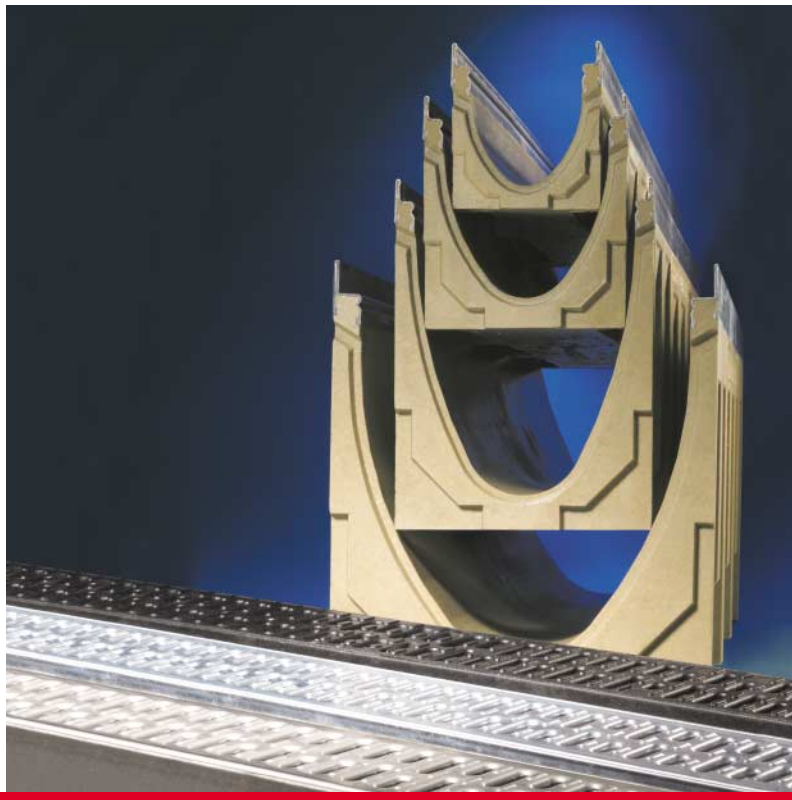


The technically superior system solution:

ACO DRAIN® Multiline® in accordance with EN 1433 for load classes A 15 to E 600

Technically superior. Our new ACO DRAIN® Multiline® channel generation sets new standards for the planning, execution and effectiveness of permanent line drainage systems. Using all of our experience as market leader, the launch of this new channel generation fully delivers what progress and innovation is meant to deliver: all-round benefits for everyone.

Five load classes, four widths, three materials and an innovative concept –the benefits are as clear as the lines on your hand:

ACO DRAIN® Multiline® is based on a system concept with benefits for all: planners, dealers, construction companies, developers, and naturally also ourselves at ACO Drain Passavant.
To maintain our leading position in the line drainage market, we have to combine these innovations with practical advantages.
The responses we have already received from experts and users show that we are charting exactly the right course with our new ACO DRAIN® Multiline®.

Hand it to ACO Drain Passavant to make life easier

by reducing the number of system components for simpler planning and installation. Every channel body can be used in every nominal width for load classes A 15 to E 600.

ACO drain passavant

Simple and convincing: the plus points for planners, dealers, builders and developers

Simpler

storage and logistics for the trade. The smaller number of system components means more streamlined storage and less tied-up capital.

Comfortable

planning thanks to higher standardisation of the interfaces and comprehensive and efficient ACO planning and tendering documents.

Safety

with a channel profile which simply drains better. The whole product line fulfils or exceeds all of today's standards and regulations, as well as those foreseeable in the future, and naturally also DIN EN 1433.

Added value

for developers thanks to intelligent design solutions. The channel bodies and the details and materials of the edge-rails and gratings are a guarantee for aesthetic diversity, high levels of functionality and extreme durability.

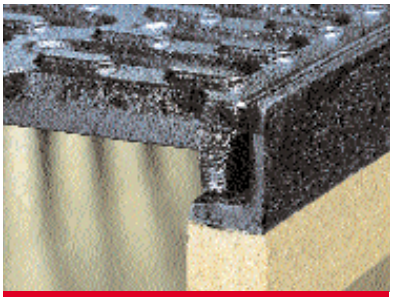
A system for all widths:

All three edge-rail versions in all four widths

The complete watertightness of the channel body right up to the top of the edge-rails, and the very smooth surface increase discharge volumes during extreme loads such as storms. The ACO safety rebate ensures that the channel body units are connected to one another with a 100 % watertight seal. The new cast-in lip-labyrinth seal ensures that the drainage system can be connected with a watertight seal to the drainage pipe system. ACO DRAIN® Multiline® easily complies with DIN EN 1433 specifications by a very large safety margin.

The new boltless snap-on Drainlock® locking mechanism with anti-shunt lugs to prevent longitudinal movement ensures simple fixing and removal of the gratings.

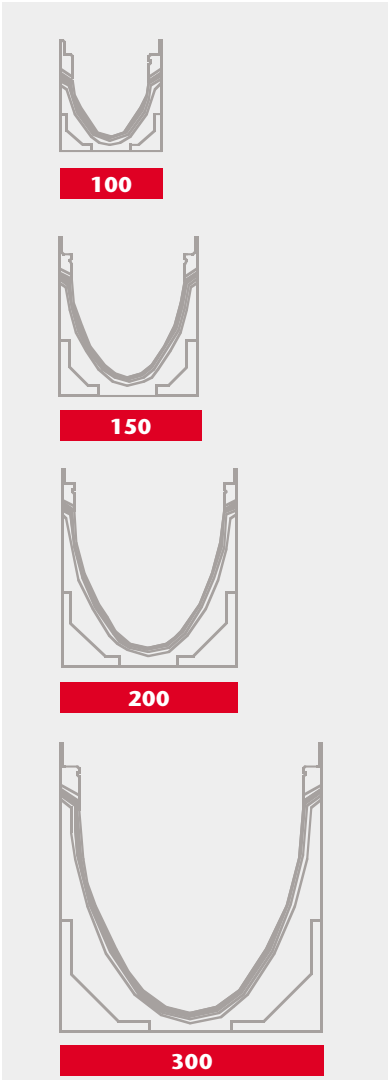
System overview: All three edge-rail versions in all four widthsSystem overview: All three edge-rail versions in all four width



Cast iron

Galvanised steel

Stainless steel



Large selection of materials for all widths and load classes. The three edge-rail versions in cast iron, galvanised steel or stainless steel allow planners to freely select the grating best suited to the visual statement they are looking for in their projects, without the risk of contact corrosion between the gratings and the edge-rails.

More design flexibility in all classes:

Material diversity in all load classes and widths

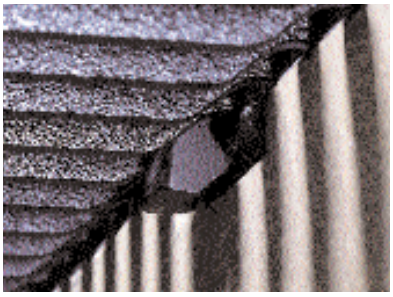
5 Load classes:	**A 15, B 125, C 250, D 400, E 600 according to DIN EN 1433**
4 widths	**100, 150, 200 and 300**
3 materials:	**edge-rails in cast iron, steel or stainless steel**
1 innovative concept	**1 universal channel body**

Added value for all target groups

Dealers benefit from the extremely streamlined range. Planners save time during tendering because the Multiline® system concept supports a high level of interface standardisation. Developers welcome the sophisticated design solutions because Multiline® combines design diversity, high functionality and extreme durability.

The large choice of gratings should match the edge-rail materials: cast iron, galvanised steel or stainless steel.

Drainlock® locking system from ACO Drain Passavant



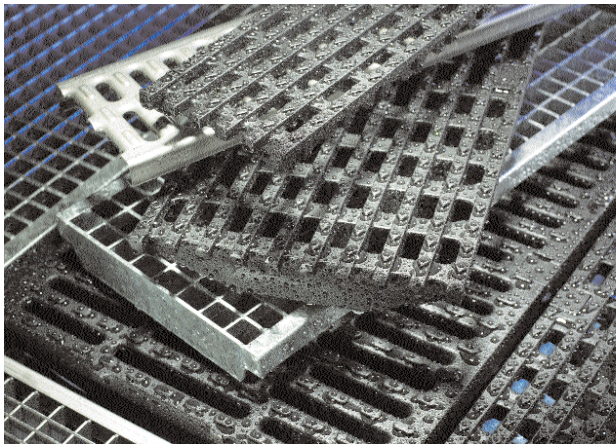
Drainlock®: the new generation of innovative boltless snap-on locking systems

Grating covers for every application

The ACO DRAIN® Multiline® system solution has a simple range of different gratings suitable for most architectural requirements in terms of aesthetics, functionality and strength. The gratings can be combined as required independent of the channel body, and are suitable for all load classes from A 15 to E 600.

Drainlock® - the new boltless safety locking mechanism

The Drainlock® locking mechanism is another innovation in the overall Multiline® concept. After Quicklock® and Powerlock®, ACO Drain Passavant sets the benchmark for the third time with this new development. The idea behind the concept was to meet the growing demands for strength, dynamic resilience and environmental protection without making any functional compromises. The unique, almost unbreakable locking mechanism was developed by using ultra-modern elastomers. A new geometry concept and the special quality of the material guarantee secure, boltless locking of the gratings even under highly dynamic traffic loads.



ACO DRAIN® Multiline® grating range: clear, flexible, creative

	Material Edge-rails/Gratings	A 15	B 125	C 250	D 400	E 600
LW 100	**Cast iron**			Slotted grating Mesh grating	Slotted grating	Slotted grating Cover plate
	Galvanised steel	Slotted grating	Mesh grating	Slotted grating Mesh grating	Mesh grating	
	Stainless steel	Slotted grating Perforated grating	Mesh grating	Slotted grating Mesh grating	Mesh grating	
LW 150/200/300	**Cast iron**			Slotted grating Mesh grating	Slotted grating Mesh grating	Slotted grating Mesh grating Cover plate
	Galvanised steel			Mesh grating	Mesh grating	
	Stainless steel			Mesh grating	Mesh grating	

The material compatibility of the edge-rails and covers provide a uniform look and prevent contact corrosion.

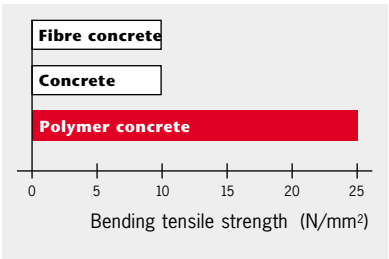
Successful material in new top form:

Channel units in ACO polymer concrete

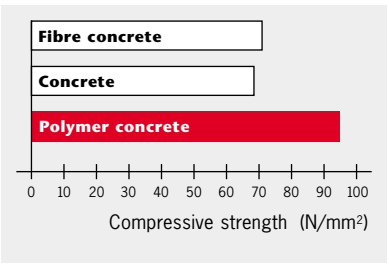
The superb properties of ACO polymer concrete reflect its special material composition and state-of-the-art ACO production technology:

Bending tensile strength: > 22 N/mm²
Compressive strength: > 90 N/mm²
Module of elasticity: approx. 25 kN/mm²
Density: 2.1 – 2.3 g/cm³
Water penetration depth: 0 mm
Chemical-resistance: high
Surface roughness: approx. 25 µm

ACO DRAIN® channel units have much higher strengths and lower weights for the same density as comparable concrete products. The low weight of the components simplifies handling and installation, and reduces costs. ACO polymer concrete is watertight. Water dries rapidly from the surface. Frost damage is totally excluded. The smooth surface of ACO polymer concrete allows water and dirt particles to run off quickly – making it easy to clean. Polymer concrete is also resistant to aggressive media without any need for extra coating and can be used flexibly and permanently even under extreme conditions. (See also ACO polymer concrete resistance catalogue.)

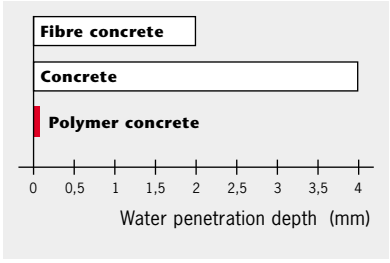


Bending tensile strengths of different materials used in drainage channels.



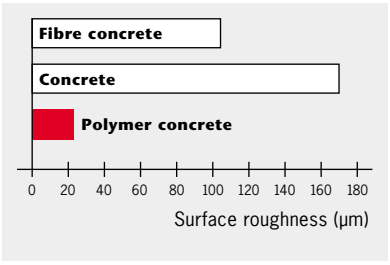
Compressive strength of different materials used in drainage channels.

Normal concrete absorbs water. Because of the local climatic conditions, DIN EN 1433 together with the national tentative standard V 19580 require certification that normal concrete channels meet the highest quality standard "W". Polymer concrete is not required to fulfil these requirements because of its superb material properties!



Water penetration depth (DIN 4281) after 72 hours of different materials used for making drainage channels.

Durable and recyclable: ACO polymer concrete avoids waste because it can be returned to the production process.

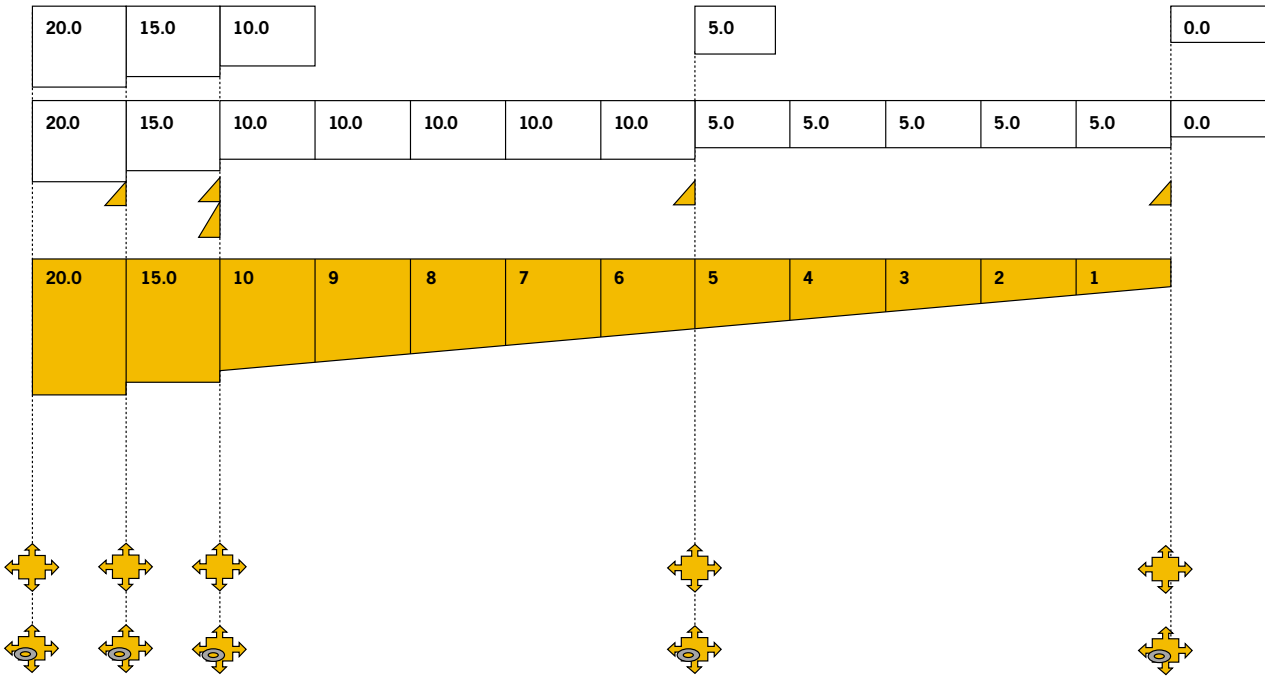


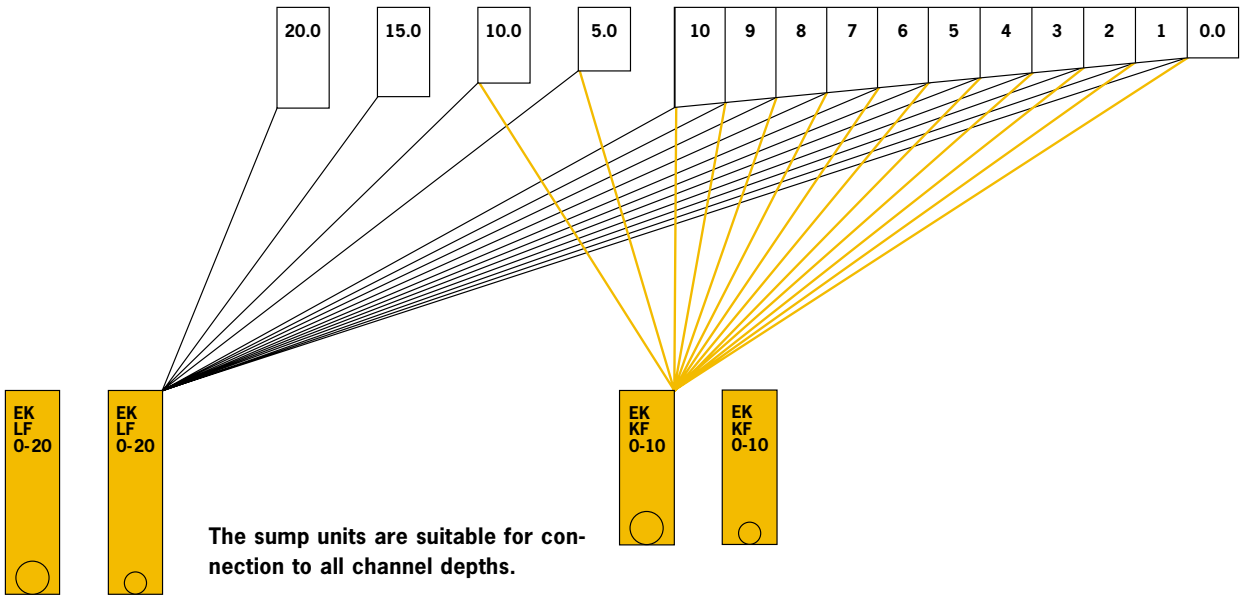
Average surface roughness of drainage channels made with different materials.

The raw materials used to make ACO polymer concrete have to meet stringent specifications and pass continuous quality controls. In addition to our internal quality controls in accordance with DIN EN 1433, our products are also tested and third-party controlled by KIWA Germany. Homologation in accordance with DIN EN 1433 is conducted by MPA Eckernförde and MPA Lübeck.

Simpler planning, more streamlined storage:

The new ACO DRAIN® Multiline® system structure





The sump units are suitable for connection to all channel depths.

1 m channel, with optional lip-labyrinth seal DN 100 for vertical outlets:
type no.: 0.0.2/5.0.2/10.0.2/15.0.2/20.0.2

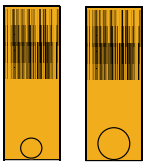
1 m channel with 0.5 % gradient
1-10

0.5 m channel preformed for corner-T-cross connections, and with preformed knockout options for vertical discharge
0.1/5.1/10.1/15.1/20.1

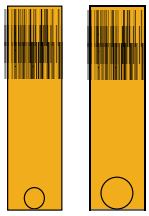
0.5 m channel preformed for corner-T-cross connections, and with vertical outlet with integrated lip-labyrinth seal

Step connector 2.5 cm

Step connector 5.0 cm



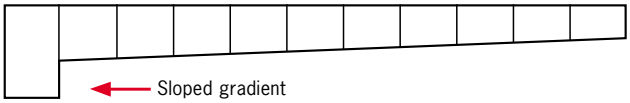
Sump unit short-form 0.5 m length with infinitely variable connection for heights 0-10 and preformed corner-T-cross connections for connection heights 0 + 5 + 10, and horizontal **drain unions DN 100 or DN 150** with integrated lip-labyrinth seals (only for LW 100)

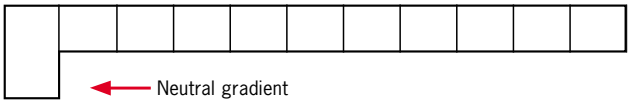


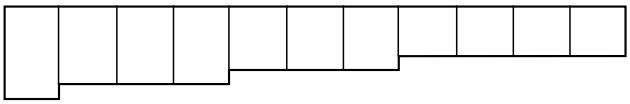
Sump unit long-form 0.5 m length with infinitely variable connection to heights 0-20 and preformed corner-T-cross connections for connection heights 0 + 5 + 10 + 15 + 20, and horizontal **drain unions DN 100, DN 150 or DN 200** with integrated lip-labyrinth seal.

Flat channel details

Internal width	Height
100	9/11 cm
150	12 cm
200	12 cm
300	12 cm





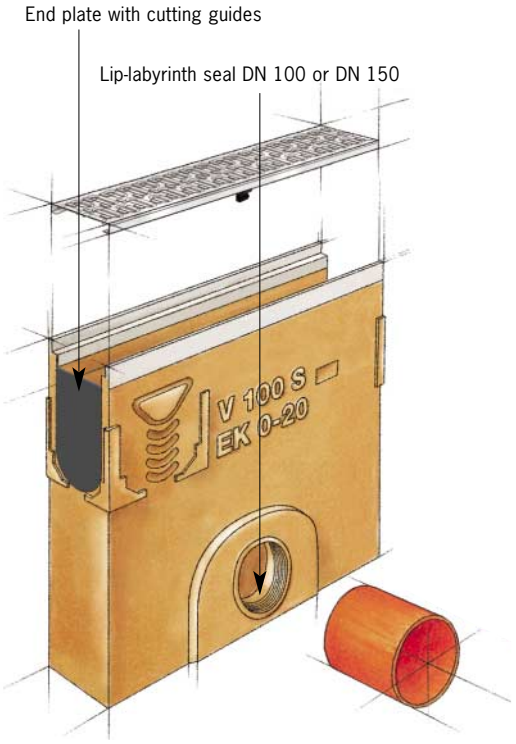


Sloped channels enhance water flow

ACO DRAIN® Multiline® drainage systems are suitable for all types of gradients, from sloped to neutral, and allow different gradient types to be combined.

The conditions for complete drainage of the channel drain are best when the system is installed using sloped channels. This speeds up the drainage of the water and boosts the self-cleaning effect. The run-off velocity built up over the first few metres of slope is maintained over the next few metres of the channel drain. This means that for longer drains, only around 10 metres of sloped gradient at the start of the drain are required to achieve the highest drainage performance. The remaining sections of the channel drain can be equipped with stepped or neutral gradients.

As simple and reliable as the system itself: the interface connections

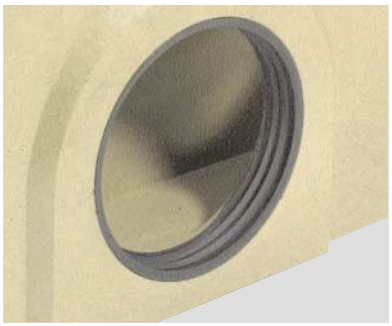


Unlike conventional sump units, the multi-function sump unit can be connected to any channel height with or without a gradient. Just select one of the two types of sump unit to match the channels to be connected: the short-form sump unit for channel heights up to 10, or the long-form sump unit for channel heights up to 20.
A new feature is the option of creating corner-T-cross connections by opening the preformed elements in the sides of the sump unit.

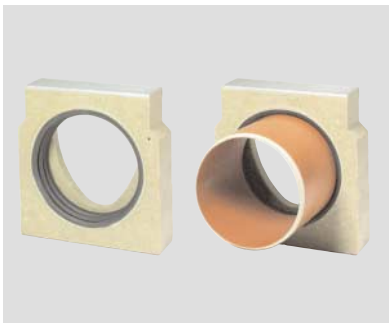
Connection table

IW	Connection	IW 100/150/200/300
	To sump unit	All overall heights
100 150 200/300	To horizontal outlets with LLD, DN 100 To horizontal outlets with LLD, DN 150 To horizontal outlets with LLD, DN 200	End plate, type no.: 0.0, 5.0, 10.0, 15.0, 20.0 End plate, type no.: 0.0, 5.0, 10.0, 15.0, 20.0 End plate, type no.: 0.0, 5.0, 10.0, 15.0, 20.0
100	With vertical outlet with LLD, DN 100	Flat channel, type no.: 9 cm/11 cm 1.0 m Element, Typnr.: 0.0.2, 5.0.2, 10.0.2, 15.0.2, 20.0.2 0.5 m Element, Typnr.: 0.2, 5.2, 10.2, 15.2, 20.2
150	With vertical outlet with LLD, DN 150	Flat channel, type no.: 12 cm 1.0 m Element, Typnr.: 0.0.2, 5.0.2, 10.0.2, 15.0.2, 20.0.2 0.5 m Element, Typnr.: 0.2, 5.2, 10.2, 15.2, 20.2
200/300	With vertical outlet with LLD, DN 200	Flat channel, type no.: 12 cm 1.0 m element, type no.: 0.0.2, 5.0.2, 10.0.2, 15.0.2, 20.0.2 0.5 m element, type no.: 0.2, 5.2, 10.2, 15.2, 20.2
100 150 200/300	Via preformed element, for knocking-out vertically, DN 100 Via preformed element, for knocking-out vertically, DN 150 Via preformed element, for knocking-out vertically, DN 200	0.5 m element, type no.: 0.1, 5.1, 10.1, 15.1, 20.1 0.5 m element, type no.: 0.1, 5.1, 10.1, 15.1, 20.1 0.5 m element, type no.: 0.1, 5.1, 10.1, 15.1, 20.1
100 150 200/300	Corner-T-cross connections	0,5 m element, type no.: 0.1/0.2, 5.1, 5.2, 10.1, 10.2, 15.1, 15.2, 20.1, 20.2 Sump units

Connection to the main drain



Multiline® sump unit with lip-labyrinth seal



Multiline® end plate and end plate with drain union

Multiline® vertical outlet

Connecting the channels to the sump unit

The standard pre-marked end plate made of elastomer plastic enables the catch basin to be connected to any depth of channel. The inlet to the sump unit can be simply opened by cutting the end plate with a standard cutting knife along the outline of the channel where it meets the end plate.
Linear connections are made without having to knockout any pre-formed elements, and every depth of channel can be connected to the sump unit.

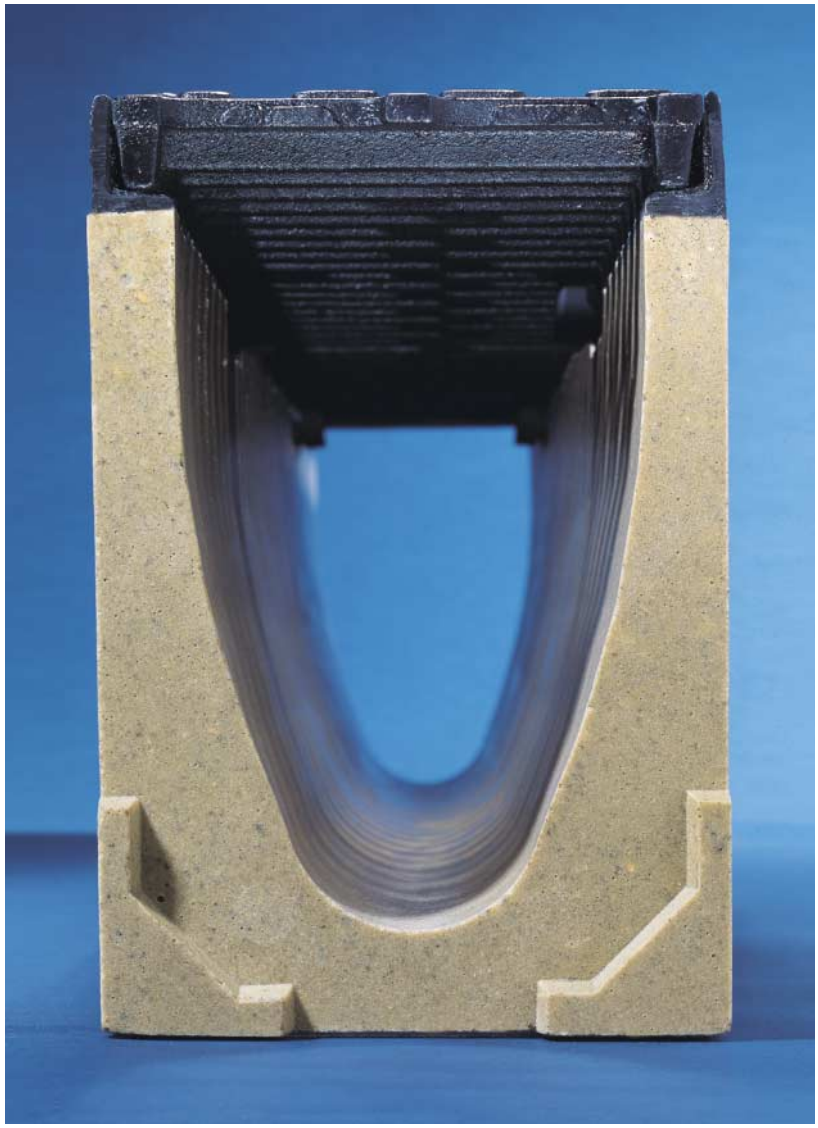
Faster flow, more effective cleaning:

The improved hydraulic properties of the system

The contours of the flow cross section have a major influence on the hydraulic performance of drainage channels. The new V-profile in combination with the smooth interior surface of the ACO polymer concrete produces amazing results.

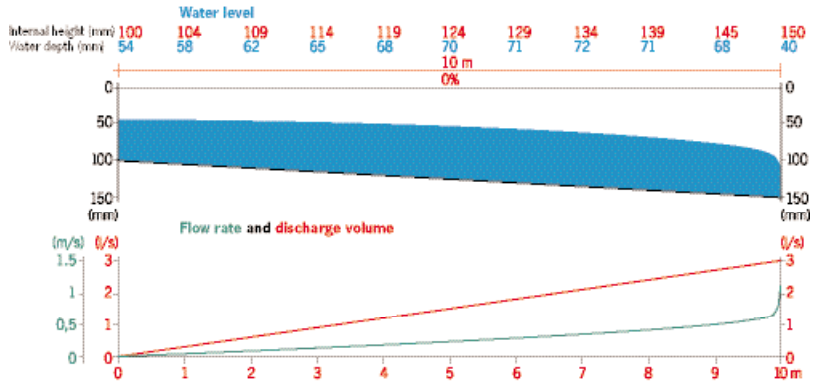
Analysis of all of the rainfall during recent decades reveals that 85 % of all rainfall only involves small amounts of precipitation. The V-profile was developed as a direct response to this rainfall analysis. During minor rainfall, the lower narrower part of the channel profile ensures that there is still fast run-off and thus an optimum self-cleaning effect. This self-cleaning effect during minor rainfall is extremely important because it clears the drain and ensures that the full drainage cross section is available during periods of heavy rainfall. This volume-responsive drainage principle has already been used for decades in designing sewers with "egg-shaped" profiles.

These cross sections raise the height of the water in the channels under minor flow conditions to give faster flow rates for the same flow cross section. The unimpeded draining of rainwater is also further enhanced by deliberately keeping the channel cross section completely clear of any extraneous components thanks to the new Drainlock® boltless safety locking mechanism.



V-profile – improved hydraulics and strength

Past analysis, comprehensive laboratory testing and the latest technical findings led to the further development of the ACO DRAIN® Multiline® system V 100 S to produce optimised hydraulic performance.



ACO drain passavant

Hydraulic dimensioning

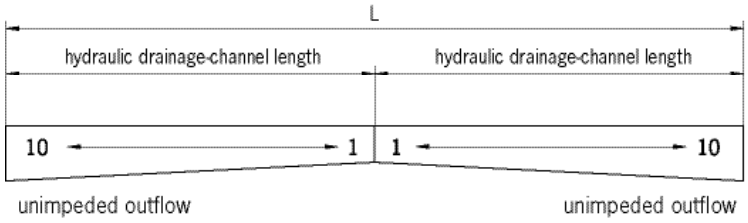
The general formula on the right is used to calculate the amount of rain draining from a surface.
When you have calculated this value for your project, go to the table below to find the nearest matching value: the table then shows the most suitable channel system. The values in the table are calculated assuming unimpeded drainage and uniform inflow.

$$Q = \frac{A \times r_{t(n)} \times \varphi}{10.000}$$

A = catchment area [m²]
$r_{t(n)}$ = rainfall [l/(s x ha)]
φ = drainage coefficient [-]

Hydraulic channel length	Gradient type	V 100	V 150	V 200	V 300
		(l/s)	(l/s)	(l/s)	(l/s)
10 m	Sloped gradient 1-10	5,0	11,5	20,0	70,0
	Stepped gradient	7,5	15,0	27,0	90,0
	Neutral gradient type 20.0	8,5	17,5	30,0	92,5
20 m	Sloped gradient 1-10	5,7	15,0	27,0	82,0
	Stepped gradient	6,4	14,0	25,0	80,0
	Neutral gradient type 20.0	7,6	16,0	28,0	85,0
30 m	Sloped gradient 1-10	6,9	14,8	25,5	81,0
	Stepped gradient	6,0	13,5	24,0	79,5
	Neutral gradient type 20.0	7,5	15,75	26,7	84,0
40 m	Sloped gradient 1-10	6,7	14,7	25,0	80,0
	Stepped gradient	5,8	13,0	23,0	77,0
	Neutral gradient type 20.0	7,0	15,2	26,0	82,0
50 m	Sloped gradient 1-10	6,25	14,0	23,75	78,0
	Stepped gradient	5,5	12,8	22,5	75,0
	Neutral gradient type 20.0	6,5	14,5	25,0	80,0

a)



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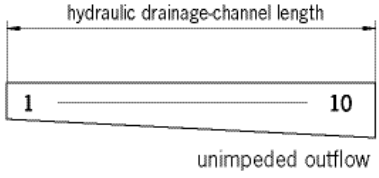

Multiline® has a successful track record

ACO DRAIN® Lightspots in front of the entrance of Mobilcom in Büdelsdorf/Germany.

ACO DRAIN® Multiline® at the IHK (Chambers of Industry and Commerce) in Kiel/Germany

ACO DRAIN® Multiline® installed as a facade drain

ACO DRAIN® Multiline® as a surface drainage system for a distribution centre.

For better planning: ACO DRAIN® Multiline® planning CD

The attached planning CD provides all of the necessary basic data to professionally support your detailed planning. It contains tendering texts as word files (.doc) and technical drawings and installation instructions as Auto-CAD-2000 files (.dwg).

Contents

ACO DRAIN® Multiline®
– Tendering texts
– Technical drawings
– Installation instructions

Please note:
The CD starts automatically when put into the player. No files are installed on your computer. The data is read directly from the CD. If the CD fails to start automatically: Start > Execute > Search > autorun.exe

System requirements
Windows 98/ME/NT/2000/XP
Internet Explorer version 5.0 +

ACO Drain Passavant service for planners

For detailed questions, precise hydraulic calculations, part lists, tendering texts, installation plans, and personal consultation on the construction site, look no further than our team of application technology experts at ACO Drain Passavant – at your disposal free-of-charge any time.

ACO Drain Passavant website
Information on our products is available in the form of downloads at the ACO Drain Passavant website **www.acodrain.de** and from the Heinze Construction office.
Further information on the line drainage system of the future ACO DRAIN® Multiline® V 100 S is also available at **www.acodrain-multiline.de**

Personal consulting and competent service.

ACO Severin Ahlmann
GmbH & Co. KG

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