenuation
- Pump shafts
- Flow control systems
- Tree protection
- Amphibian protection

ACO Severin Ahlmann
GmbH & Co. KG

P.O. Box 320
24755 Rendsburg
Am Ahlmannkai
24782 Büdelsdorf
Germany

info@aco-international.com
www.aco.com