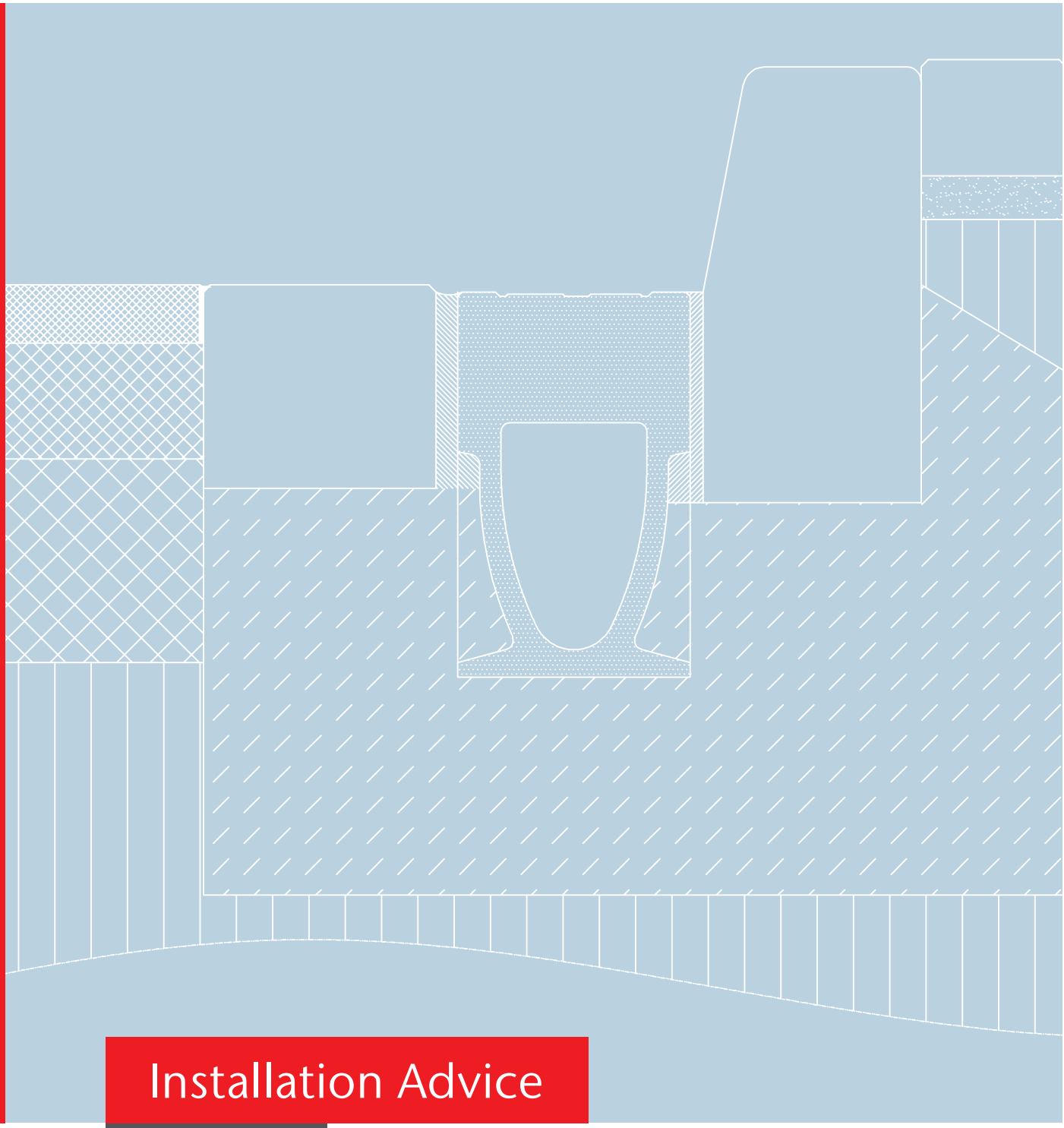


Installation Advice

international

ACO DRAIN® Line and Point Drainage

2021 | Part 1

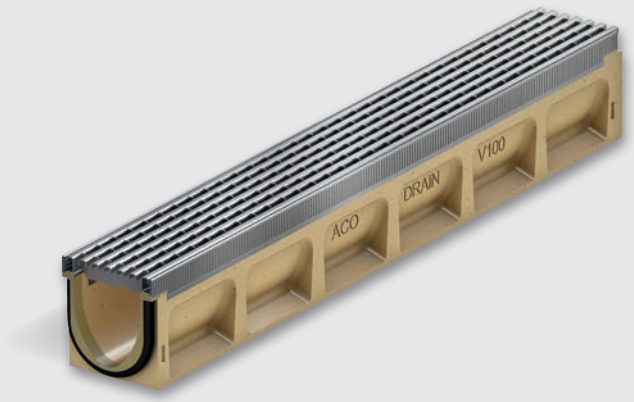

ACO

Your question – our answer:

The ACO system chain

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

How does surface water management and water protection begin?



How to achieve the right water quality?

COLLECT

ACO surface water drainage

- Drainage channels
- Road and yard drains
- Gully tops
- Manhole covers

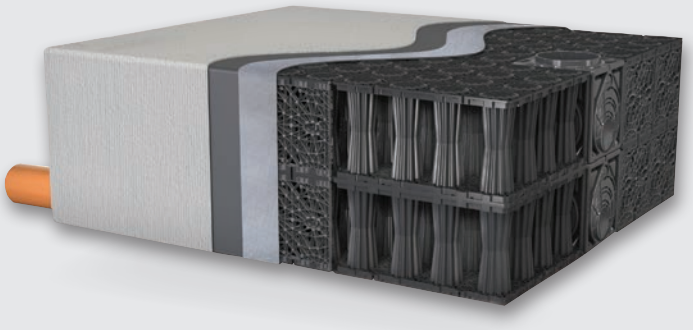
CLEAN

ACO cleaning systems

- Separators
- Sedimentation and filtration systems

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

How to reduce surface runoff to a natural level?



How to control the discharge rate to the required level?

HOLD

ACO infiltration/ attenuation systems
- Control valve shafts
- Infiltration and attenuation systems
- Retention basins made of concrete

RELEASE

ACO control systems
- Flow control systems
- Pump shafts

Optimum solution

Channel drainage is the proven optimum solution in a wide range of surface drainage applications, uniquely combining excellent performance, and aesthetics, in clearing surface water.

ACO Drain is the world leader in channel drain technology, offering the market quality solutions from the most innovative range of channel drainage systems available for any loading, whether light domestic, medium urban or the heaviest highway or airport drainage schemes. ACO has over 40 years of experience of channel installations, with more than 100 million metres ACO channel drainage installed worldwide.

Channel drainage system

ACO channel drainage systems comprise: channel units manufactured in resin concrete or plastic; gratings; end caps; step connectors; drain unions; sumps; gullies.
The systems are designed to intercept surface water from hard surfaces and convey it efficiently to the underground drainage network.
The three basic types of channel system available – constant depth, pre-sloped and step-fall inverts – may be installed to match a wide range of site characteristics.

Bespoke design

As well as its role in channel design and development, the ACO International Technical Support Team is able to provide advice on all non-standard or special requirements for channel drainage, including the development of products for specific applications.

Optimum support

ACO is dedicated to providing the level of service, information and support expected from the channel drainage market leader.
ACO´s International Technical Support Team supports specifiers and installers through technical and installation advice for drainage scheme design using standard ACO channel drainage products. Parts schedules, full hydraulic calculations and CAD for scheme layouts can be provided and these services are available by telephoning or e-mailling.

Your contact:
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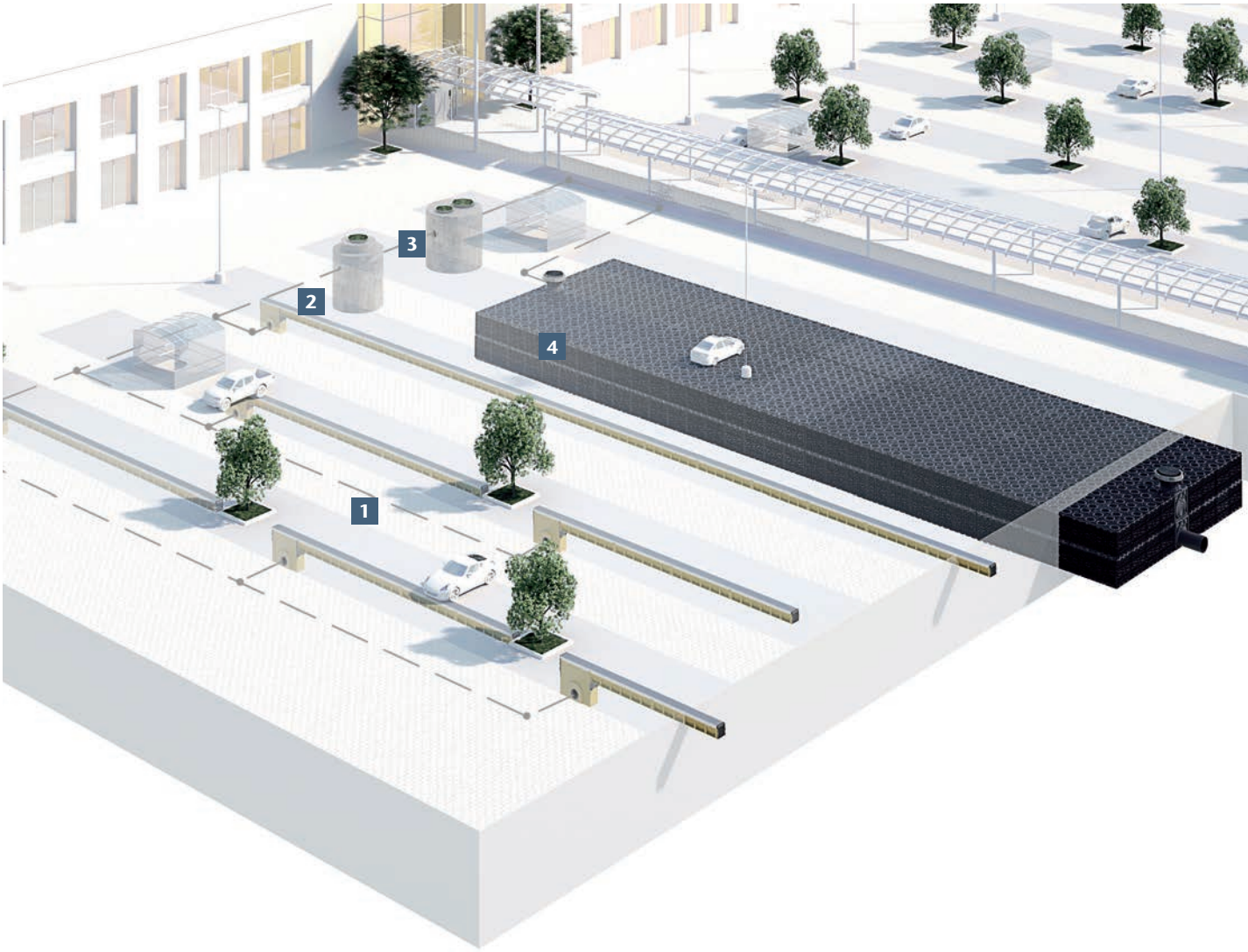
gunnar.olesen@aco.com

At your office or on-site

In addition to the International Technical Support Team, ACO´s regionally-based sales and specification teams are trained to provide site or office support and advice.
A network of specialist drainage stockists, and builders merchants further extends the service around the world.

Car parks



What should be considered when designing public car park drainage?

Public car parks, for example, in front of large shopping centres, are particularly high frequented traffic areas. The channels laid for surface drainage are driven over by vehicles with regular frequency. Therefore they have to be extremely durable.

Rainwater from trafficked areas may be highly contaminated with abraded material, brake dust and traces of petrol and oil. To avoid irreversible damages, the channel system has not only to hold the water but has also to carry it to the connected surface water treatment, and thus the natural water cycle, without avoidable losses.

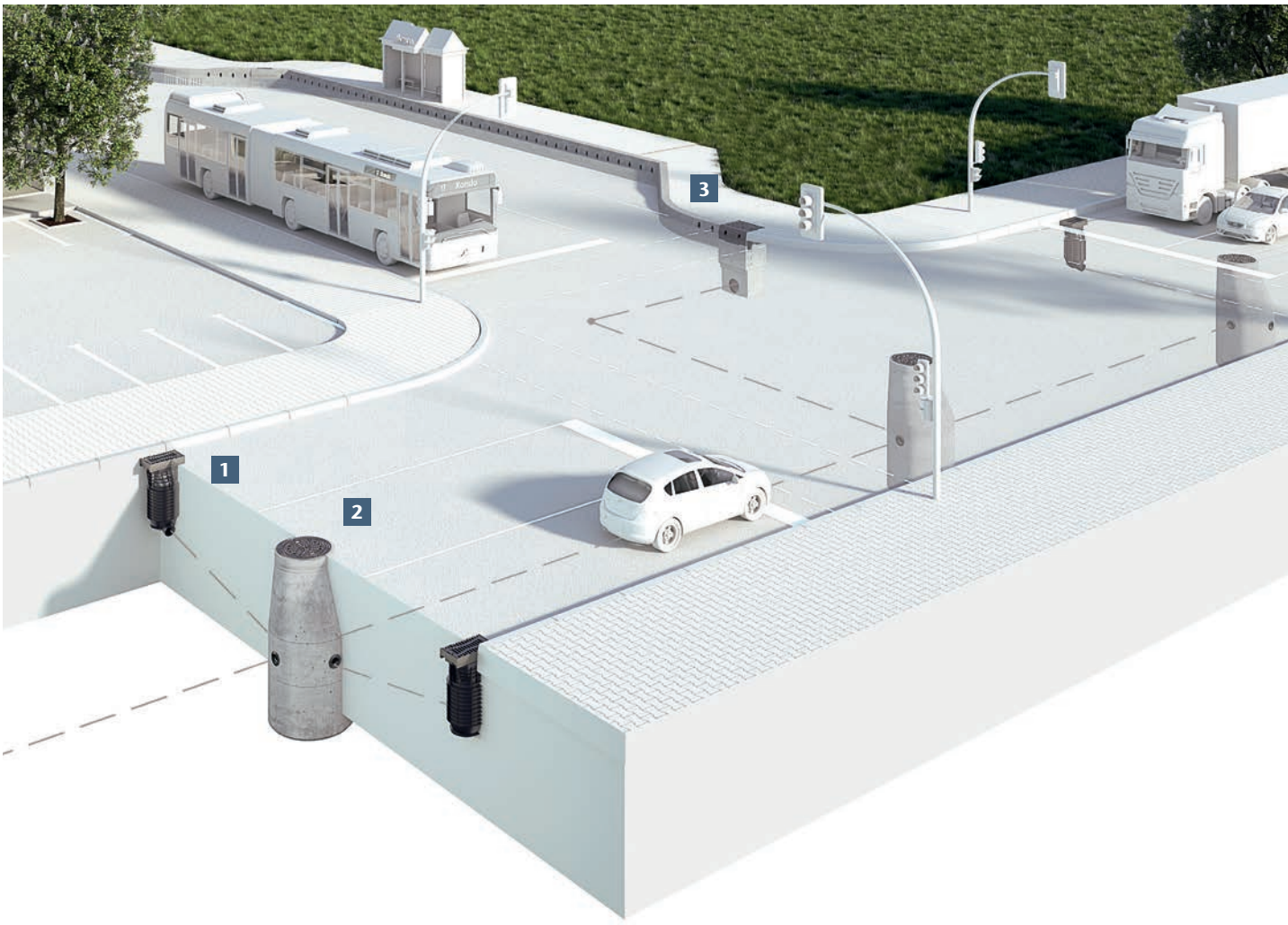
1 **ACO DRAIN® drainage channels**
ACO DRAIN® Multiline Sealin

2 **ACO heavy metal filter**
ACO heavy metal filter HMS

3 **ACO sedimentation systems**
ACO Sedised-C, ACO Sedismart-C

4 **ACO infiltration systems**
ACO Stormbrixx

Public roads



What should be considered in case of trafficked areas with high loading?

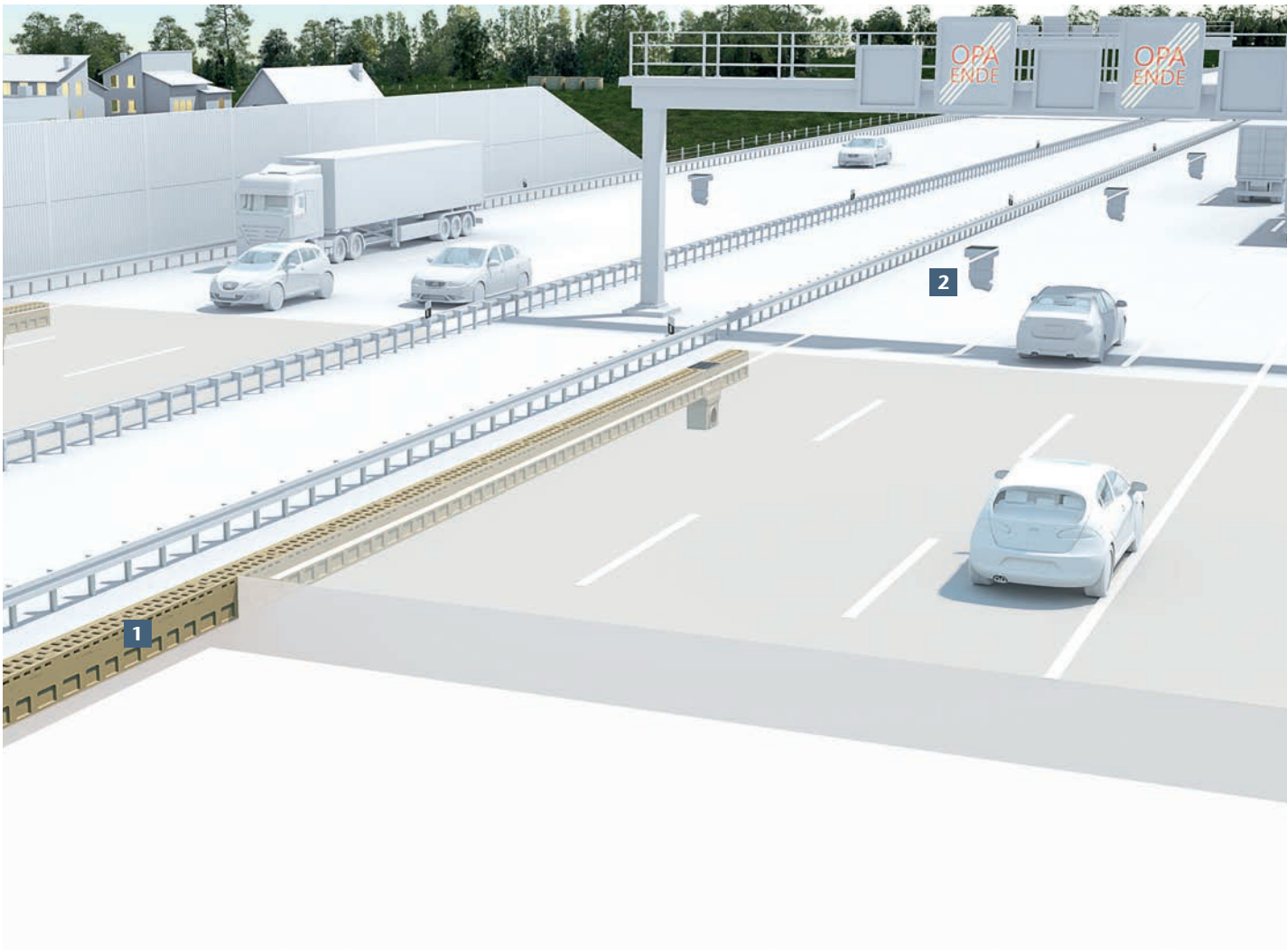
Public roads are indispensable for the transport of all types of goods, but also for passenger traffic. Way too often, we forget that widening and maintenance are part of a functioning traffic network. Installation of a new drainage system is also required as part of complete renewal. For this, ACO offers a large number of systems for use in the different traffic areas.

1 ACO road gullies
ACO Combipoint

2 ACO manhole covers
ACO Multitop

3 ACO kerb drainage
ACO DRAIN® KerbDrain

Motorways



How can traffic safety and noise control be combined?

Expansion of motorways does not only require expansioning of road cross-section, but also adapting the surface drainage to the new requirements.
A special channel is required where open-pored asphalt is used as the top layer (surface course) for noise control reasons; which can take in the surface water that infiltrates through the road paving.

1 ACO DRAIN® drainage channels
ACO DRAIN® Monoblock

2 ACO motorway gully top
ACO motorway gully top

Drainage of tunnels

What should be considered in case of accidents in tunnels?

What intake capacity will be required in the drainage system in the event of an accident? What happens to liquids in the drainage channel? How is a safe, accessible access to the escape route implemented? All ACO product systems for tunnel drainage provide answers to these and other questions.

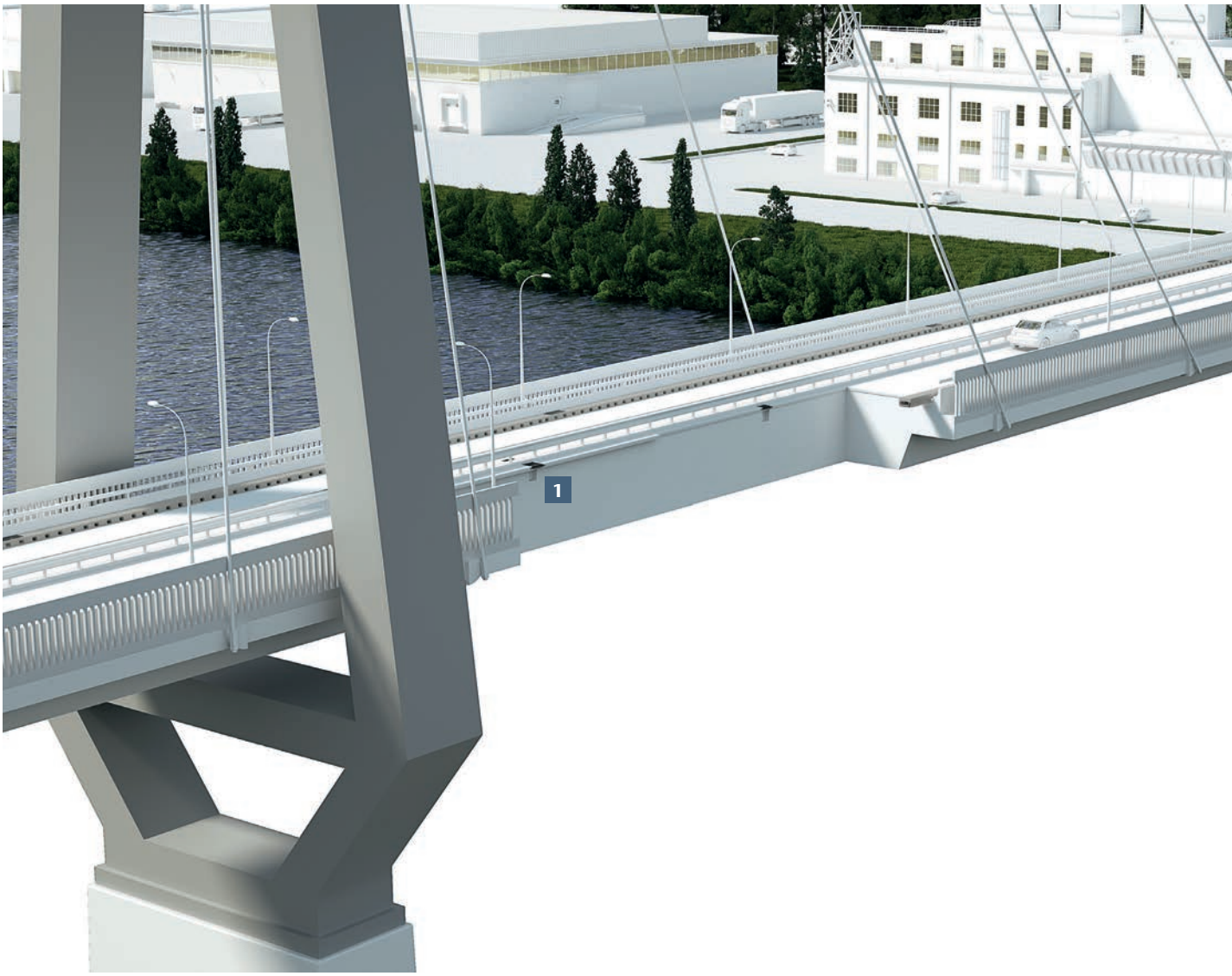
ACO is one of the world market leaders in drainage technology and rises to the challenges in tunnel construction. Special products have been developed for the drainage of tunnels and the connected infrastructure. The wide range of climatic conditions in tunnels and the particular local environment require ecological and economic solutions. ACO tunnel drainage systems not only include standardised products such as the Monoblock T drainage channel, but also project-specific solutions.

1 ACO DRAIN® tunnel channels
ACO DRAIN® Monoblock T tunnel channel

2 ACO manhole covers
ACO Multitop

3 ACO accident and storage basin
ACO large tank system

Drainage of bridges



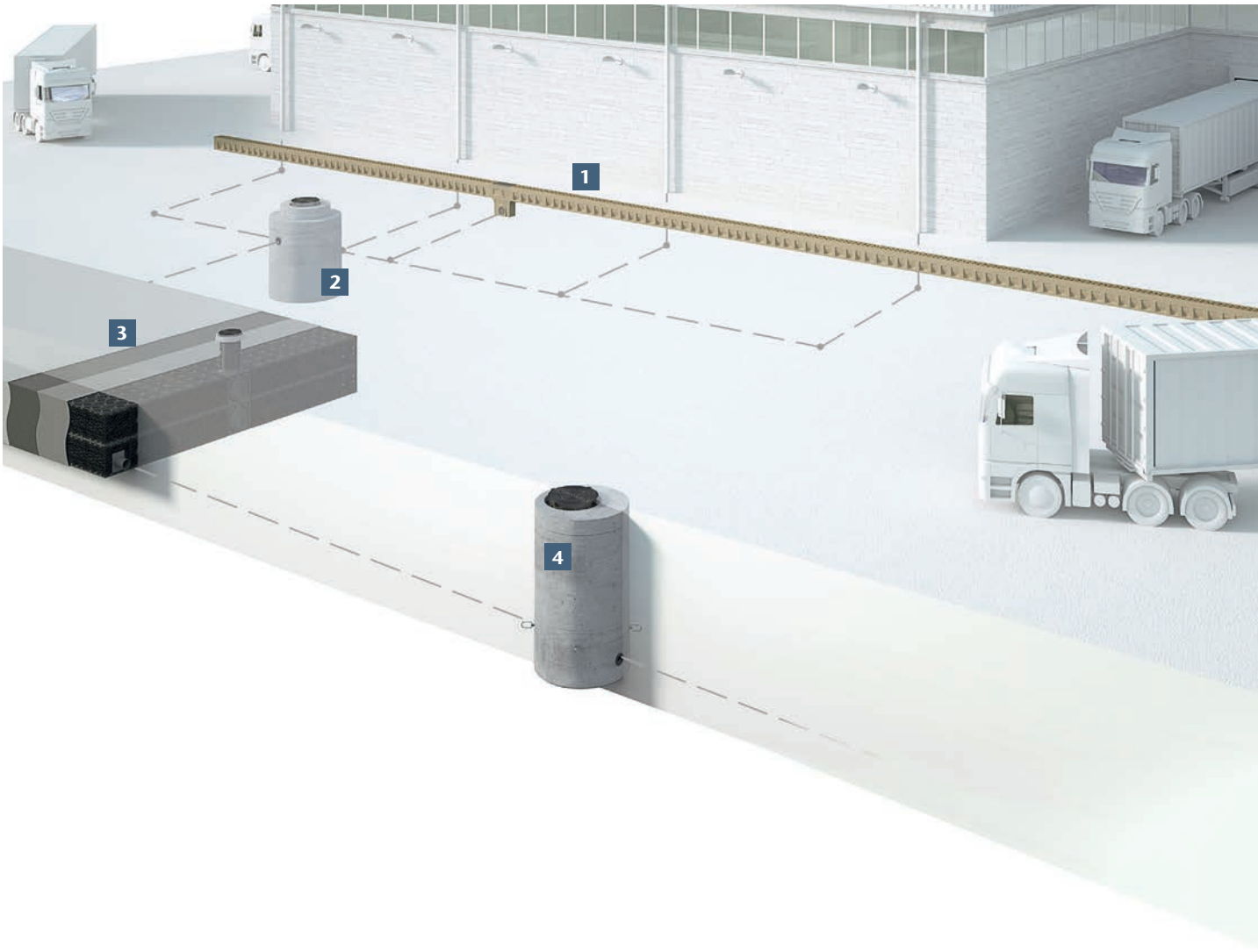
What should be considered when designing drainage for prestressed concrete, reinforced concrete and ballasted deck bridges?

Bridges are key elements in a road traffic system. If water is collected on them, aquaplaning or black ice can quickly occur. These hazards can be avoided by using ACO's special bridge gullies, because the surface water is removed quickly and effectively, and bridges are permanently safe for traffic and operation.

ACO Multitop bridge gullies are designed to meet the special requirements during the construction and renovation of bridges and pavements. They enable significant improvement in the function, safety and economic efficiency of drainage. Special solutions are offered for all relevant areas of use.

1 ACO Multitop universal gully tops with cover plates that can be mounted on both sides
ACO Multitop bridge gullies

Drainage of industrial yards



What should be considered when designing drainage for large roofs and sites with heavy duty traffic?

Industrial yards in front of warehouses are areas with high traffic loads and large catchment areas. Therefore it is necessary to remove large quantities of water within a short time, especially in case of heavy rainfall.
Different solutions exist for controlled surface water management. Both products and their positioning vary depending on the specific application. Local conditions, such as ground and design levels, degree of pollution of the collected surface water and approval legislation requirements should be taken into consideration.
ACO's application engineers can advise you on the technical possibilities.

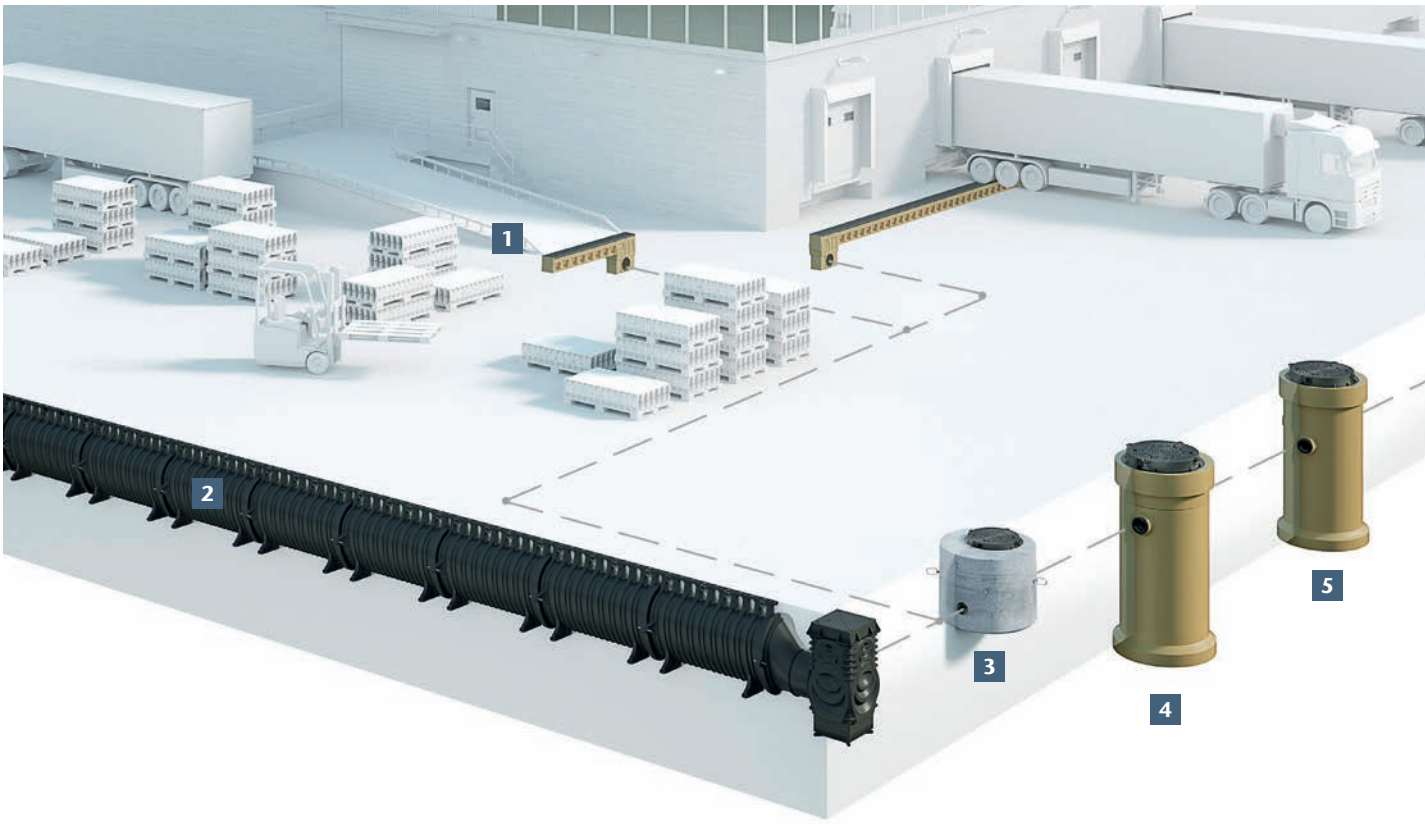
1 ACO DRAIN® drainage channels
ACO DRAIN® Monoblock

2 ACO sedimentation systems
ACO Sedismart-C

3 ACO Stormbrixx block storage
ACO Stormbrixx

4 ACO flow restriction systems
ACO flow restriction manhole

Drainage of logistics areas



What should be considered in case of heavy rain on large areas?

Logistics and storage areas have high traffic loading and large catchment areas. Especially during heavy rainfalls, large quantities of water have to be removed in the shortest possible time.
Retention channels such as ACO Qmax enable simultaneous water intake and retention. Before discharging the surface water into the receiving water (outfall), it is treated and raised to the normal drainage level by a pumping station. ACO heavy-duty channels are used for the drainage of special areas such as ramps or loading and unloading bridges.

1 **ACO DRAIN® drainage channels**
ACO DRAIN® PowerDrain

2 **ACO DRAIN® retention channels**
ACO DRAIN® Qmax

3 **ACO flow restriction systems**
ACO flow restriction manhole

4 **ACO light-liquid separators**
ACO Oleosmart Pro

5 **ACO pumping stations**
ACO Powerlift

Near-surface drainage

How can economy and ecology be combined usefully?

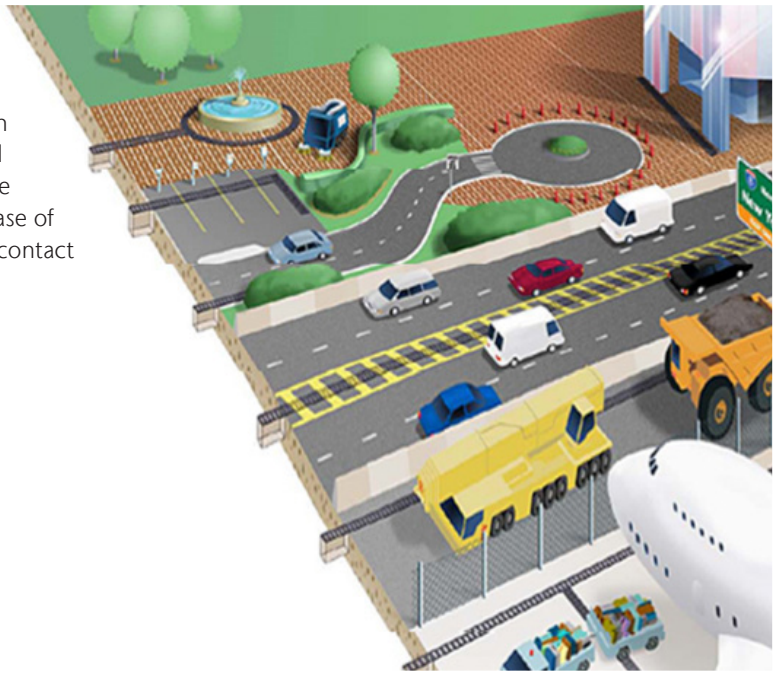
In comparison calculations, with the help of drainage channels, near-surface located drainage solutions are a more economic variant compared to conventional drainage with pipes. The near-surface routing also benefits the downstream treatment plant. The discharge level is significantly higher. In this way, through designs replicating those found in nature, open design treatment plants can have a positive influence on the ecological and design ideas for open space design.

1 ACO DRAIN® drainage channels
ACO DRAIN® Multiline Sealin

2 ACO sedimentation systems
ACO Sedised-P

3 ACO Stormbrixx block infiltration
ACO Stormbrixx

The choice of a suitable drainage channel depends on the surroundings and the traffic which will take place around and on top of the channel. The places of installation are divided in 6 different load classes. The location of the load classes are shown exemplarily .The choice of the appropriate load class is up to the planner. In case of doubts please choose one load class higher or contact the ACO technical support team.



Load class A 15
Pedestrian and cycle ways

Load class B 125
Footpaths, pedestrian and similar areas, private car parks and car parking decks

Load class C 250
Kerbside drainage and non-trafficked areas of hard shoulder

Load class D 400
Carriageways of public roads and motor-ways, hard shoulders and parking areas

Load class E 600
Areas subjected to heavy wheel loading, eg ports and docksides

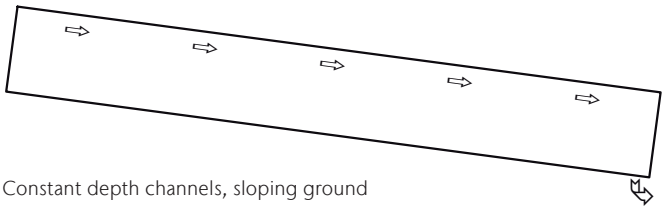
Load class F 900
Areas subjected to especially heavy wheel loads, including tracked vehicles, eg airfields

How to choose the right channel

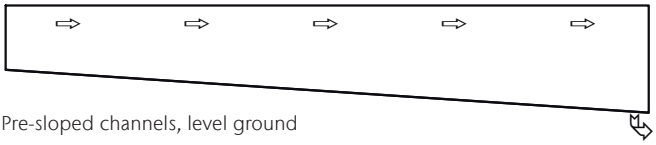
	Highway	Platform	Bus station	Container terminal	Light & Design	Facade	Airfield	Pedestrian area	Footh path	Industrial area	Lorry parking	Logistic area	Ways and places	Parking deck	Parking lot	Underground parking	Street side rainage	Petrol stations	Sealable	Sport, track and field	Private ways and places	Terrace
Seal in A 15 - E 600		x			x	x		x	x				x	x	x	x					x	x
Multiline A 15 - E 600		x			x	x		x	x				x	x	x	x			x		x	x
XtraDrain A 15 - D 400					x	x		x	x				x		x						x	x
PowerDrain A 15 - F 900			x	x			x	x		x	x	x				x		x	x			
PowerDrain Performance A 15 - F 900			x	x			x	x		x	x	x				x		x	x			
Monoblock PD A 15 - D 400			x					x					x		x							
Monoblock RD B 125 - F 900	x			x			x			x	x	x					x	x	x			
SK A 15 - F 900			x	x			x			x	x	x				x		x	x			
KerbDrain A 15 - D 400															x		x					
Qmax A 15 - F 900				x			x			x	x	x										
Gully A 15 - B 125		x						x	x												x	x
Euroline A 15 - B 125																			x		x	x
Hexaline A 15 - B 125																					x	x
Self 200 A 15 - B 125																					x	x
Galaline A 15 - C 250																					x	x
Combipoint A 15 - D 400										x	x	x	x		x		x					
Sport																				x		

Channel system main fall options

Constant depth channels, level ground

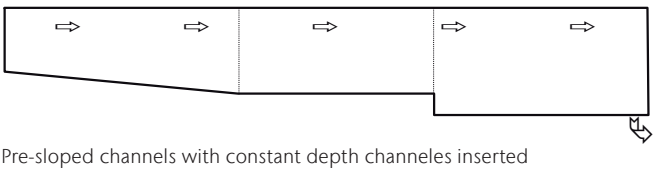


Constant depth channels, sloping ground

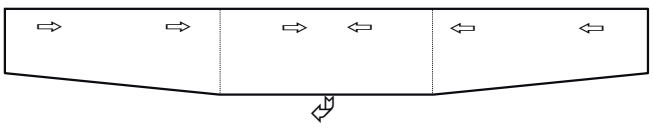


Pre-sloped channels, level ground

Stepped constant depth channels



Pre-sloped channels with constant depth channeles inserted



Twin leg; pre-sloped channels draining into a central outlet

Guidance on channel drainage system selection

ACO drain products are independently tested and certificated to EN 1433.
In selecting an appropriate channel system, the following points of guidance should be considered.

a) EN 1433 gives no load class guidance on traffic frequency or lateral loading from manoeuvring vehicles. In either case, a product in a higher load class should be selected where high frequency or loading is anticipated. In addition, if laterally loaded, the concrete bed and haunch should be designed for stability.

b) Depending on frequency and loading, fork lift trucks with solid tyres will require a minimum load class E 600.

c) Once the appropriate load class is established, the hydraulic capacity of the channel should be considered. The position of a fixed outlet, for example, in conjunction with a high design inflow, may require a wider channel with a higher load class.

d) For further detailed explanation of load classes, place of installation etc. please refer to EN 1433.

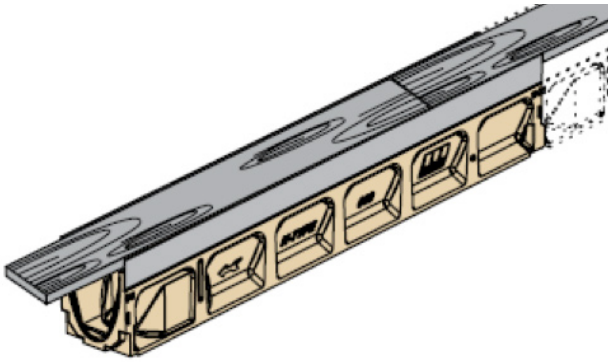
General installation advice

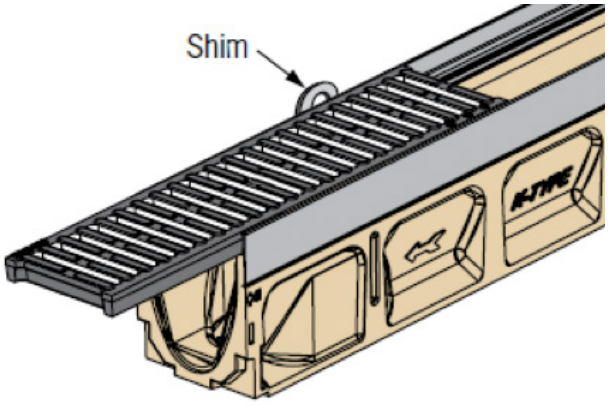
The installation of ACO drainage channel systems should always be done according the planners advice and considering the ACO installation detail.
Paving of the surroundings should be done according planners recommendation.
If needed, do an additional compaction after excavation works to eliminate loosened soil.
Ensure loose material is removed from trench and base is well compacted.
Manufacture foundation and haunches according structural engineering calculations respectively ACO installation detail.

For a better load distribution the foundation should be longer than the channel run: at load class A 15 – C 250 app. 15 cm, at load class D 400 – E 600 app. 25 cm and at load class F 900 app. 50 cm.
At channel runs with a length of more than 25-30 m we recommend installing an expansion joint through the channel and its foundation.
Bedding of the channel parts on a humid concrete bedding without creating hollow spaces under the channel.
Please notice the direction of the arrows on the side of the channel bodies.
Always start laying at the outlet/deepest point of the channel run.

To prevent channel wall and joints from distortion by weight of concrete, gratings or 20 mm plywood sections (cut to create a snug fit) should be placed in the grate rebate of channel.
If gratings are used, they should be suitably wrapped to protect from concrete contamination and should be laid to bridge channel joints to aid alignments. Shims or washers should be placed along one side to allow easy removal of the grating.

Expansion joints or cut stones may not be installed directly to the channel to avoid distortion of side wall caused by pressure or sharp edges been pressed against the side of the channel. Make sure, that the adjoining surfaces will be everlasting 3-5 mm higher than the channel edges.Start laying setts at the channel without any joint. Except for load class D 400, where a app. 2 cm wide joint between channel and first row of stones is to be filled with grouting mortar.

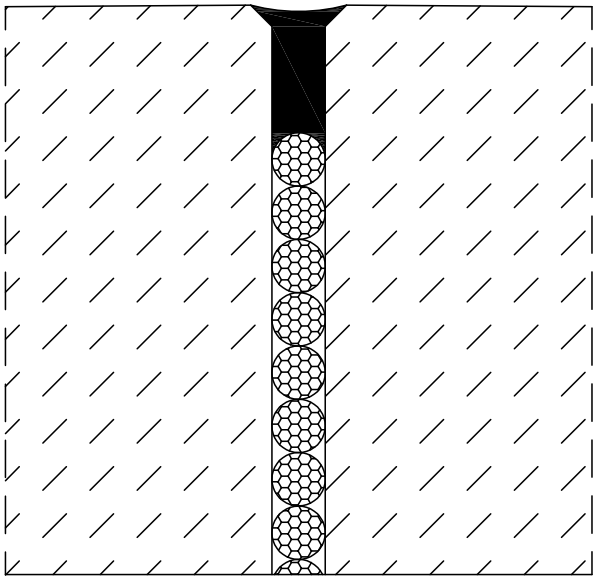


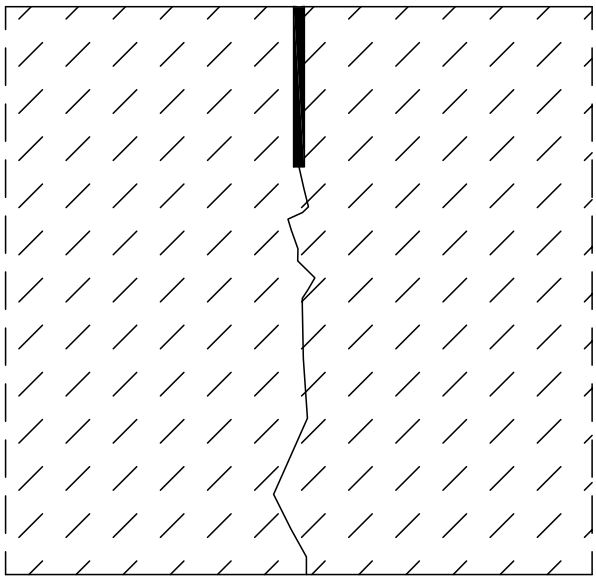


Joints

Construction and sealing of joints according to valid standards and regulations. Therefore an appropriate joint plan has to be provided by the planner.
Expansion joints may not be installed directly to the channel, because the channel cannot take the loadings from thermal caused concrete expansion.
Longitudinal expansion joints are recommended to be positioned according the appropriate ACO Drain installation advice.
If transversal joints cross the channels bed and haunch, such joints may be positioned to coincide with the channel-to-channel joint, or the channel may be cut to suit and re-sealed with suitable flexible sealant.
At afterwards installation of channels in concrete or pavement in concrete bedding the planner has to make sure, that enough expansion joints will be installed. The joints have to ensure, that thermal expansions from the concrete slab won´t harm the channel.

In an unreinforced concrete haunch please position a concrete joint every 1-2 m. Alternatively the haunch could be constructed reinforced.
Longitudinal expansion joints may be doweled if necessary.
At use of mastic asphalt we recommend filling the joint in two phases. First fill grouting mortar up to 1,5 cm under surface level and second fill remaining space with bituminous water stop.
The final location, width and geometry of expansion joints have to be determined by the planner or structural engineer. Joints and sealing material should be inspected and maintained on regular basis.





Expansion joint
An expansion joint has to go through the entire concrete slab to absorb the movement within the slab due to thermal expansion and shrinkage.
The bottom of the joint is filled with backing rod and the top is sealed with a suitable and flexible sealant.

Contraction joint
A contraction joint is made by cutting approximately 1/3 of the concrete slab to define where the slab shall crack. The crack will occur directly at the cut due to aging and shrinking of the concrete. The cut should be sealed with a flexible sealant.
A contraction joint is not able to absorb any kind of movements due to expansion of the concrete slab.

Sealing

According EN 1433 the body of drainage channels has to be watertight and the design has to provide a possibility of sealing the channel joints.

With the patented safety joint ACO provides a well-fitting channel joint which can be sealed to get a watertight channel up to the top of the edge rail, if required.
The preinstalled lip labyrinth sealing makes a watertight connection of vertical pipes possible.

For an elastic sealing we recommend to use EUROLASTIC TC 30S as sealant in conjunction with EUROLASTIC Primer S2, or similar, depending what´s available on your market. Please contact your local supplier to get more information about appropriate products.

1. Seek the sealant manufacturer´s advice on suitability on all occasions.
2. For filling the sealant into the groove please use the sealing set (art.no. 01376) consisting of a cartridge gun, a cartridge, a stirrer and some tips in different sizes.
3. Storage of the sealant has to be frost free.
4. Use of the sealant at minimum 5°C (41°F) air temperature and surface temperature of 5 – 35°C (41-95°F). At 20°C (68°F) the curing time is 24 hours.
5. Attention: Polymer concrete surfaces have to be cleaned carefully.
6. After cleaning put on primer EUROLASTIC Primer S2 (art.no. 10682) by using a paintbrush and let it flash off for app. 30 minutes.
7. Put the cartridge with the 2 component sealant into the cartridge holder and stir it by using the stirrer with a drilling machine. Mix the sealant at least 3 minutes with 400 turns per minute until the colour is unique.
8. Before setting cartridge into the cartridge gun, please remove the plastic cap, which is only needed for the use of sealant in bags.
9. Always make sure, that the sealant is connected to the sealing at the channel edge to ensure a complete sealed system.
10. Smooth the surface by using a spatula which is dipped in soap solution.
11. Cleaning of equipment with acetone or Eurolastic G.
12. Technical data and safety sheets are available at www.euroteam-bauchemie.de or at the international support department at ACO headquarter in Büdelsdorf.

What sealant we can recommend for the connection of two pieces of Xtradrain (plastic)?
PP is the plastic with the smallest density and has due to that feature a very low surface energy. This texture of the surface makes it hard to interact with other substances, for example paint or glue. As a result, PP is one of the most difficult-to-bond materials due to its low surface energy of 30 mJ/m².

There is no sealant or glue what will stick on PP for long time.

ACO polymer concrete and the sealant are resistant against a wide range of mediums. For information about all not listed mediums, please contact the ACO International Support Department.

If Multiline Seal in or Monoblock RD200V is used, a sealing of joints is not necessary, because these systems have an integrated sealing.

Channel systems made of plastic require an additional effort if joints have to be sealed. XtraDrain and Hexaline are made of Polypropylene and have to be welded to get watertight joints.

Special installation advices

All shown installation details are exemplary advices and represent the whole channel system. Even the illustration of paving and asphalt layer is representative and has to be adjusted to the planner's advice and all valid local regulations and standards.

According EN 1433 ACO channels may have tolerances in height, length and width of ±2mm. Additional tolerances during installation are possible and have to be considered.

Depending on the circumstances and the local requirements drainage channels always need a foundation (Type M) like shown in our ACO DRAIN® installation advice.

Where a channel drain is being inserted within an existing slab, in a box-out cut or cast within a slab, a minimum 25 mm clearance around the channel is required for grouting. The channel may be suspended in the box-out while being grouted. Bed and haunch the channel with a proprietary epoxy-mortar grout with a minimum strength of 30N/mm²; advice should be sought from the grout manufacturer.

If a channel crosses an expansion joint in an existing concrete slab, the channel should be sawn in half where it crosses the joint, and re-joined with a proprietary flexible sealant.

Shallow channels are special channels which only differ in height from ordinary channels. Caused by the shallow clear height the hydraulic capacity is limited and should be proved by an ACO application engineer. In general they are used in parking decks, inside buildings or in areas with shallow layers and limited space.

Drainage channels in floors should always be installed upon the waterproofed layer. A direct connection of waterproofed layer
and channel is not possible. Sealing of the channel joints is highly recommended.

When intermediate piece DN100 or DN150 with clamping flange is used, the nozzle may not reach longer than 60mm into the intermediate piece to provide a proper runoff of the water.

Drainage channels are always installed on same level like the adjusting area. In asphalt or paved areas the channel top shall be installed app. 5mm under the surrounding surface. In concrete areas a levelled installation is possible. In areas with more than 5 % slope we recommend to choose one load class higher than needed to make sure, that thrust and other loadings are distributed properly.

At extreme loadings within load class D 400 – F 900 you should differ between occasionally and constantly traffic.

Even traffic crossing the channel, narrow corners, slow moving traffic, often braking and accelerating could mean to install after a special installation advice.

In case of extreme loadings we recommend to install according one load class higher than needed.

Extreme loadings could be container terminals, loading zones, logistic areas or sloped areas.

For these application we advise to choose ACO DRAIN® PowerDrain or ACO DRAIN Monoblock system.

In front of rail way crossings we recommend to use Monoblock in every case.

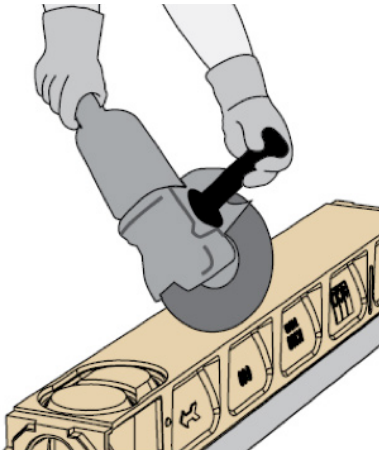
As well for high dynamic loaded areas like highways we recommend using Monoblock only.

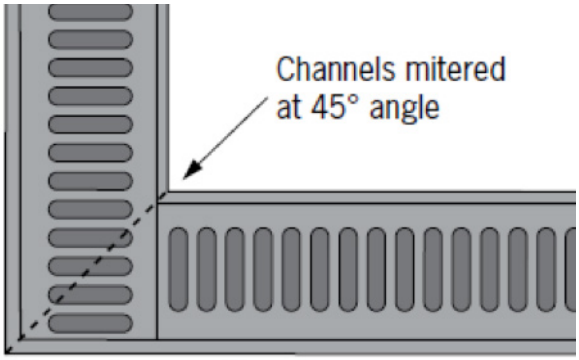
Accessories like sump units and revision units and cut channel elements as well should always be located outside the trafficked area.

Mitre joints are formed by sawing the channels (eg with disc cutter) to the required angle and butting them together dry jointed or resin bonded. A suitable adhesive should be used in a corrosive environment. The sealant used should be able to withstand contact with the effluent or chemical solution.

Where possible, 90° joints and Ts should be formed such that gratings do not have to be cut. 90° channel junctions are available as standard and pre-mitred joints are available to special order, or angles can be formed with connecting proprietary PVC pipework on ACO inlet/outlet endcaps.

Note: For load classes higher than C 250, mitred joints are not recommended in trafficked areas and it is recommended that ACO DRAIN® S Range and PowerDrain are not mitred. ACO can custom-manufacture angled junctions to order. Always consider health and safety instructions when cutting.





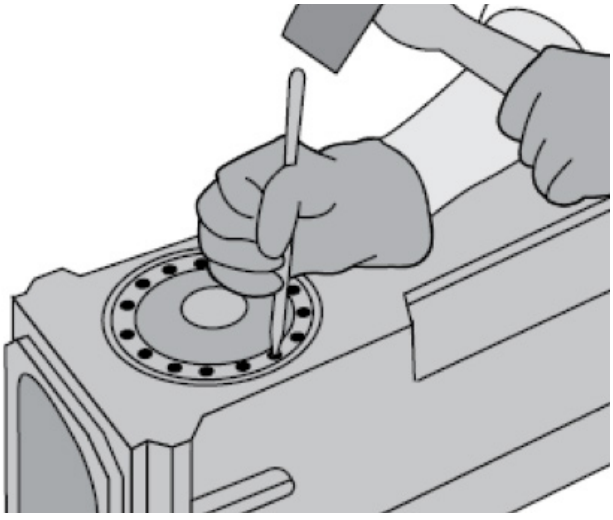
**Channels are mitered;
grates are shown as tee joint.**

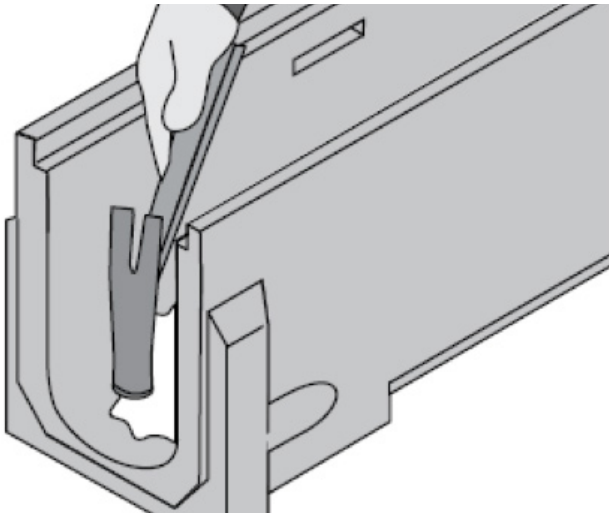
Products made from galvanized steel should only be installed in areas where contact to chemical cleaning devices, heavy acids and solutions as well as acetic acid containing silicon is impossible. For special applications please get in contact with an ACO application engineer.
During installation and site work products made from stainless steel should be protected against flying sparks (Disc cutter) and flash rust during installation to prevent a bad looking surface and a dissatisfied customer. We recommend testing the compatibility of stainless steel (1.4301) and other metals to avoid contact corrosion. For applications with contact with sea air, salt water, chemicals or other environmental influences please check if more high-grade stainless steel would be better to use. To keep the good looking smooth surface of stainless steel products and to prevent rusting we recommend to clean all surfaces occasionally with fresh water.

Products made from ductile iron are delivered with two different coatings. ACO DRAIN® PowerDrain is coated with a cathodic dip painting, which is quite long lasting dependent on the environmental influences.

All other systems are delivered with a coating which is meant to be a temporary protection for storing, delivery and installation and will be removed after short time to give the grating and edge rail the typical ductile iron look. This is no lack of quality and no reason for a complaint at all.

All preformed knockouts are made to be knocked out from the inside to the outside. To avoid breakage we highly recommend perforating the knockout by drill or chisel before knocking out.





Please don´t cut black rubber walls at sump units before cleaning the channel and the silt bucket to prevent dirt entering the sewage system before customer has made the approval of the project. For cutting please use a sharp knife and cut along the connected channel.

At Brickslot frames in brick paved areas it might happen, that sand from transversal paving joints trickles into the slot.

At Brickslot frames in asphalt areas we recommend installing a row of bricks adjoining the slot frame to make the installation of the asphalt easier. Even a possible renewing of the surface is much easier if the cold planer can use the row of bricks as a fence.

To protect the environment we recommend sealing joints in areas where hazardous liquids and mediums will be handled.

Before sealing please make sure that all materials and mediums are compatible to each other. If you have doubts, please contact ACO International Support Department to get the remaining information.

For this kind of applications, it might be necessary to have a closer look for some special regulations in your country.

Grouting of joints between kerbs and channel or facades and channel should be made like shown in the appropriate ACO DRAIN® installation advice later on in this guideline. We recommend using a high-strength (but dynamic loadable), non-shrinking and de-icing salt resistant mortar which meets all requirements considering all conditions (loading, resistance etc.) on site. The joints measurements shall be according to the mortar manufacturers advice.

To prevent mortar leaking into the channel we recommend to tighten channel joints from the outside (duct tape) before grouting.

When connecting the pipe to the sump unit, please don´t push the pipe against the silt bucket.

To get the optimum outlet capacity the pipe has to be inserted only right through the lip labyrinth sealing.

If foul air traps are used, please consider that water remaining in the sump unit could freeze in winter times and cause distortion of the sump unit.

Sump units shall be installed appropriate to the channel system.

For special demands or custom made products which you won´t find in this guideline please feel free to get in contact with the ACO International Technical Support Team, who will help you creating a proper solution for your special application.

Materials of manufacture

ACO drain channels are manufactured from ACO resin concrete, consisting of polyester resin reinforced by mineral aggregates and fillers or.

The appearance is self-coloured light brown or can be pigmented to match virtually any colour shade, and resin concrete offers high quality, precise detailing.

A channel repair kit comprising polyester paste and hardeners is available for minor repairs or non-flexible channel joints.

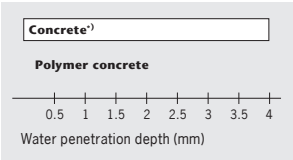
Physical properties

Channels
ACO resin concrete is a strong material offering approximately four times the compressive strength of average concrete, and half the weight (for an equivalent channel section).

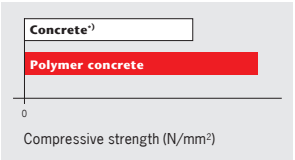
ACO drain systems are available in types to suit load classes A 15 to F 900 as specified in EN 1433.

Flexural strength	20 - 25 N/mm²
Compressive strength	90 - 100 N/mm²
Modulus of elasticity	20 - 25 N/mm²
Density	2,1 - 2,3 g/cm³
Typical water absorption	0,05 - 0,1 % (by weight)
Roughness	25 µm
Fire behaviour	non-flammable
Water penetration	0,0 mm

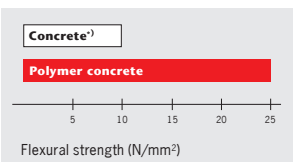
Comparison of drainage channel materials



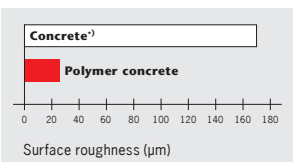
Water penetration depth (4281) after 72 hours



Compressive strengths



Flexural strengths



Average surface roughness of drainage channels

*) Concrete for use according to EN 1433

Surface performance
The ultra-smooth internal surface (Manning Strickler roughness coefficient average value is 0,011) encourages superior liquid flow for a given nominal cross-section when compared to conventional concrete. ACO drain channels allow greater discharge rates to be achieved, or longer lengths of channel to be installed before an outlet from the system is required.

Chemical resistance
Standard polyester resin concrete ACO drain channels are highly resistant to chemical attack and, with the appropriate grating, can be used in most environments where acids and dilute alkalis are likely to be encountered. The material is not affected by road de-icing salts.

In situations where exposure to aggressive chemicals is likely please check resistance of polyester resin concrete. See chart on page 25, which gives the resistance of standard polyester and joint sealant to various common industrial and agricultural chemicals with given concentration at room temperature (23°C).

Reaction to fire
For applications in tunnels it is very important to provide a non-flammable channel unit. Our special mixture of polyester resin concrete fulfils this requirement and is tested according EN 13501-1.

Gratings
Separate gratings are available in galvanised steel, stainless steel, epoxy glass reinforced composite and ductile iron. Special grating materials and non-standard finishes are available on request.

Grating bolts, where provided, are Tuflok coated high-tensile steel or stainless steel with integral friction grip washers. Quicklock and Powerlock are provided as standard locking on some systems.

Resistance to high and low temperatures
With low moisture absorption the channels are completely resistant to frost. The maximum temperature for permanent content is 80°C.

ACO drain channels can be occasionally exposed to boiling water, or steam cleaned, without risk of damage. Where continual exposure to boiling liquids or intensive steam cleaning is likely, an alternative channel material, for example stainless steel, should be considered; contact ACO Industries k.s. in Pribyslav. aco-industries.cz

Resistance to vandalism
Most ACO drain systems are available with lockable gratings which are sufficient to deter casual vandalism. Where vandalism is likely to be a serious problem, bolted gratings should be specified or alternatively a security locking can be used to prevent vandalism.

23415
Drainlock™ security locking assembly

Chemical resistance

ACO polymer concrete is a reaction resin based material highly filled with quarzitic aggregates (up to 8 mm). Chemical resistance refers to the pure medium stated in the chart at ambient temperature (23°C) and given concentration. Differing conditions require consultation. Information are based on extensive investigations conducted by Polymer Institute Flöhrsheim, a research institute for polymer building materials accredited by the German Federal Institute of Materials Research and Testing (BAM). Masterflex-sealant/primer system possesses a general building approval Z-76.6-48 according to KIWA BRL-K 781/01.

Chemical Medium (pure, unmixed)	max. concentration[1]	**Short term exposure**[3] • ACO Polymer Concrete[2]	• Sealant / Primer	**Long term exposure**[4] • ACO Polymer Concrete[2]	• Sealant / Primer
Test liquid as required by the German Institute of Consturction Technology (DIBt)					
DIBt no. 1: Petrol DIN 51 600, DIN 51 607		+	+	+	+
DIBt no. 2.1: Aviation fuel 50 Vol.-% Isooctane 50 Vol.-% Toluene		+	+	+	+
DIBt no. 2.3: Jet fuel Jet-A1 Nato-Code F-34/F-35		+	+	+	+
DIBt no. 3: Test mixture A 20/NP II		+	+	+	+
DIBt no. 4: 10 Vol.-% Methylnaphthalene 60 Vol.-% Toluene 30 Vol.-% Xylene		+	+	+	+
DIBt no. 4a: 30 Vol.-% Benzene 10 Vol.-% Methylnaphthalene 30 Vol.-% Toluene 30 Vol.-% Xylene		+	+	+	(+)
DIBt no. 4b: According to TRbF 401/2, Abs. 3.1.8		+	+	+	+
DIBt no. 5: 48 Vol.-% Isopropanol 48 Vol.-% Methanol 4 Vol.-% Water		+	+	+	+
DIBt no. 5a: Methanol		+	+	–	+
DIBt no. 6: Trichlorethylene		+	–	–	–
DIBt no. 6b: Monochlorbenzene		+	–	+	–
DIBt no. 7: 50 Vol.-% Ethylacetate 50 Vol.-% Methylisobutylketone		+	+	+	+
DIBt no. 7a: 50 Vol.-% Acetophenone 50 Vol.-% Methyl Salicylate		+	–	+	–
DIBt no. 8: Formaldehyde	35 %	+	+	+	+
DIB no. 9: Acedic Acid	10 %	+	+	–	(+)
DIBt no. 9a: 50 Vol.-% Acedic Acid 50 Vol.-% Propionic Acid		+	+	+	–
DIBt no. 10: Sulfuric Acid	20 %	+	+	+	+
DIBt no. 11: Sodium Hydroxide Solution	20 %	(+)	+	–	–
DIBt no. 12: Sodium Chloride Solution	20 %	+	+	+	+
DIBt no. 13: 30 Vol.-% n-Butylamine 35 Vol.-% Dimethylaniline 35 Vol.-% Triethanolamine		+	+	+	–
DIBt no. 14.1: 2 wt.-% Marlophen 3 wt.-% Protectol 95 wt.-% Water		+	+	+	+
DIBt no. 14.2: 2 wt.-% Marlipal 013/80 3 wt.-% Texapon N 40 95 wt.-% Water		+	+	+	+
DIBt no. 15a: Tetrahydrofuran		+	+		
Acetone		+	+	–	+
Formic Acid	10 %	+	+	–	(+)
Ammonia	10 %	+	+	–	(+)
Aniline (s.a.s.)		+	+	+	–
Aniline 10 % in Ethanol	10 %	+	+	+	–

Chemical Medium (pure, unmixed)	max. concentration[1]	**Short term exposure**[3] • ACO Polymer Concrete[2]	• Sealant / Primer	**Long term Exposure**[4] • ACO Polymer Concrete[2]	• Sealant / Primer
Acedic Acid	30 %	+	+	–	(+)
Bezene		+	–	+	–
Boric Acid (s.a.s.)		+	+	–	+
2-Butanol		+	+	+	+
Calcium hydroxide (s.a.s.)		+	+	–+	+
Caster oil		+	+	+	+
Chevron Hyjet		+	+	+	+
Chlorobenzotrifluoride		+	+	+	+
Chloric Acid	5 %	+	(+)	–	(+)
Chromic Acid	5 %	+	+	+	+
Chromic Acid	10 %	+	+	–	+
Citric Acid (s.a.s.)		+	+		
p-Cresol (s.a.s.)		(+)	+	(+)	–
Diesel fuel		+	+	+	+
Ethanol		+	+	+	+
Ethyl Acetate		+	+	+	–
Ethylenediamine		+	–	+	–
FAM test liquid A		+	+	+	+
FAM test liquid B		+	+	+	+
Fuel oil EL		+	+	+	+
n-Heptane		+	+	+	+
Hexafluoro Silica	10 %	+	+	+	+
n-Hexane		+	+	+	+
Hydraulic oil Donax TM		+	+	+	+
Hydrochloric Acid	10 %	+	+	–	+
Hydrofluoric Acid	5 %	+	+	+	+
Iron(II) Sulfate	20 %	+	+	+	+
Isooctane		+	+	+	+
Lactic Acid	10 %	+	+	+	+
Methylamine		+	–	–	–
Methylethylketone		+	+	–	+
Mineral oil SAE 5 W 50 Shell		+	+	+	+
Monochloroacetic Acid	10 %	+	+	+	–
Nitric Acid	10 %	+	+	–	(+)
n-Nonane		+	+	+	+
Oxalic Acid (s.a.s.)		+	+	+	+
Petrol 95 – 98 octane index		+	+	+	+
Phenol (s.a.s.)		+	+	+	–
Phosphoric Acid	20 %	+	+	–	+
Potassium Hydoxide	20 %	–	+	–	–
Sodium Carbonate	20 %	+	+	+	+
Sodium Hypochlorite	5 %	+	+	–	+
Sulfuric Acid	40 %	+	+	+	+
Tetrafluoroboric Acid	20 %	+	+	–	(+)
Toluene		+	(+)	+	–
Trichlorotrifluoroethane		+	+	+	+
Triethylamine		+	+	+	+
Xylene		+	+	+	+

1) for different concentrations consultation required
2) ACO polymer concrete with unsaturated polyester resin as binder
3) up to 72 hours
4) up to 42 days

s.a.s. saturated aqueous solution
\+ resistant
(+) limited resistance, consultation required
– not resistant

Application-technical consultation in spoken and written and through individual trials is given to the best of our knowledge. It is just an advice without obligation, also in respect of the protected rights of third parties and, thus, does not release the buyer from his obligation to inspect the delivered products for their suitability to the intended processes and purposes. Application, use and processing of the goods occur outside our sphere of control and, therefore, are entirely your responsibility. Should an issue of liability arise nevertheless, then any damages shall be limited to the value of the goods supplied. As a matter of course we guarantee the perfect quality of our products as outlined in our “General terms and conditions”.

ACO DRAIN® Multiline Seal in drainage channel

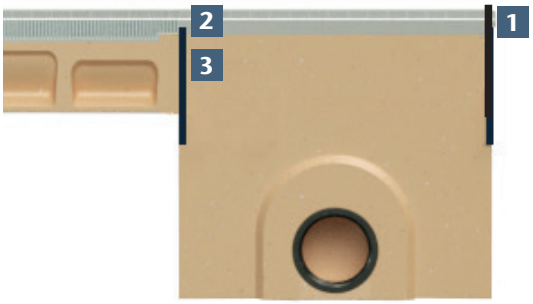
As a manufacturer of drainage channels, we are obligated in accordance with EN 1433, Point 7.17 and Point 11, to provide generally applicable installation regulations. The specifications in this document only represent an extract of our entire documentation.

Sealin TECHNOLOGY

Contents

A Installation of catch basin

Before installing the catch basin
Prepare the relevant accessories as described below and fit it on the catch basin.



Accessories (included in the scope of supply for the catch basin)

1 x catch basin end cap
Art. no. 132384

2 x short-form connection adapters for channel height 0–10
Art. no. 132382

Only included with "longform" version

2 x long-form connection adapters for channel height 20
Art. no. 132383

1 Installing the end cap on the catch basin

Push against the boundary point

If one side of the catch basin is without a connected channel, it has to be closed by using the catch basin end cap (art. no.132384).
It is important to ensure that the attached gasket always faces the catch basin.

Press on

End cap locked into place

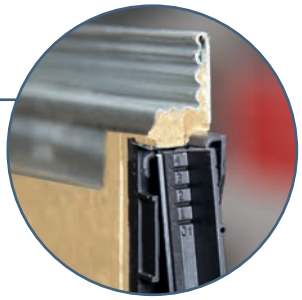
Push end cap as far as possible towards the upper boundary of the attached cut-out template.
When you press these the two parts togehter, you will hear them lock into place.

2 Connecting a channel element, types 0–10, to the catch basin

Shorten using side cutters if necessary

The **short-form** connection adapter (art. no. 132382) is required for connecting the **channel elements, type 0–10**. When connecting **type 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

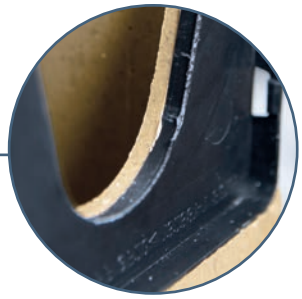
Connection adapter locked into place

When connecting a channel, it is important to ensure that the attached gasket always faces the catch basin, to guarantee a watertight connection.

To install, push the connection adapter legs as far as possible towards the upper boundary of the attachedcut-out template. When you press these parts together, you will hear them lock into place.

3 Connecting a channel element, type 20, to the catch basin

Step 3 only necessary with "long-form" version



Removed completely

The **long-form** connection adapter (art. no. 132383) is required for connecting a **channel element, type 20**. Prior to connection, the attached cut-out template for the catch basin has to be knocked out by hammer from the outside to the inside.

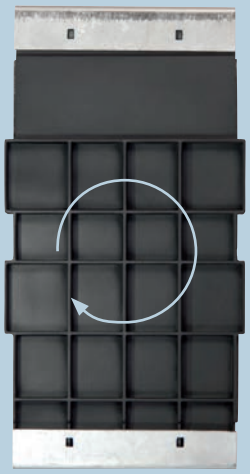
Press on

Connection adapter locked into place

When connecting a channel, it is important to ensure that the attached gasket always faces the catch basin,
To install, push the adapter as far as possible towards the upper boundary of the attached cut-out template.
When you push these parts together, you will hear them lock into place.

B Installation of end caps

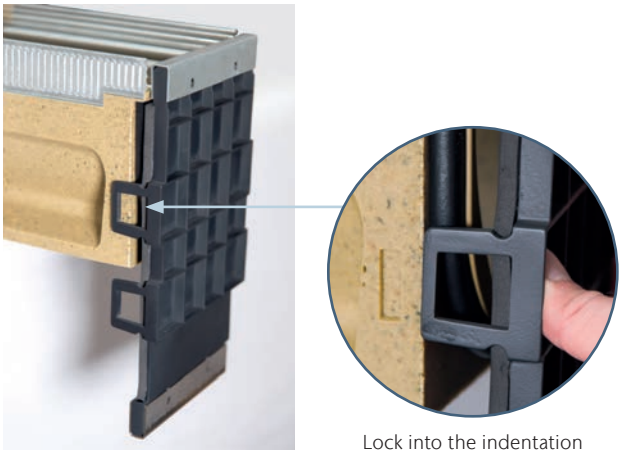
Installtion of universal end cap for male and female end



Female end, this way up

Male end, this way up

Universal end cap
for all building heights
Art. no. 132385

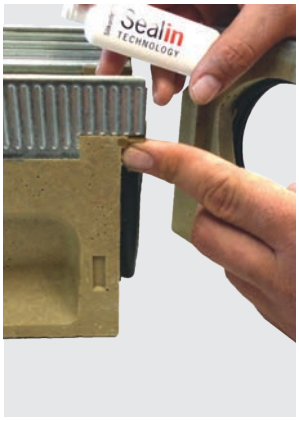


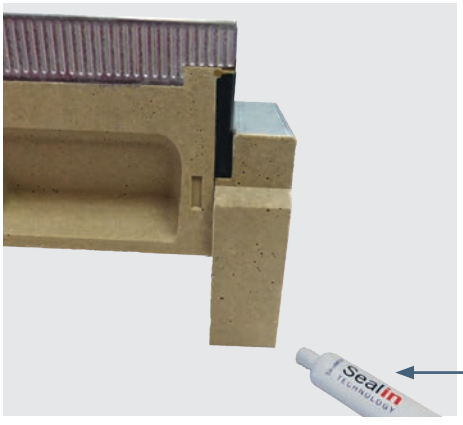
Lock into the indentation

The universal end cap is suitable for the male and female end, all channel heights and every channel type from the ACO DRAIN® Multiline Seal in product range.
On the inlet side, attach the universal closing end cap so that the inscription on the rear is facing up. For the male end (outlet side with integrated seal), the end cap must be rotated 180 degrees. 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.During installation, the locking device always faces the channel and may need to be turned 180 degrees depending on whether you are working at the inlet or outlet side.
If necessary, the universal end cap can be shortened on site.

Assembly of end cap with lip labyrinth seal (LLS)





usual installation from above

Art. no. 132495

The end cap with lip labyrinth seal is suitable for horizontal, water-tight pipe connection for the channel end.
We recommend using our specially adapted silicone grease to install the channel.

C Fabrication of fitting pieces or adapters to change flow direction

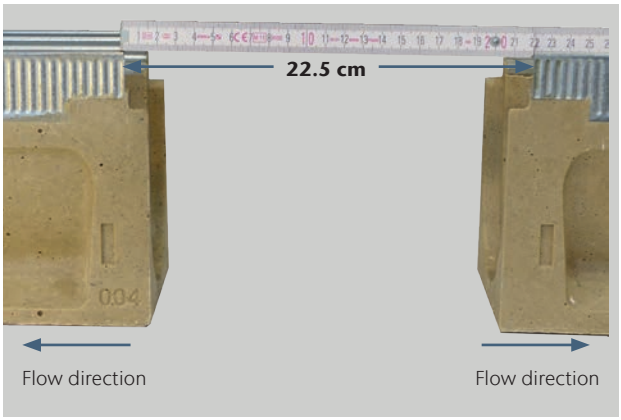
Required tools

- Folding ruler
- Polyester adhesive with hardener (Art. no. 02163)
- Cup wheel for angle grinder
- Diamond cutting disk for angle grinder
- Spatula

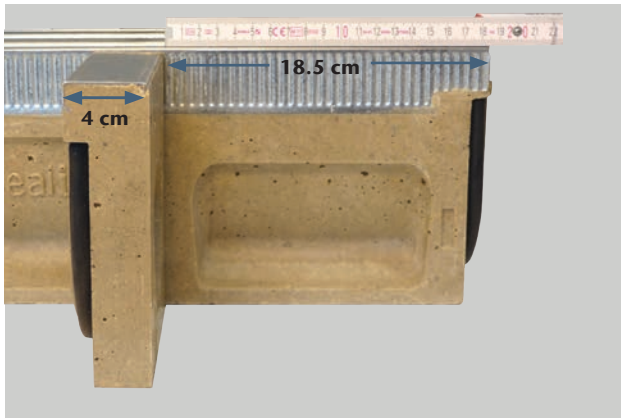
Longitudinal and mitre cuts

Note: To fabricate other longitudinal and mitre cuts, cut the channel elements, grind and glue the adhesive surfaces according to the procedure described below. It must be ensured that the stop and shift protection of the gratings remain functional.

Measuring the dimensions

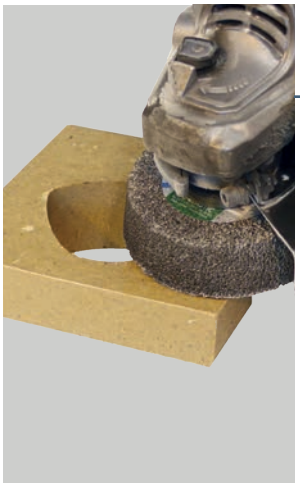


As shown exemplarly in the picture an adapter of 22,5 cm is needed. Following steps describe how to do.



In this example:
22.5 cm - 4 cm = 18.5 cm

Cutting the channel body to length

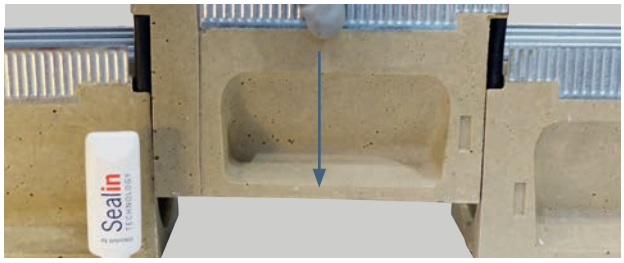


cutting the channel body to size

grinding the adhesive surfaces

Please use a diamond cutting disc to cut the channel body to the measured dimension (in this case 18.5 cm). 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 the polyester adhesive, and 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
- Polyester adhesive with hardener (Art. no. 02163)
- Cup wheel for angle grinder
- Drill with masonry bit
- Hammer and chisel
- Spatula

Knocking out the recess

pre-drilling

knocking out the recess

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

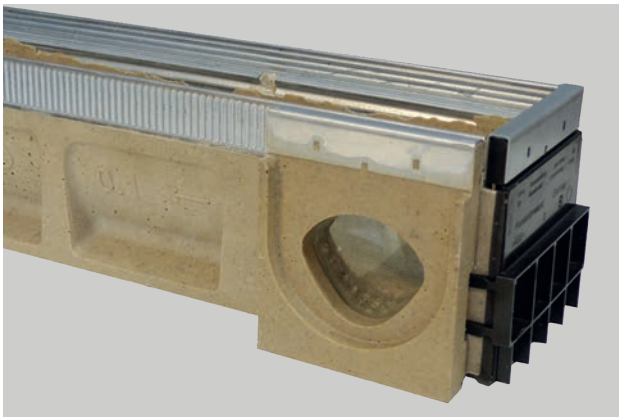
Pre-treating the adhesive surfaces

grinding the adhesive surfaces

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

Gluing the individual components

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

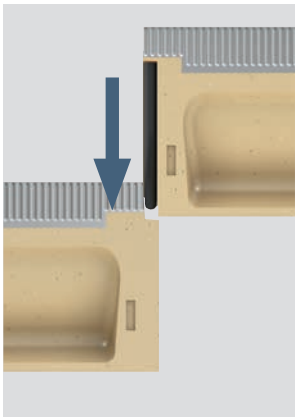


After the polyester adhesive has hardened, the channel elements can be inserted from above as usual.

Note: When creating a corner connection, make sure that the universal end cap is mounted before the components are glued with the polyester adhesive!

E Installation of channel and Installation drawings for plaster, asphalt and concrete

Installing the channel

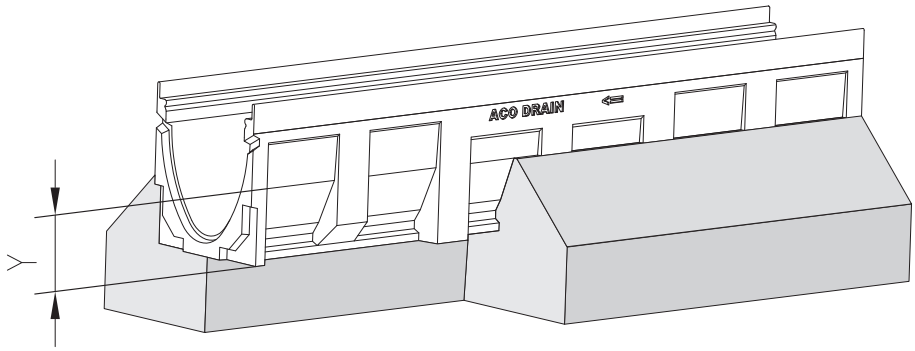


Silicone grease for seal

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

As before, it is fundamentally based on installing the channel without any gaps on a compacted channel foundation (please have a look at detailed installation advices in this guideline), **taking into account the moulded arrow direction on the channel body** and **the sequence of channel types in the case of sloping channels.**
Installation must always begin at the lowest point; i.e. at the transition point where the watercourse begins (e.g. the pipe system or the catch basin).

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



The given measurement “Y” in the appropriate installation detail may be adjusted in accordance to the chosen channel height and paving.

Side pocket and concrete foundation

1	**Bedding of paving**	Sand, gravel or grit bedding, acc. to local regulations
2	**Top edge of side pocket**	Have a look at the schematic illustration. Info: The geometry of the side pockets changes according to the channel system.
3	**Structure according to RStO**	All layers have to be made frost-free and settlement-free acc. to local regulations.
4	**Enlargement of foundation**	Necessary for static and constructive reasons for channels with NW 400 and NW 500.
5	**Grouting mortar**	The filling of joints between the channel and pavement, a building edge or inside concrete trenches has to be done acc. to the ACO Drain installation advice. For this matter we recommend to use a heavy duty and frost-free, shrink-free and de-icing salt resistant mortar.
6	**Expansion joint**	Please have a look at chapter "Joints" on page 19.
7	**Heavy duty load**	For heavy duty loads from class D 400 to class F 900 like container terminals, truck logistic areas and frequently used loading zones should ACO Drain Powerdrain or ACO DRAIN Monoblock be used. In areas with heavy duty loads we recommend to install the channel in one load class higher as assumed, or to get in contact with the technical department to evaluate a special way of installation. Before rail crossing and in streets we generally recommend using ACO DRAIN Monoblock. Please also consider no. 17 if concrete haunches are manufactured up to top edge of channel.
8	**Construction joint**	Follow the instructions regarding cement and concrete works.
9	**Membrane**	Valid for reinforced concrete acc. to static calculation.
10	**Overhang for brick slot frame**	For installation of brick slot frames in paved areas an overhang of the pavement of permanent 5-10mm. If pavement is settled down the frame will jut out. This can cause puddles or ice in winter. Furthermore overdriving then could damage frame and channel as well. With a larger overhang sand can enter the channel from the sides of the joints between the single stones. That can cause settlements closed to the channel and the described problem could occur as well.
11	**Drain concrete**	Consider producers recommendation in respect to planned application and method of installation. Possibly use drain concrete only in area of vertical outlet. An alternative would be to use a drain layer acc. to the producers advice.
12	**Installation in sloped areas**	Channels are always installed levelled to the surrounding surface. For asphalt and paved areas the channel should be installed 5mm deeper than surface level. In concrete installed channels can be installed with a height of +/-0mm.

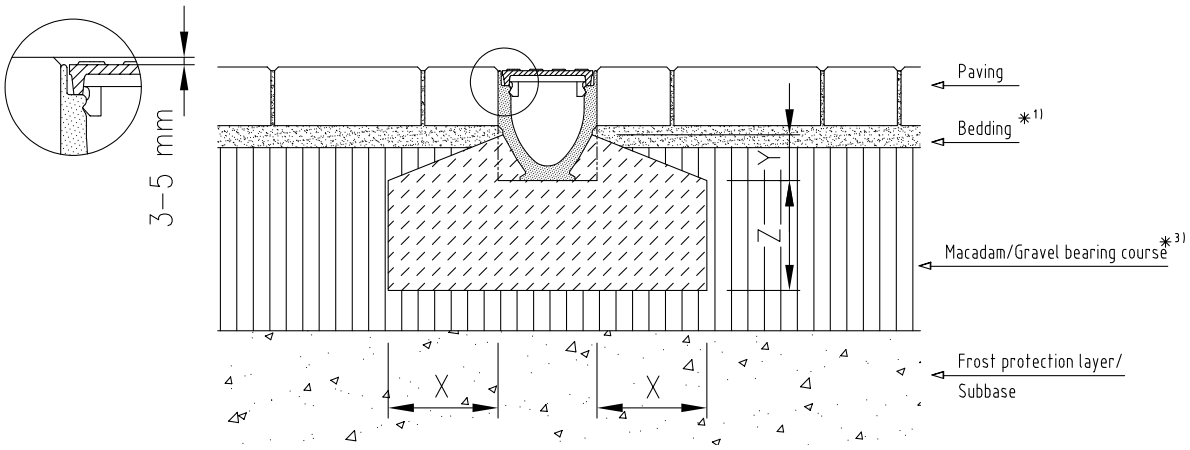
13	**Sealing under channel body**	In parking decks or roofs installed channels should always be installed over the water-tight membrane. A direct connection of channel and membrane is not possible. For this matter the "second" draining surface can be drained down by a vertical outlet with clamping flange. Please also have a look at the installation detail "Second level drainage" and point 11.
14	**Concrete trench**	For an installation in an existing concrete slab a smaller foundation and smaller haunches are possible. Measurements of the trench are dependent on the mortar producers' advice (In general ≥ 12mm.) or the needed working space. Based on the tolerances on site, handling on site and installations in the surrounding of the connection to the sewage system our statement is only a reference value.
15	**Installation in mastic asphalt**	For installation in mastic asphalt it is recommended to build the joint between channel and asphalt surface as a two phased joint. Up to -1,5cm the joint can be filled with grouting mortar (cement based or modified mortar) before covering the mortar with a bituminous filling mass up to the top of the channel. It is not advisable to put the mastic asphalt directly to the channel.
16	**Concrete quality**	X0 is only valid for concrete without reinforcement installed completely below surface. Frequently frost-melting periods are not expected for this way of installation. Requirements for the concrete quality in respect to environmentally influences have to be set by the planner. For more information please have a look at the table for other exposure classes.
17	**Reinforcement**	Concrete haunches up to the top of the channel have to be separated every 1-2m or they have to be reinforced. Exception: Reinforcement is recommended because of static analysis. Then the static analysis is determinative for the choice and installation of reinforcement.
18	**Bearing course and top layer**	The description of bearing course and top layer is just an example. The needed and accurate measurements of all layers have to be given by the planner. All description according to the channel foundation and haunches are not influenced by that. In case of doubts or for special applications please get in contact with the technical department at ACO.
19	**Special application**	For street crossing channels on highways, freeways and in front of rail road crossings the use of a reinforced foundation up to the top of the channel is recommended.
20	**Bearing of concrete plates**	In accordance of the hydraulically needed channel height should a direct laying of the concrete slab on the channel foundation be avoided. Alternative a separate foundation of the channel can be made. The joint between channel sheathing and concrete slab has to be made as an expansion joint.

Exposure classes

Designation	Description
X0	No risk of corrosion or attack
XC	Corrosion induced by carbonation
XD	Corrosion induced by chlorides other than from seawater
XS	Corrosion induced by chlorides from seawater
XF	Freeze/thaw attack with or without de-icing agents
XA	Chemical attack

ACO DRAIN® Multiline Seal in

Installation in paved areas, load class A 15 to C 250

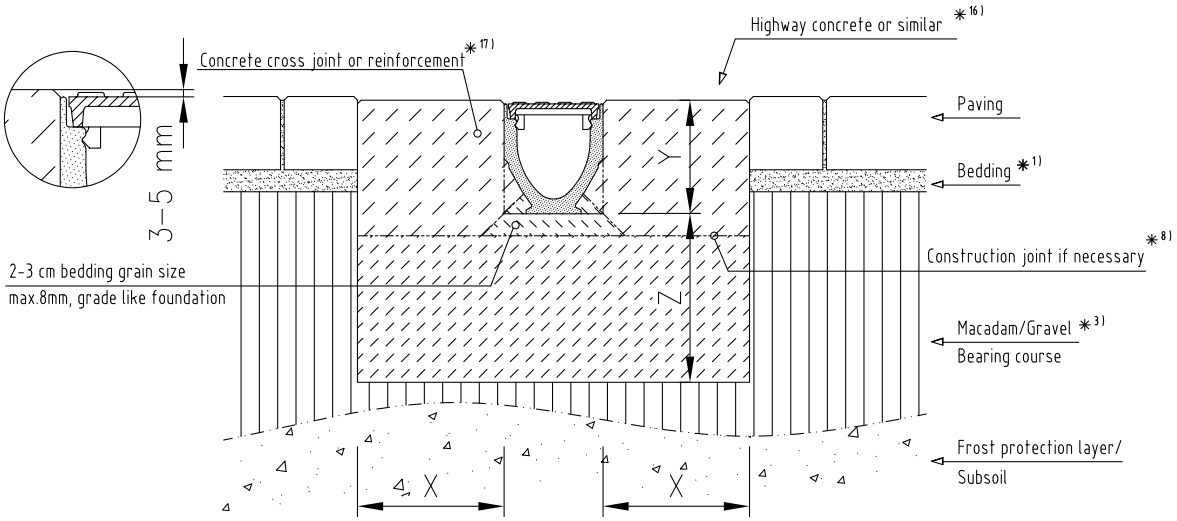


Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. quality for bedding concrete	(ref. EN 206-1)	≥ C 12/15	≥ C 12/15	≥ C 12/15	This way of installation is NOT recommended for applications with load class higher than C 250.		Not available for this load class. Please use appropriate channel systems like Power-Drain, SK, Qmax or Monoblock
Exposure class *16)		(X0)	(X0)	(X0)			
Bedding dimensions	X	≥ 10	≥ 10	≥ 15			
	Y	Half height of channel					
	Z	≥ 10	≥ 10	≥ 15			

*...) please see list of footnotes at beginning of chapter drawings

Installation in paved areas, load class D 400

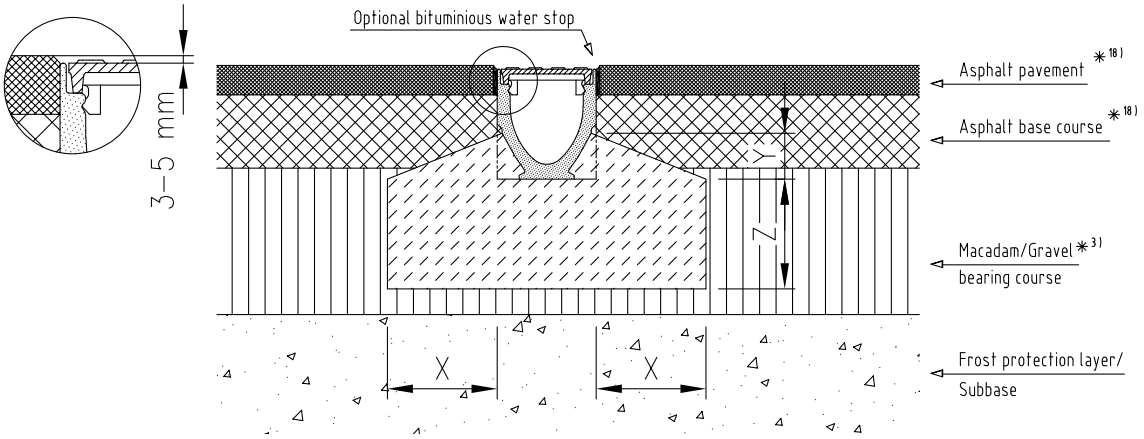


Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. quality for bedding concrete	(ref. EN 206-1)				≥ C 25/30	Project specific design may be required.	Not available for this load class. Please use appropriate channel systems like PowerDrain, SK, Qmax or Monoblock
Exposure class *16)					(X0)		
Bedding dimensions	X				≥ 20 (25)*4)		
	Y				Height of channel		
	Z				≥ 20 (25)*4)		

*...) please see list of footnotes at beginning of chapter drawings

Installation in asphalt areas, load class A 15 to C 250



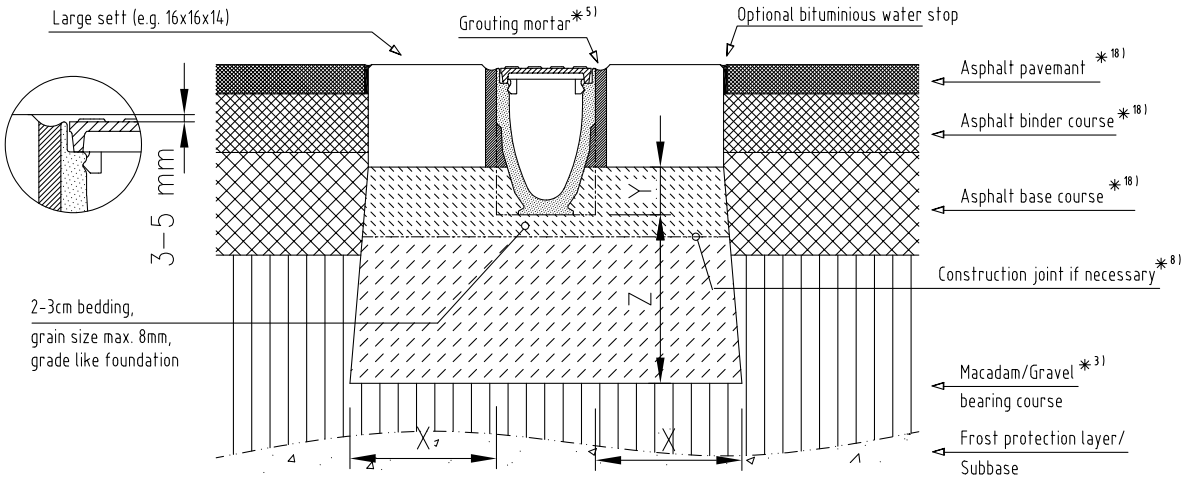
Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. quality for bedding concrete	(ref. EN 206-1)	≥ C 12/15	≥ C 12/15	≥ C 12/15	This way of installation is NOT recommended for applications with load class higher than C 250.		Not available for this load class. Please use appropriate channel systems like Power-Drain, SK, Qmax or Monoblock
Exposure class *16)		(X0)	(X0)	(X0)			
Bedding dimensions	X	≥ 10	≥ 10	≥ 15			
	Y	Half height of channel					
	Z	≥ 10	≥ 10	≥ 15			

*...) please see list of footnotes at beginning of chapter drawings

Installation in asphalt areas, load class D 400

For heavy duty load please see footnote *7)

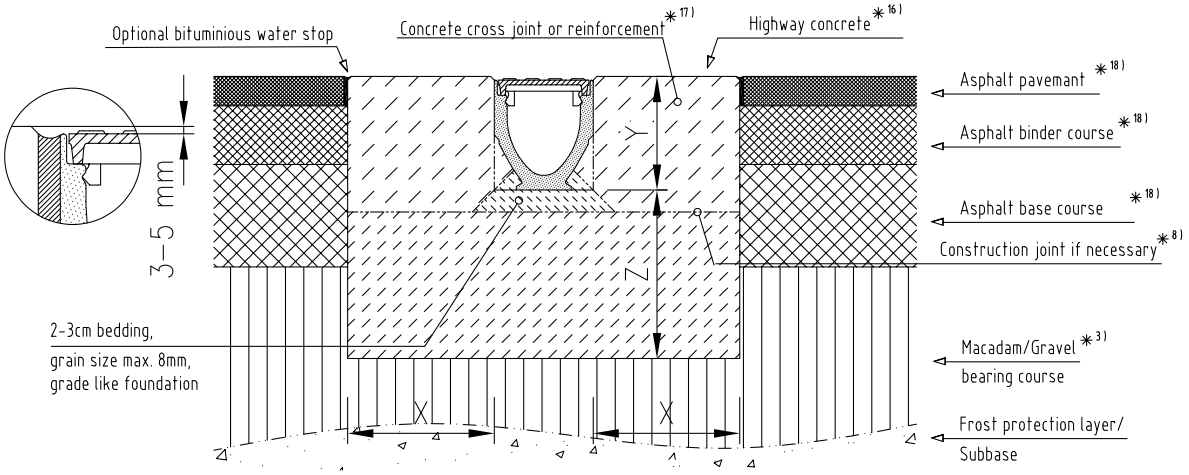


Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. quality for bedding concrete	(ref. EN 206-1)				≥ C 25/30	Project specific design may be required	Not available for this load class. Please use appropriate channel systems like Power-Drain, SK, Qmax or Monoblock
Exposure class *16)					(X0)		
Bedding dimensions	X				≥ 20 (25)*4)		
	Y				Bottom of stretcher		
	Z				≥ 20 (25)*4)		

*...) please see list of footnotes at beginning of chapter drawings

Installation in concrete areas, load class D 400

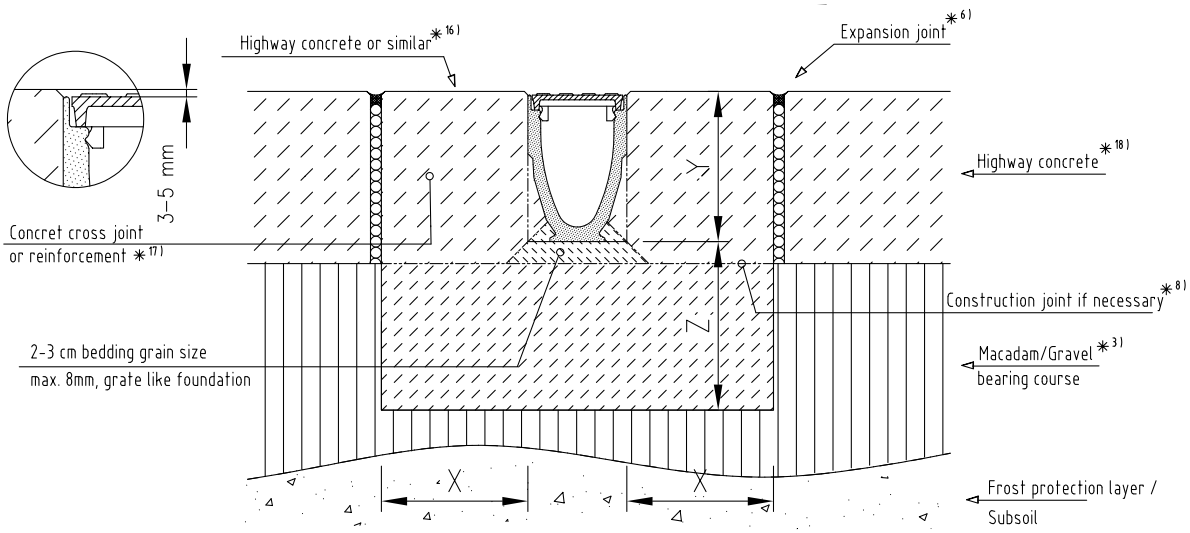


Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	**A 15**	**B 125**	**C 250**	**D 400**	**E 600**	**F 900**
Min. quality for bedding concrete	(ref. EN 206-1)				≥ C 25/30	Project specific design may be required.	Not available for this load class. Please use appropriate channel systems like Power-Drain, SK, Qmax or Monoblock
Exposure class *16)					(X0)		
Bedding dimensions	**X**				≥ 20 (25)*4)		
	Y				Height of channel		
	Z				≥ 20 (25)*4)		

*...) please see list of footnotes at beginning of chapter drawings

Installation in paved areas, load class A 15 to D 400

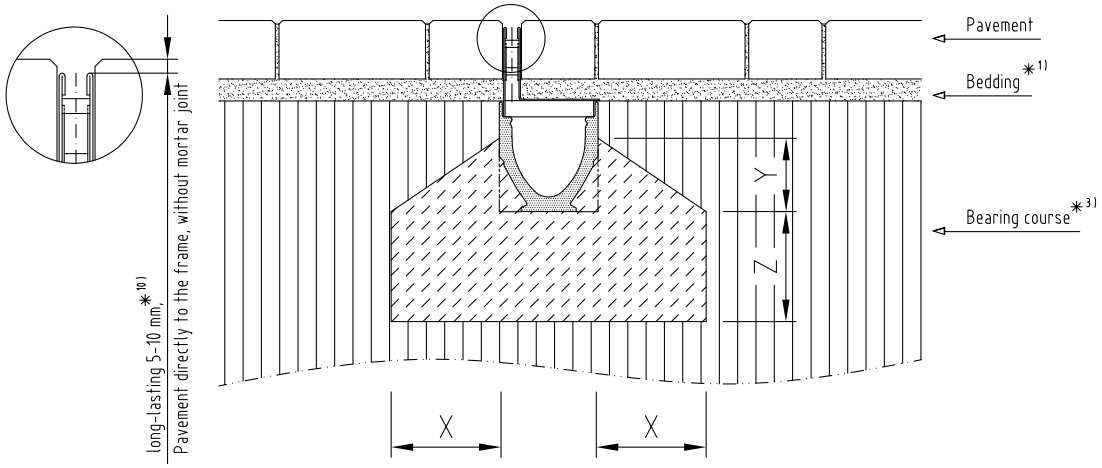


Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	**A 15**	**B 125**	**C 250**	**D 400**	**E 600**	**F 900**
Min. quality for bedding concrete	(ref. EN 206-1)	≥ C 12/15	≥ C 12/15	≥ C 12/15	≥ C 25/30	Project specific design may be required.	Not available for this load class. Please use appropriate channel systems like Power-Drain, SK, Qmax or Monoblock
Exposure class *16)		(X0)	(X0)	(X0)	(X0)		
Bedding dimensions	**X**	≥ 10	≥ 15	≥ 15	≥ 20 (25)*4)		
	Y	Height of channel					
	Z	≥ 10	≥ 10	≥ 15	≥ 20 (25)*4)		

*...) please see list of footnotes at beginning of chapter drawings

Installation of Brickslot frame in paved areas, load class A 15 to C 250

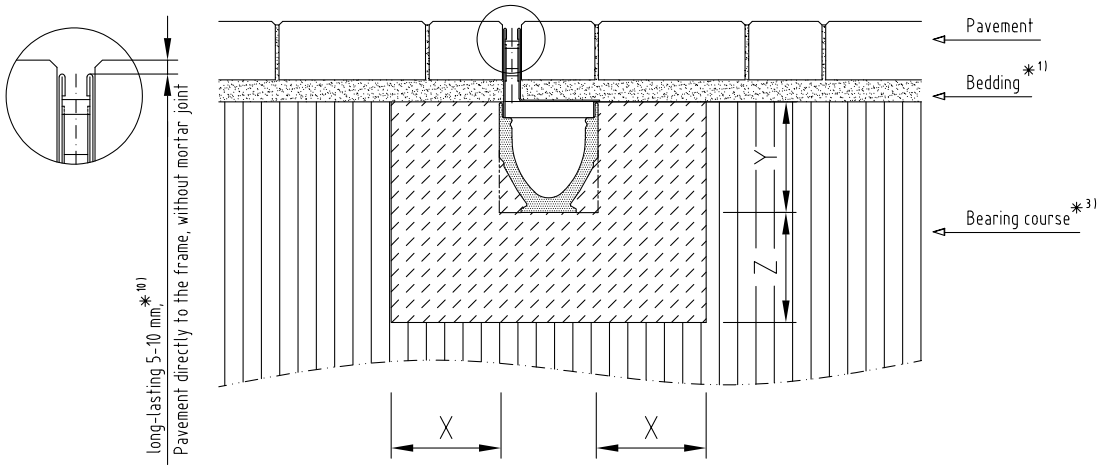


Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. quality for bedding concrete	(ref. EN 206-1)	≥ C 12/15	≥ C 12/15	≥ C 12/15	This way of installation is NOT recommended for applications with load ckasses higher than C 250.		
Exposure class *16)		(X0)	(X0)	(X0)			
Bedding dimensions	X	≥ 10	≥ 10	≥ 15			
	Y	Half height of channel					
	Z	≥ 10	≥ 10	≥ 15			

*...) please see list of footnotes at beginning of chapter drawings

Installation of Brickslot frame in paved areas, load class D 400



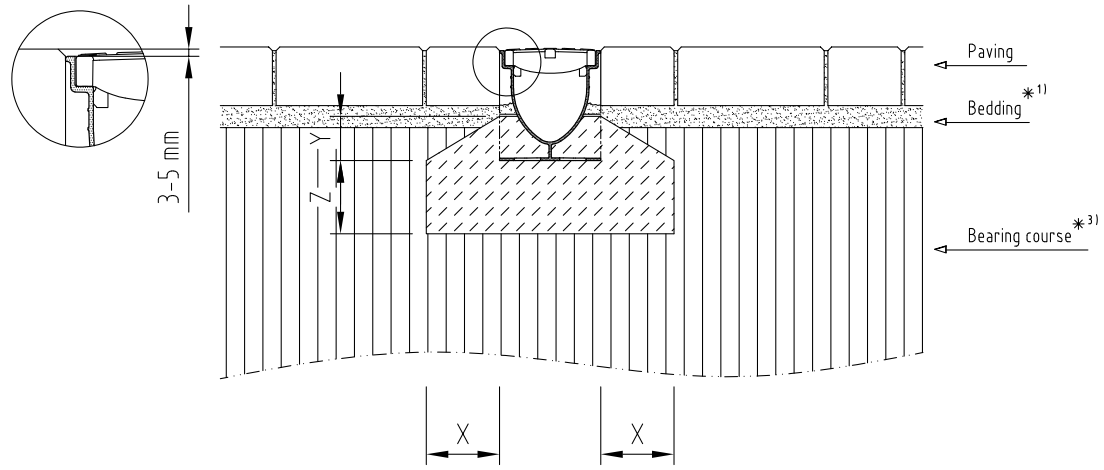
Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. quality for bedding concrete	(ref. EN 206-1)				≥ C 25/30	This way of installation is NOT recommended for applications with load ckasses higher than D 400.	
Exposure class *16)					(X0)		
Bedding dimensions	X				≥ 20		
	Y				Height of channel		
	Z				≥ 20		

*...) please see list of footnotes at beginning of chapter drawings

ACO DRAIN® XtraDrain

Installation in paved areas, load class A 15

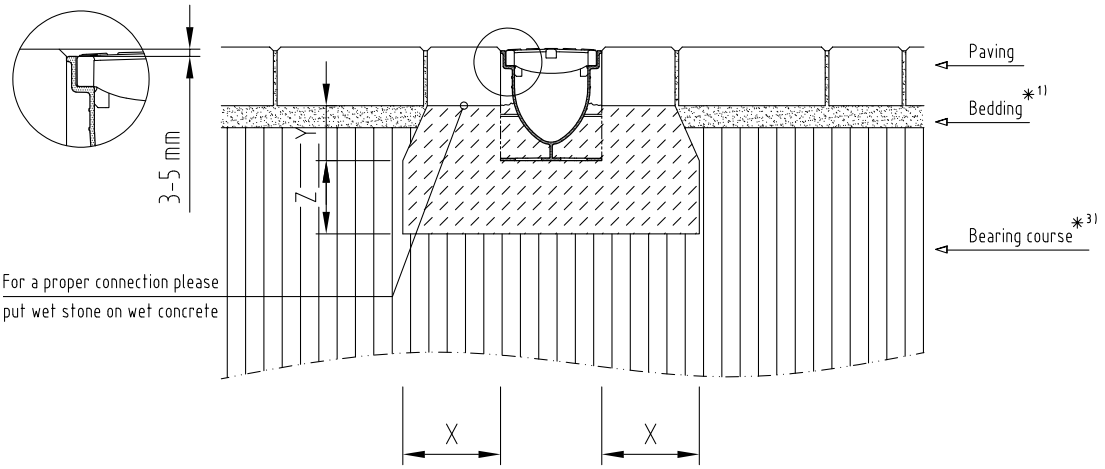


Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. quality for bedding concrete	(ref. EN 206-1)	≥ C 12/15	This way of installation is NOT recommended for applications with load ckasses higher than A 15.			Not available for this load class. Please use appropriate channel systems like PowerDrain, SK, Qmax or Monoblock	
Exposure class *16)		(X0)					
Bedding dimensions	X	≥ 10					
	Y	6					
	Z	≥ 10					

*...) please see list of footnotes at beginning of chapter drawings

Installation in paved areas, load class B 125

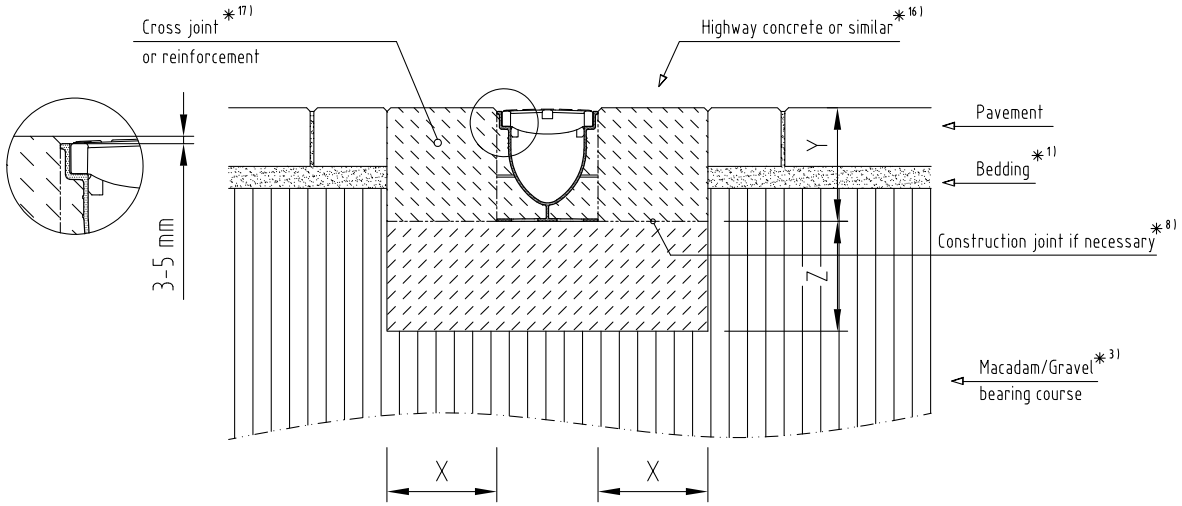


Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. quality for bedding concrete	(ref. EN 206-1)		≥ C 12/15	This way of installation is NOT recommended for applications with load ckasses higher than B 125.		Not available for this load class. Please use appropriate channel systems like PowerDrain, SK, Qmax or Monoblock	
Exposure class *16)			(X0)				
Bedding dimensions	X		≥ 10				
	Y		Bottom of stretcher				
	Z		≥ 10				

*...) please see list of footnotes at beginning of chapter drawings

Installation in paved areas, load class C 250

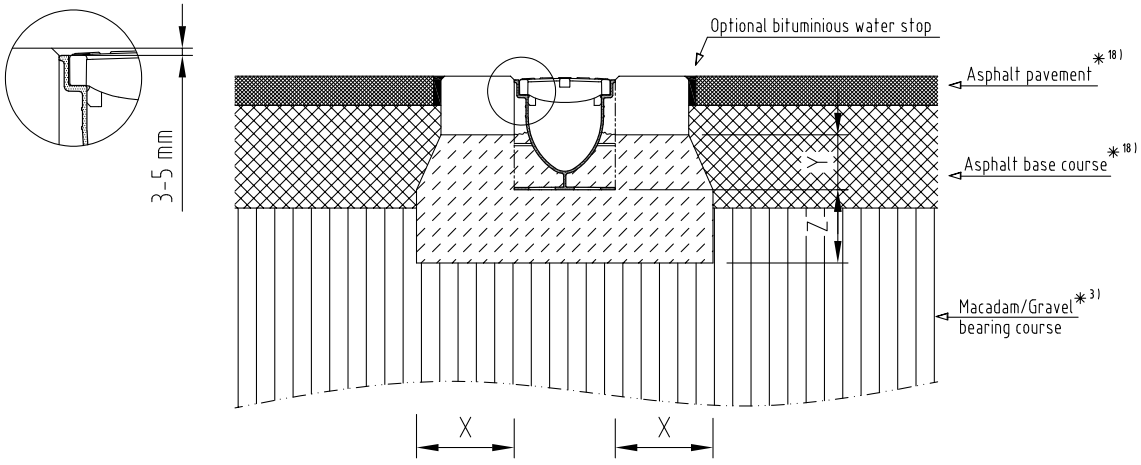


Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. quality for bedding concrete	(ref. EN 206-1)			≥ C 20/25	Project specific design may be required.	Not available for this load class. Please use appropriate channel systems like PowerDrain, SK, Qmax or Monoblock	
Exposure class *16)				(X0)			
Bedding dimensions	X			≥ 15			
	Y			Height of channel			
	Z			≥ 15			

*...) please see list of footnotes at beginning of chapter drawings

Installation in asphalt areas, load class A 15 to B 125

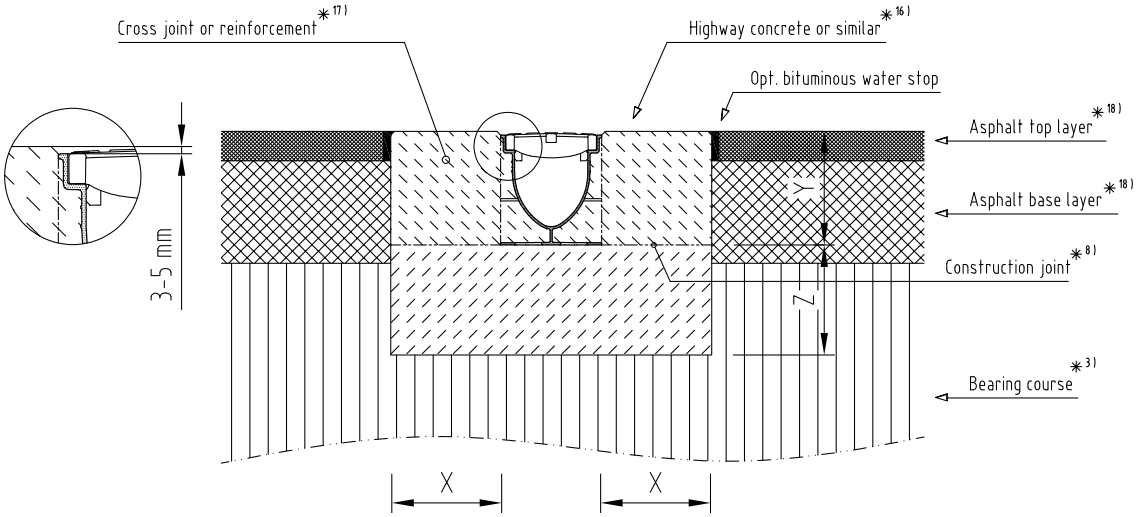


Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. quality for bedding concrete	(ref. EN 206-1)	≥ C 12/15	≥ C 12/15	This way of installation is NOT recommended for applications with load ckasses higher than B 125.		Not available for this load class. Please use appropriate channel systems like PowerDrain, SK, Qmax or Monoblock	
Exposure class *16)		(X0)	(X0)				
Bedding dimensions	X	≥ 10	≥ 10				
	Y	Bottom of stretcher					
	Z	≥ 10	≥ 10				

*...) please see list of footnotes at beginning of chapter drawings

Installation in asphalt areas, load class C 250

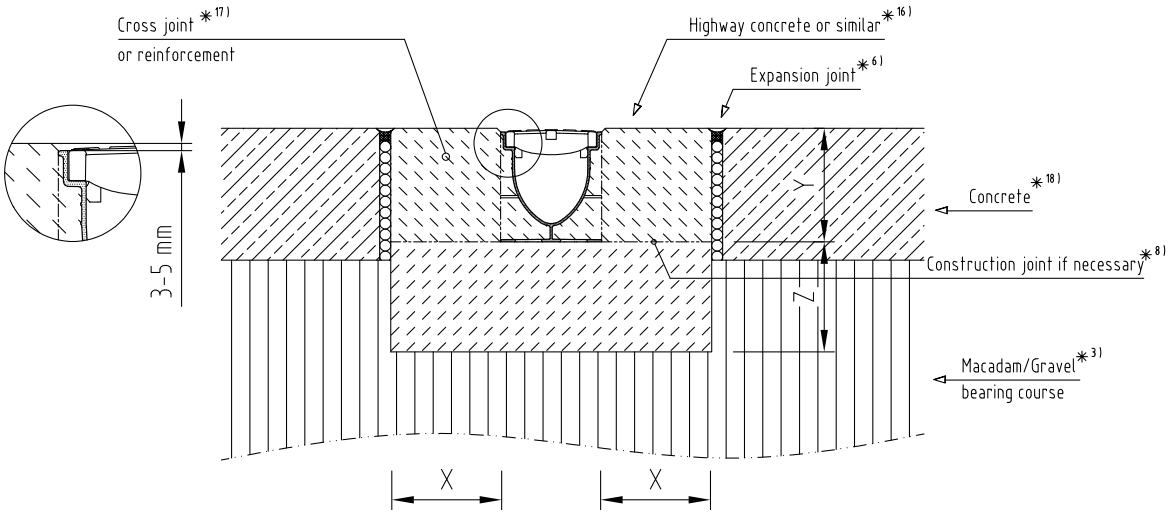


Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. quality for bedding concrete	(ref. EN 206-1)			≥ C 20/25	Project specific design may be required.	Not available for this load class. Please use appropriate channel systems like PowerDrain, SK, Qmax or Monoblock	
Exposure class *16)				(X0)			
Bedding dimensions	X			≥ 15			
	Y			Height of channel			
	Z			≥ 15			

*...) please see list of footnotes at beginning of chapter drawings

Installation in concrete areas, load class C 250

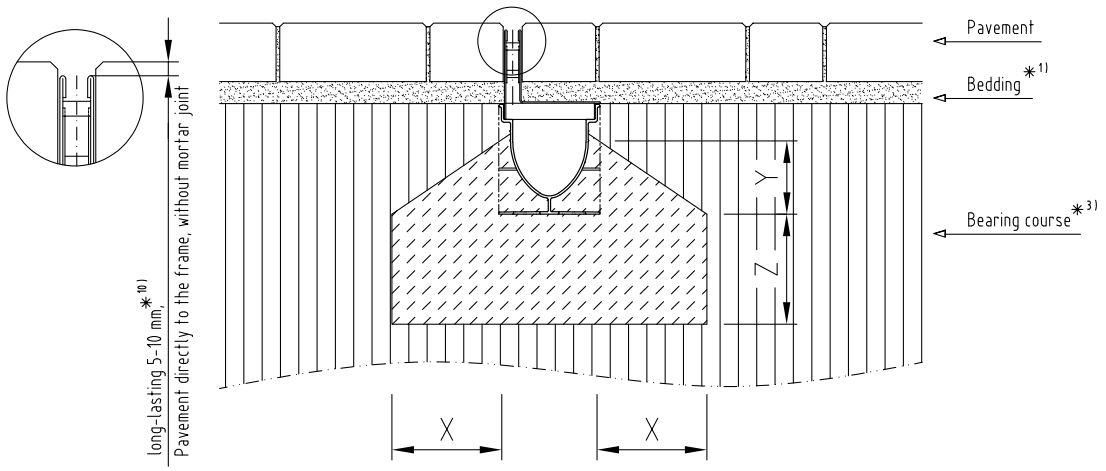


Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. quality for bedding concrete	(ref. EN 206-1)			≥ C 20/25	Project specific design may be required.	Not available for this load class. Please use appropriate channel systems like PowerDrain, SK, Qmax or Monoblock	
Exposure class *16)				(X0)			
Bedding dimensions	X			≥ 15			
	Y			Height of channel			
	Z			≥ 15			

*...) please see list of footnotes at beginning of chapter drawings

Installation of Brickslot frame in paved areas, load class A 15 to C 250



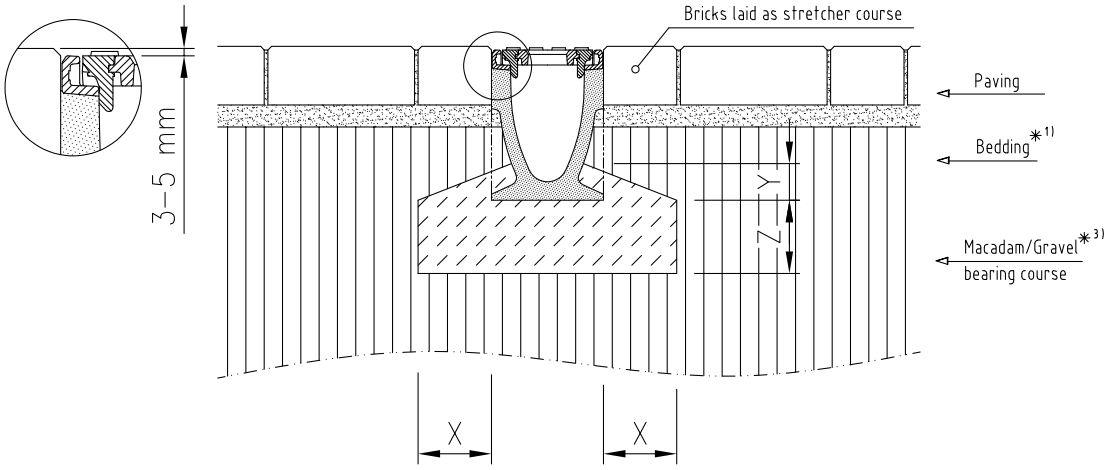
Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	**A 15**	**B 125**	**C 250**	**D 400**	**E 600**	**F 900**
Min. quality for bedding concrete	(ref. EN 206-1)	≥ C 12/15	≥ C 12/15	≥ C 20/25	Project specific design may be required.	Not available for this load class. Please use appropriate channel systems like PowerDrain, SK, Qmax or Monoblock	
Exposure class *16)		(X0)	(X0)	(X0)			
Bedding dimensions	**X**	≥ 10	≥ 10	≥ 15			
	Y	≥ 10	≥ 10	≥ 15			
	Z	≥ 10	≥ 10	≥ 15			

*...) please see list of footnotes at beginning of chapter drawings

ACO DRAIN® PowerDrain Seal in/ PowerDrain Performance

Installation in paved areas, load class A 15 to C 250

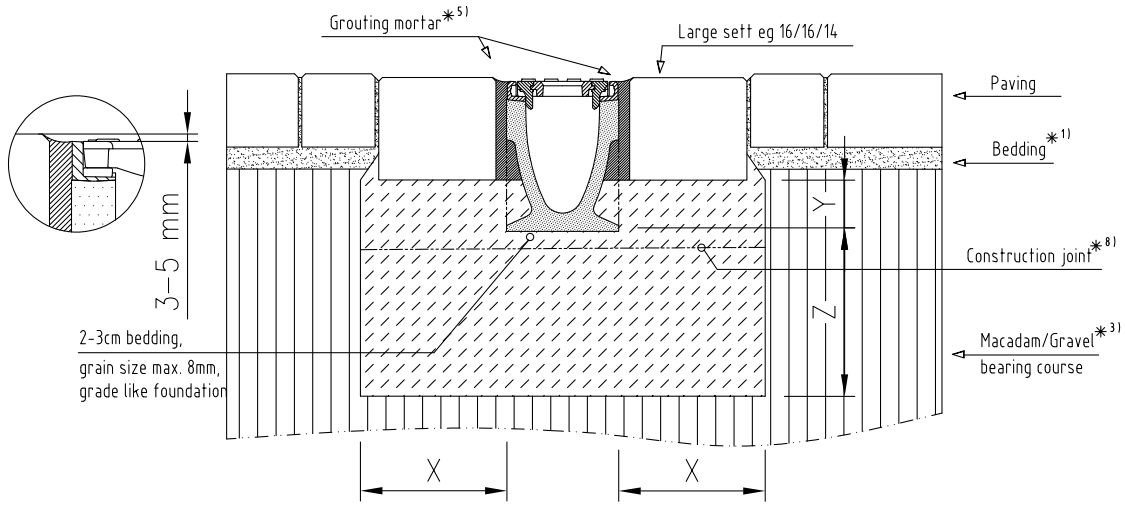


Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. quality for bedding concrete	(ref. EN 206-1)	≥ C 12/15	≥ C 12/15	≥ C 12/15	This way of installation is NOT recommended for applications with load ckasses higher than C 250.		
Exposure class *16)		(X0)	(X0)	(X0)			
Bedding dimensions	X	≥ 10	≥ 10	≥ 15			
	Y	≥ 5	≥ 5	≥ 5			
	Z	≥ 10	≥ 10	≥ 15			

*...) please see list of footnotes at beginning of chapter drawings

Installation in paved areas, load class D 400 to E 600

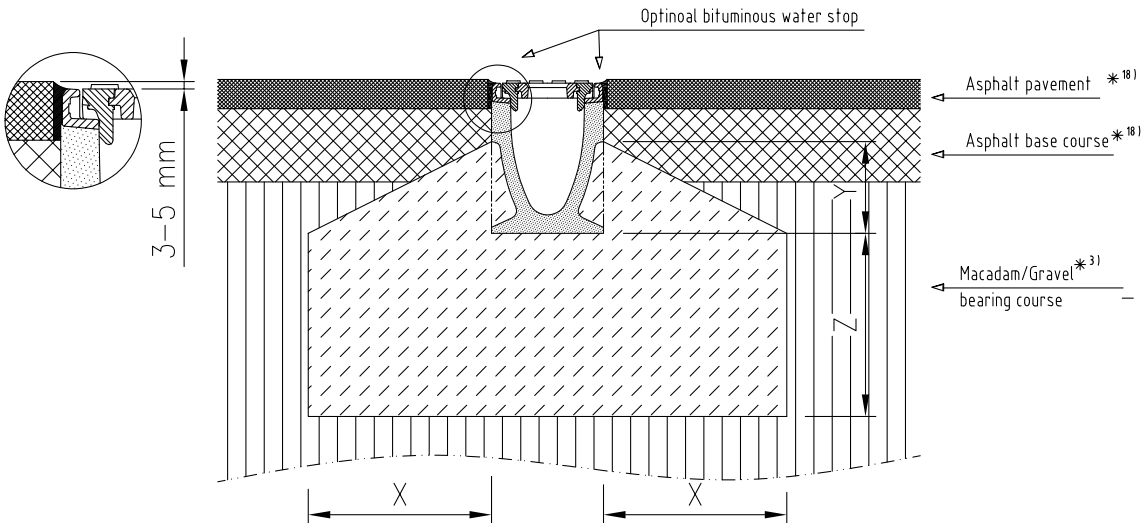


Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. quality for bedding concrete	(ref. EN 206-1)				≥ C 25/30	≥ C 25/30	Project specific design may be required.
Exposure class *16)					(X0)	(X0)	
Bedding dimensions	X				≥ 20	≥ 20	
	Y				Bottom of stretcher		
	Z				≥ 20	≥ 20	

*...) please see list of footnotes at beginning of chapter drawings

Installation in asphalt areas, load class A 15 to D 400

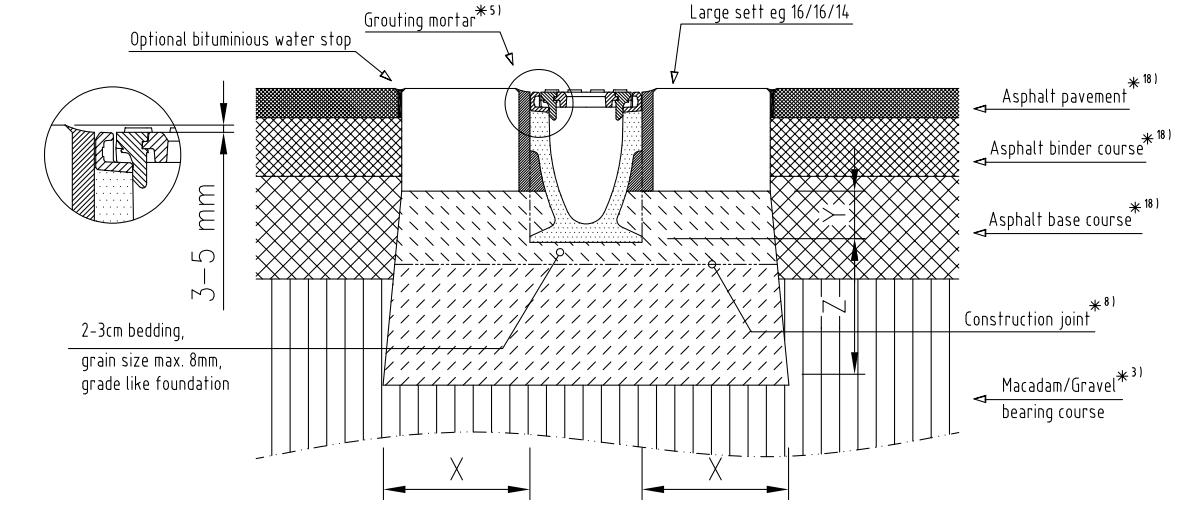


Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. quality for bedding concrete	(ref. EN 206-1)	≥ C 12/15	≥ C 12/15	≥ C 12/15	≥ C 25/30	This way of installation is NOT recommended for applications with load ckasses higher than D 400.	
Exposure class *16)		(X0)	(X0)	(X0)	(X0)		
Bedding dimensions	X	≥ 10	≥ 15	≥ 15	≥ 20		
	Y	Half height of channel			Top edge of side pocket*2)		
	Z	≥ 10	≥ 10	≥ 15	≥ 20		

*...) please see list of footnotes at beginning of chapter drawings

Installation in asphalt areas, load class D 400 to E 600

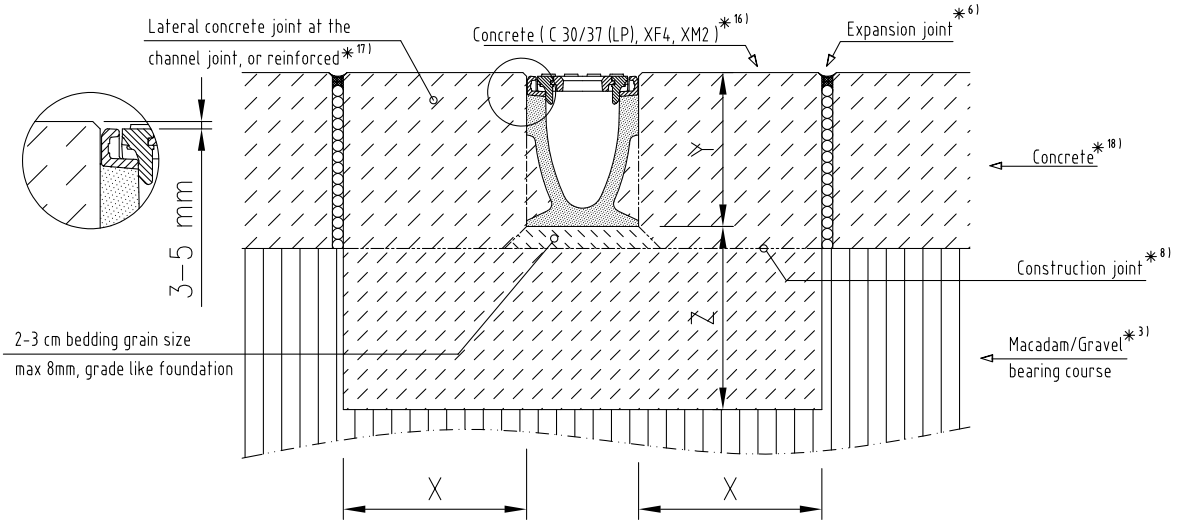


Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. quality for bedding concrete	(ref. EN 206-1)				≥ C 25/30	≥ C 25/30	Project specific design may be required.
Exposure class *16)					(X0)	(X0)	
Bedding dimensions	X				≥ 20	≥ 20	
	Y				Bottom of stretcher		
	Z				≥ 20	≥ 20	

*...) please see list of footnotes at beginning of chapter drawings

Installation in concrete areas, load class A 15 to E 600

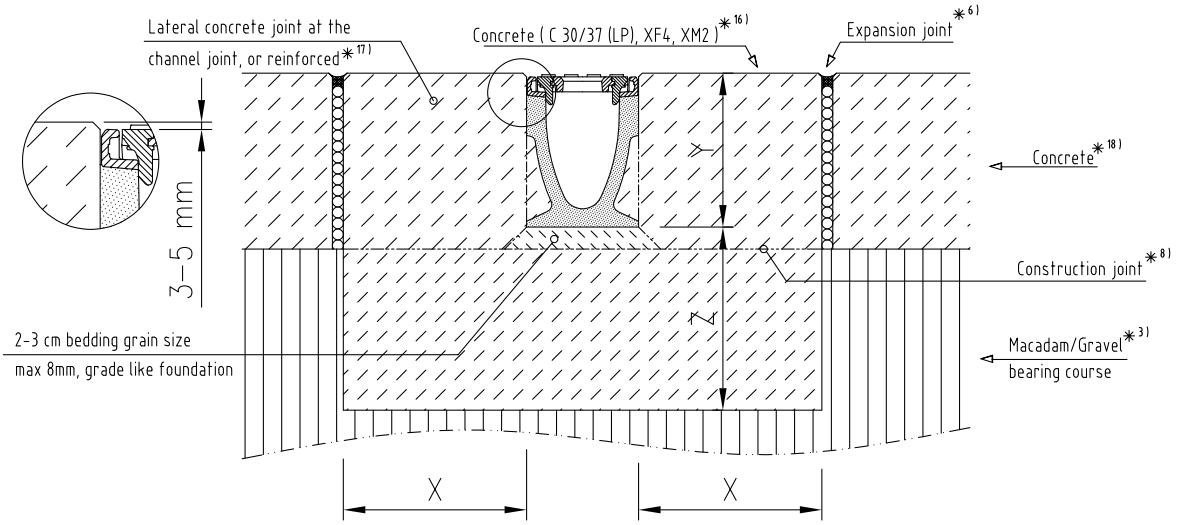


Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	**A 15**	**B 125**	**C 250**	**D 400**	**E 600**	**F 900**
Min. quality for bedding concrete	(ref. EN 206-1)	≥ C 12/15	≥ C 12/15	≥ C 20/25	≥ C 25/30	≥ C 30/37	Not available for this load class. Please use appropriate channel systems like PowerDrain, SK, Qmax or Monoblock
Exposure class *16)		(X0)	(X0)	(X0)	(X0)	(X0)	
Bedding dimensions	**X**	≥ 15	≥ 15	≥ 15	≥ 20	≥ 20	
	Y	Height of channel					
	Z	≥ 10	≥ 10	≥ 10	≥ 20	≥ 20	

*...) please see list of footnotes at beginning of chapter drawings

Installation in concrete areas, load class F 900



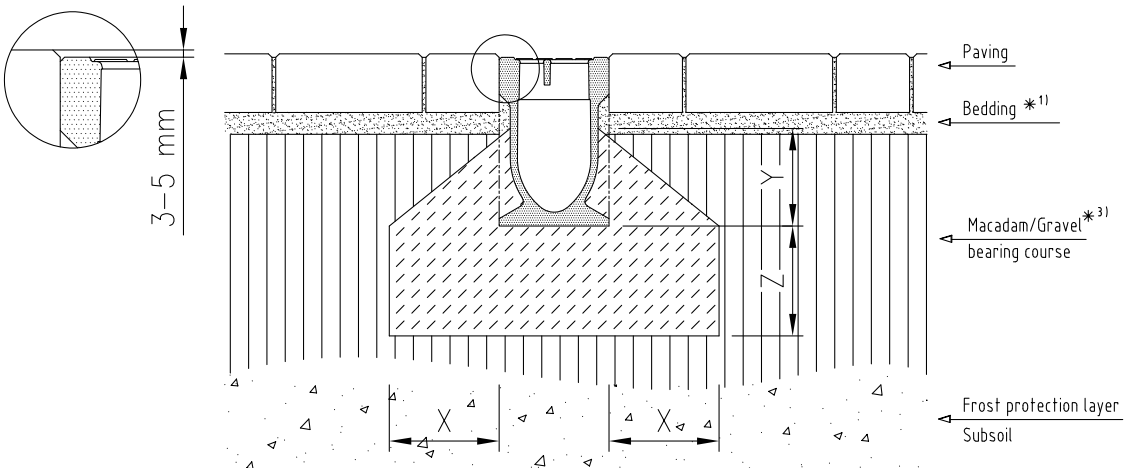
Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	**A 15**	**B 125**	**C 250**	**D 400**	**E 600**	**F 900**
Min. quality for bedding concrete	(ref. EN 206-1)						≥ C 30/37
Exposure class *16)							(X0)
Bedding dimensions	**X**						≥ 25
	Y						Height of channel
	Z						≥ 25

*...) please see list of footnotes at beginning of chapter drawings

ACO DRAIN® Monoblock PD

Installation in paved areas, load class A 15 to C 250

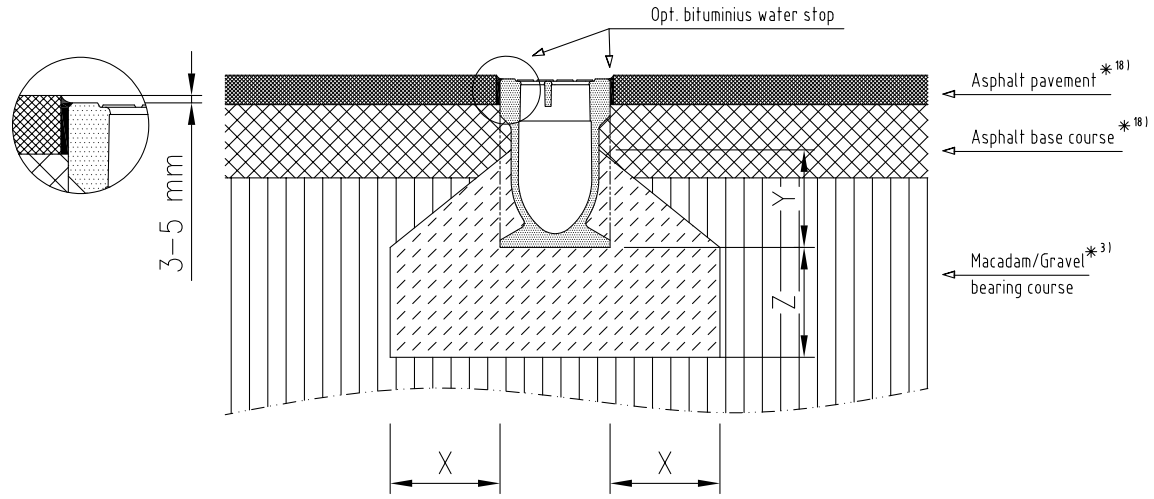


Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. quality for bedding concrete	(ref. EN 206-1)	≥ C 12/15	≥ C 12/15	≥ C 20/25	Project specific design may be required.	Not available for this load class. Please use appropriate channel systems like PowerDrain, SK, Qmax or Monoblock	
Exposure class *16)		(X0)	(X0)	(X0)			
Bedding dimensions	X	≥ 10	≥ 10	≥ 15			
	Y	≥ 10	≥ 10	≥ 10			
	Z	≥ 10	≥ 10	≥ 15			

*...) please see list of footnotes at beginning of chapter drawings

Installation in asphalt areas, load class A 15 to C 250



Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

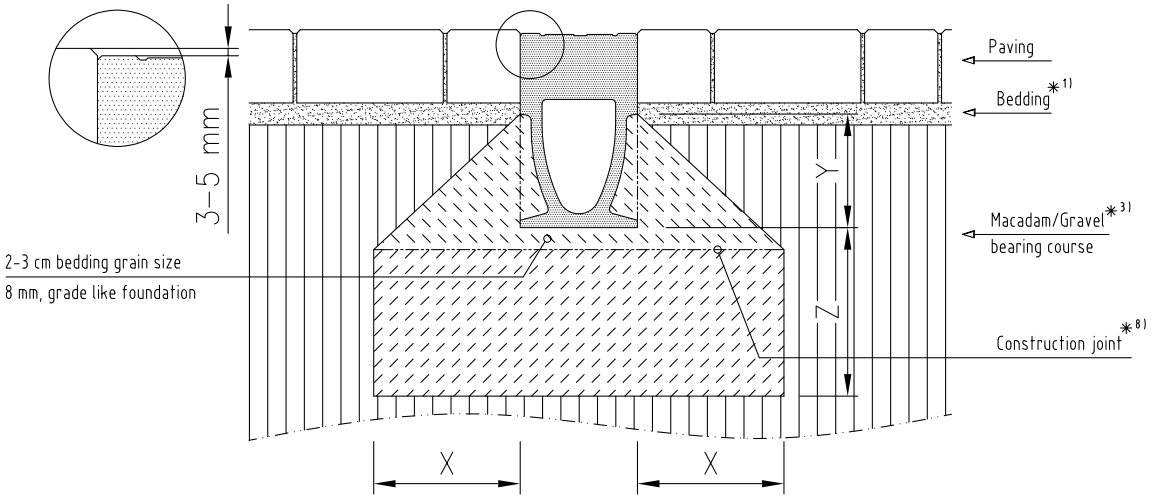
Load class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. quality for bedding concrete	(ref. EN 206-1)	≥ C 12/15	≥ C 12/15	≥ C 20/25	Project specific design may be required.	Not available for this load class. Please use appropriate channel systems like PowerDrain, SK, Qmax or Monoblock	
Exposure class *16)		(X0)	(X0)	(X0)			
Bedding dimensions	X	≥ 10	≥ 10	≥ 15			
	Y	≥ 10	≥ 10	≥ 10			
	Z	≥ 10	≥ 10	≥ 15			

*...) please see list of footnotes at beginning of chapter drawings

ACO DRAIN® Monoblock RD

Installation in paved areas, load class D 400

For heavy duty load please see footnote *7)



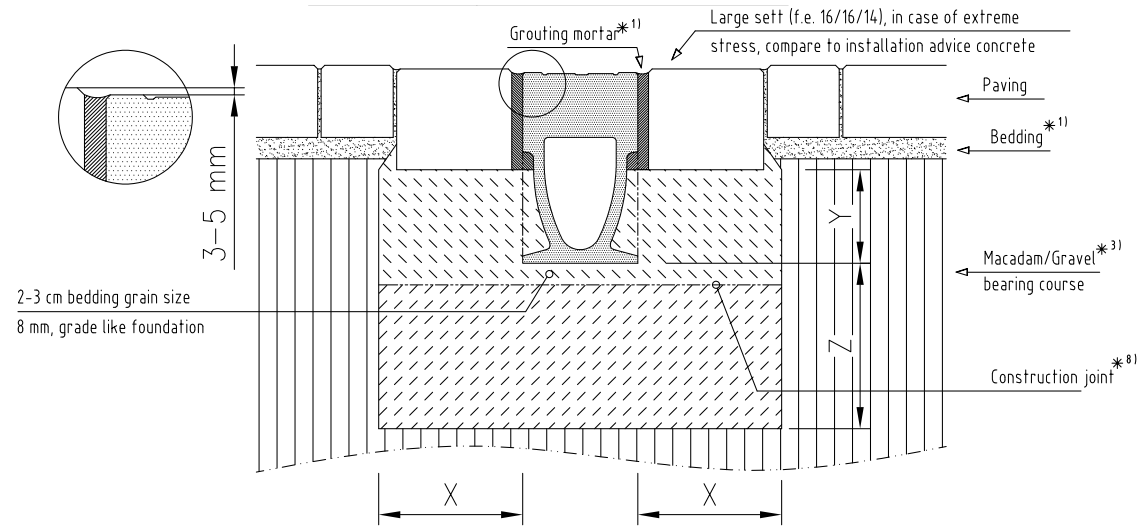
Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. quality for bedding concrete	(ref. EN 206-1)				≥ C 25/30	Not available for this load class. Please use appropriate channel systems like PowerDrain, SK, Qmax or Monoblock	
Exposure class *16)					(X0)		
Bedding dimensions	X				≥ 20		
	Y				Top edge of side pocket*2)		
	Z				≥ 20		

*...) please see list of footnotes at beginning of chapter drawings

Installation in paved areas, load class E 600

For heavy duty load please see footnote *7)



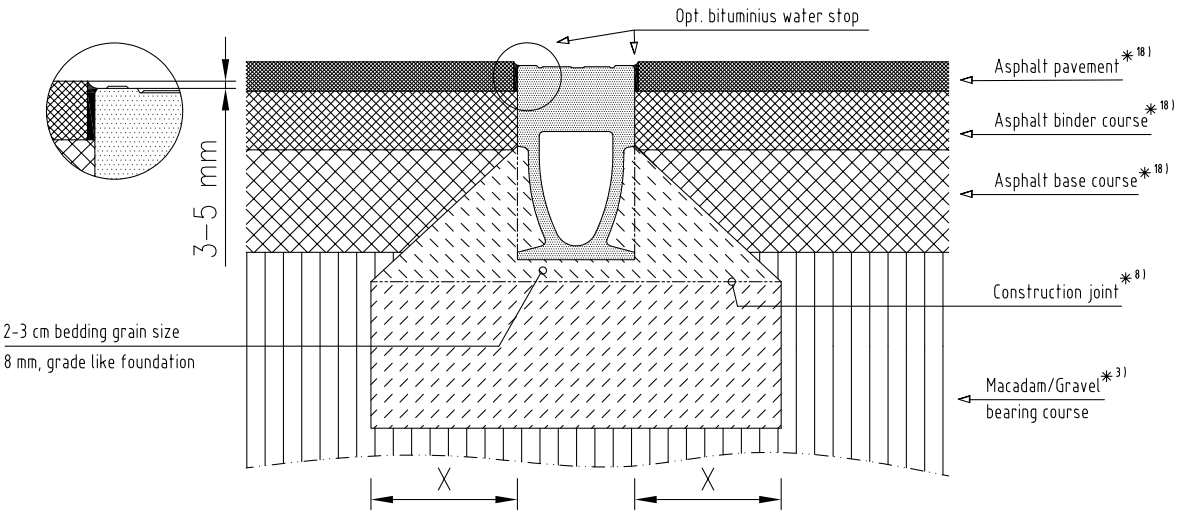
Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. quality for bedding concrete	(ref. EN 206-1)					≥ C 25/30	Project specific design may be required.
Exposure class *16)						(X0)	
Bedding dimensions	X					≥ 20	
	Y					Bottom of stretcher	
	Z					≥ 20	

*...) please see list of footnotes at beginning of chapter drawings

Installation in asphalt areas, load class D 400

For heavy duty load please see footnote *7)



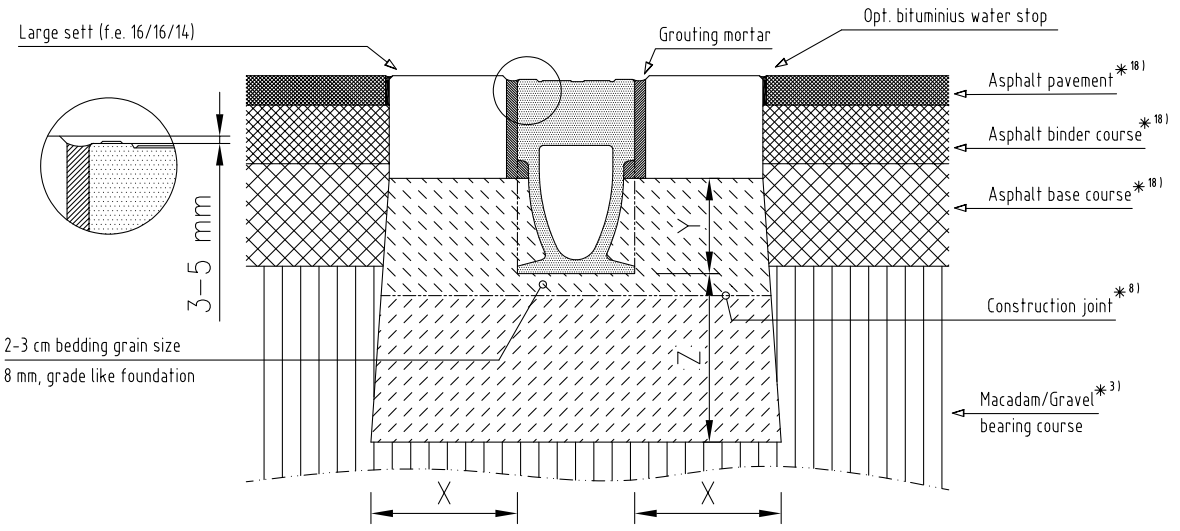
Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. quality for bedding concrete	(ref. EN 206-1)				≥ C 25/30	Not available for this load class. Please use appropriate channel systems like PowerDrain, SK, Qmax or Monoblock	
Exposure class *16)					(X0)		
Bedding dimensions	X				≥ 20		
	Y				Top edge of side pocket*2)		
	Z				≥ 20		

*...) please see list of footnotes at beginning of chapter drawings

Installation in asphalt areas, load class E 600

For heavy duty load please see footnote *7)

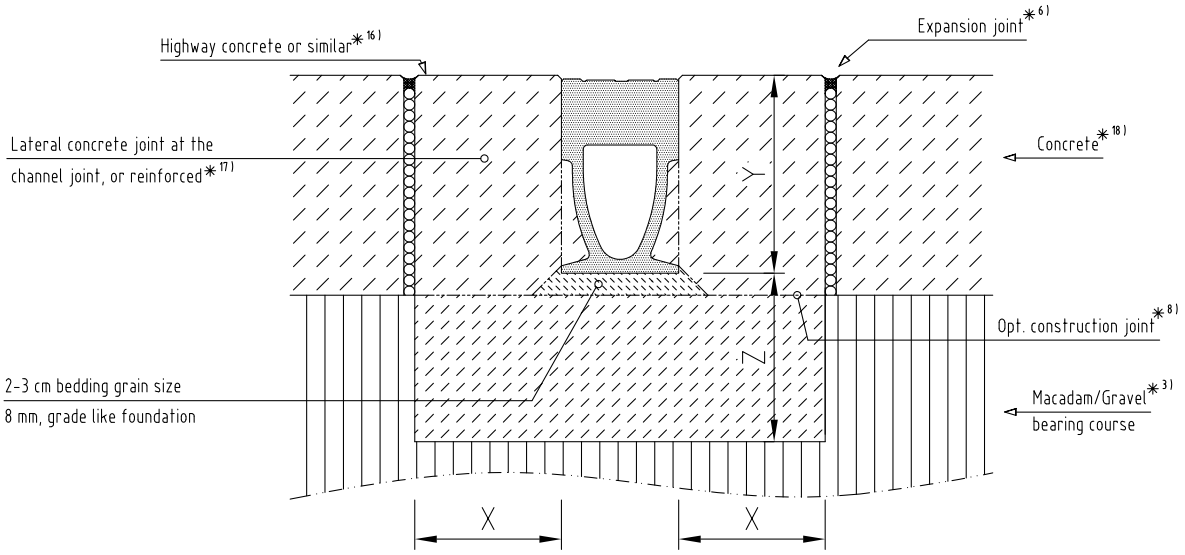


Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load Class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. quality for bedding concrete	(ref. EN 206-1)				≥ C 25/30	≥ C 25/30	Project specific design may be required.
Exposure class *16)					(X0)	(X0)	
Bedding dimensions	X				≥ 20	≥ 20	
	Y				Bottom of stretcher	Bottom of stretcher	
	Z				≥ 20	≥ 20	

*...) please see list of footnotes at beginning of chapter drawings

Installation in concrete areas, load class D 400 to E 600



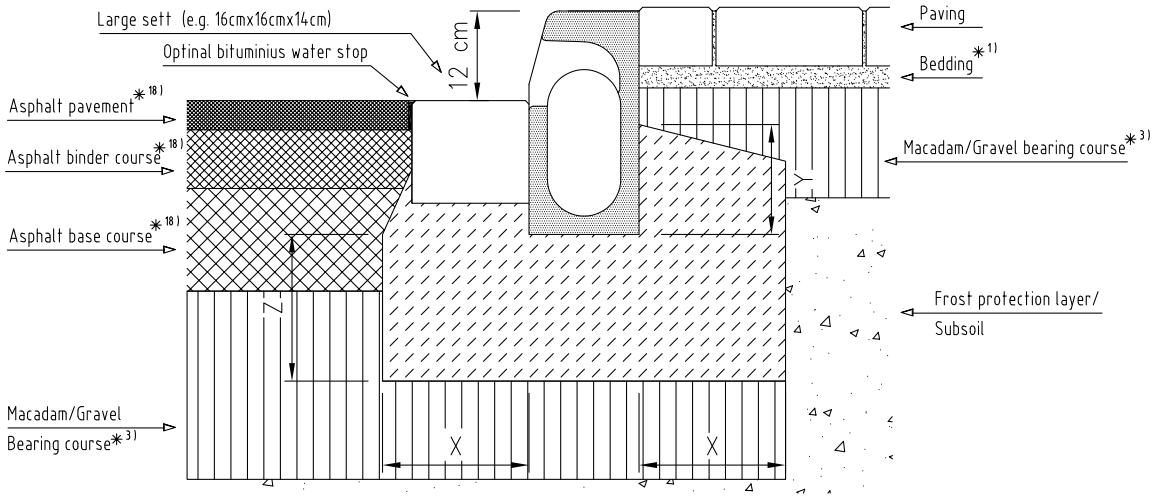
Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	**A 15**	**B 125**	**C 250**	**D 400**	**E 600**	**F 900**
Min. quality for bedding concrete	(ref. EN 206-1)				≥ C 25/30	≥ C 25/30	Project specific design may be required.
Exposure class *16)					(X0)	(X0)	
Bedding dimensions	**X**				≥ 20	≥ 20	
	Y				Height of channel		
	Z				≥ 20	≥ 20	

*...) please see list of footnotes at beginning of chapter drawings

ACO DRAIN® KerbDrain

Installation at roadside, load class C 250 to D 400

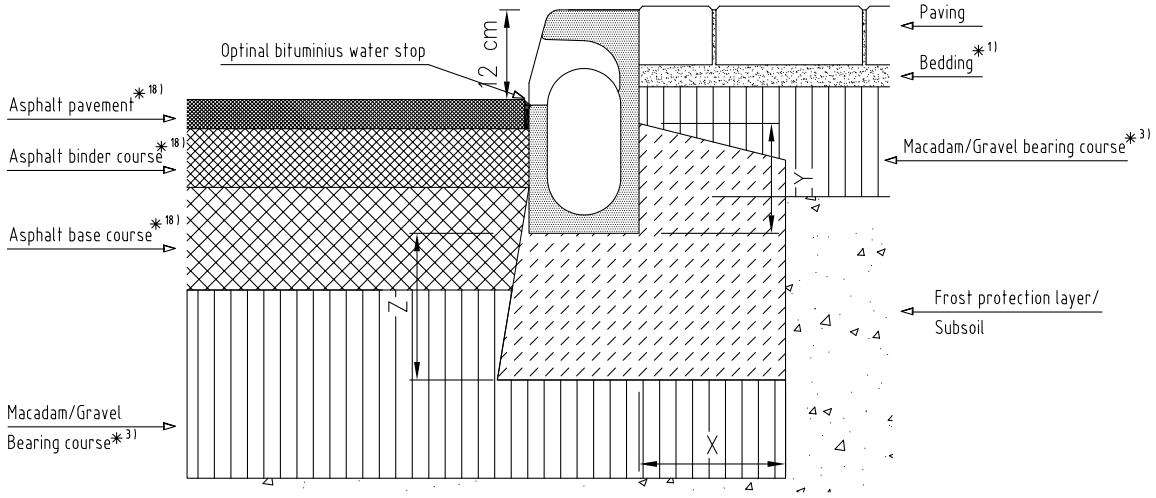


Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. quality for bedding concrete	(ref. EN 206-1)			≥ C 20/25	≥ C 20/25		
Exposure class *16)				(X0)	(X0)		
Bedding dimensions	X			≥ 15	≥ 20		
	Y for KD 305			≥ 18	≥ 18		
	Y for KD 480			≥ 36	≥ 36		
	Z			≥ 15	≥ 20		

*...) please see list of footnotes at beginning of chapter drawings

Installation at roadside, load class C 250 to D 400



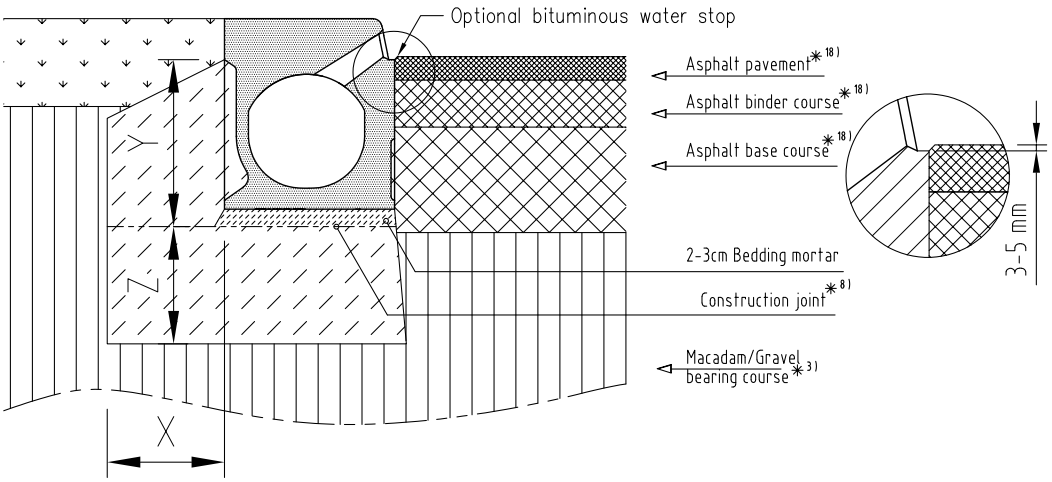
Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. quality for bedding concrete	(ref. EN 206-1)			≥ C 20/25	≥ C 20/25		
Exposure class *16)				(X0)	(X0)		
Bedding dimensions	X			≥ 15	≥ 20		
	Y for KD 305			≥ 18	≥ 18		
	Y for KD 480			≥ 36	≥ 36		
	Z			≥ 15	≥ 20		

*...) please see list of footnotes at beginning of chapter drawings

ACO DRAIN® KerbDrain Road

Installation at roadside with asphalt, load class D 400

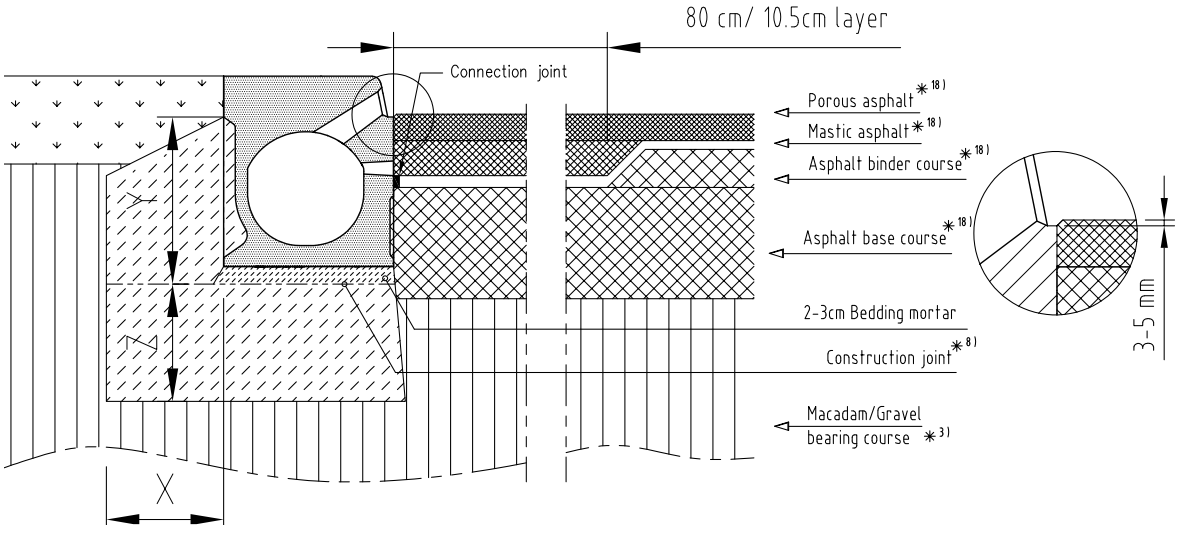


Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. quality for bedding concrete	(ref. EN 206-1)				≥ C 20/25		
Exposure class *16)					(X0)		
Bedding dimensions	X				≥ 20		
	Y				Top edge of side pocket*2)		
	Z				≥ 20		

*...) please see list of footnotes at beginning of chapter drawings

Installation at roadside with porous asphalt, load class D 400

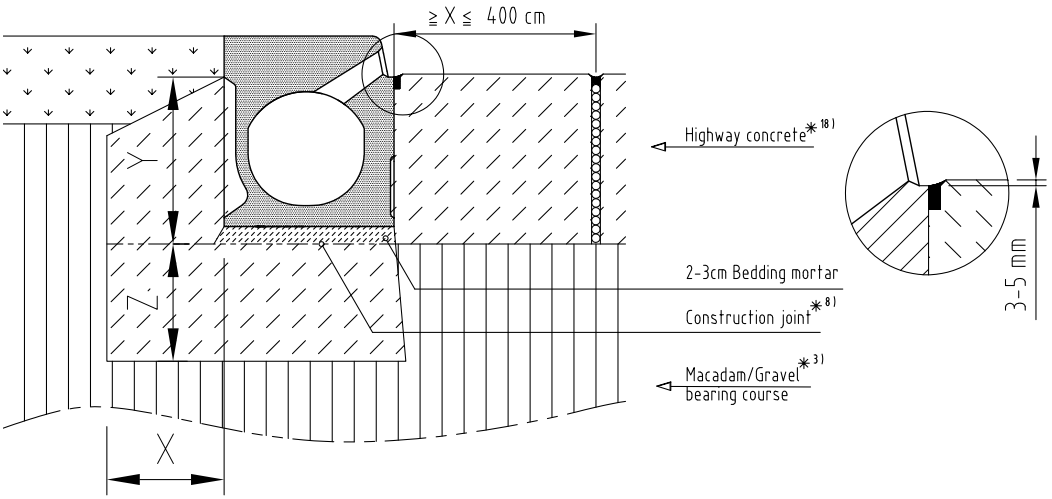


Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. quality for bedding concrete	(ref. EN 206-1)				≥ C 20/25		
Exposure class *16)					(X0)		
Bedding dimensions	X				≥ 20		
	Y				Top edge of side pocket*2)		
	Z				≥ 20		

*...) please see list of footnotes at beginning of chapter drawings

Installation at roadside with concrete, load class D 400

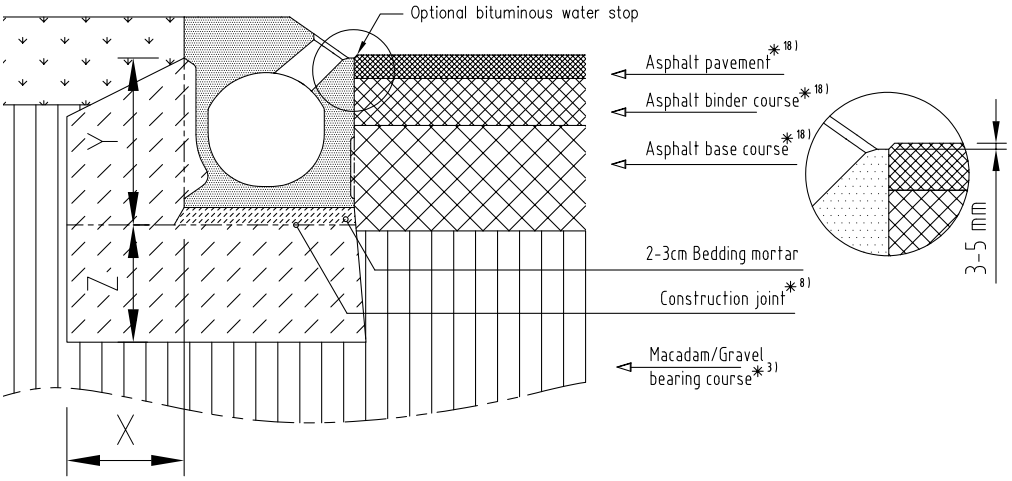


Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. quality for bedding concrete	(ref. EN 206-1)				≥ C 20/25		
Exposure class *16)					(X0)		
Bedding dimensions	X				≥ 20		
	Y				Top edge of side pocket*2)		
	Z				≥ 20		

*...) please see list of footnotes at beginning of chapter drawings

Installation at roadside with asphalt, load class D 400

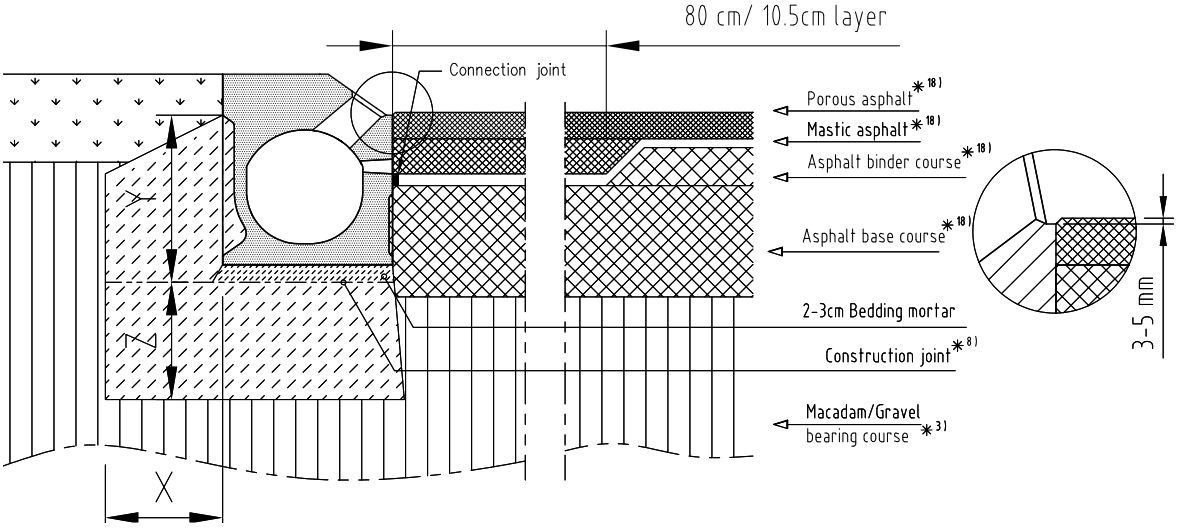


Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. quality for bedding concrete	(ref. EN 206-1)				≥ C 20/25		
Exposure class *16)					(X0)		
Bedding dimensions	X				≥ 20		
	Y				Top edge of side pocket*2)		
	Z				≥ 20		

*...) please see list of footnotes at beginning of chapter drawings

Installation at roadside with porous asphalt, load class D 400

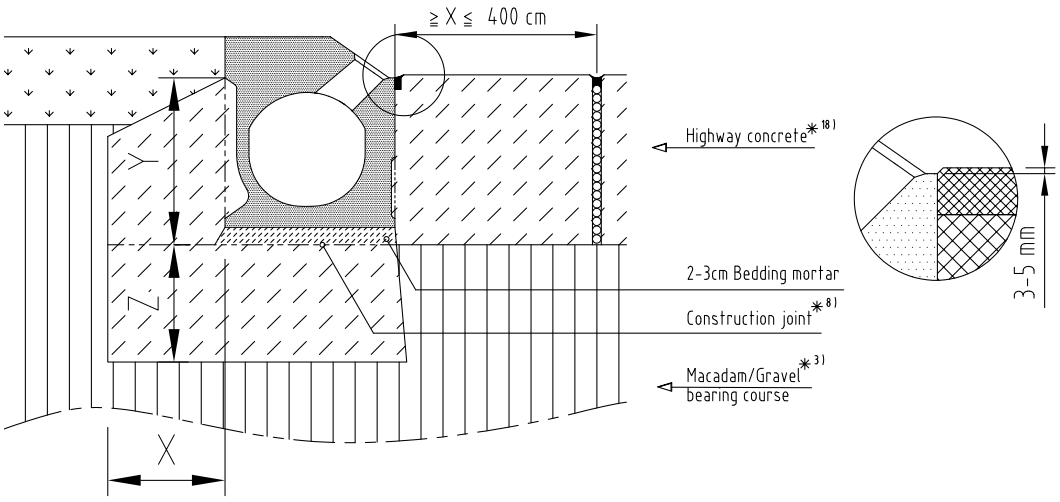


Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. quality for bedding concrete	(ref. EN 206-1)				≥ C 20/25		
Exposure class *16)					(X0)		
Bedding dimensions	X				≥ 20		
	Y				Top edge of side pocket*2)		
	Z				≥ 20		

*...) please see list of footnotes at beginning of chapter drawings

Installation at roadside with concrete, load class D 400



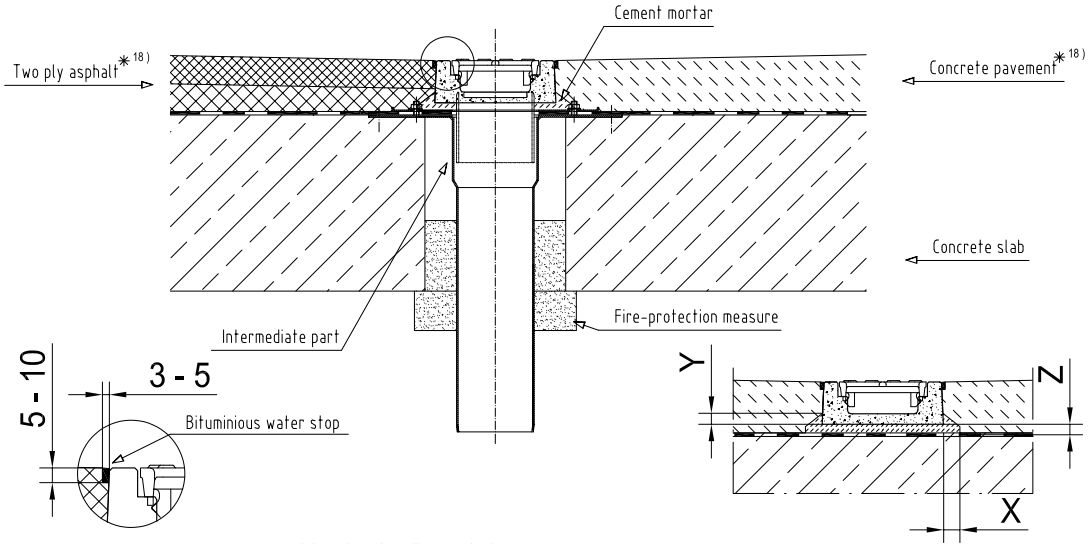
Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. quality for bedding concrete	(ref. EN 206-1)				≥ C 20/25		
Exposure class *16)					(X0)		
Bedding dimensions	X				≥ 20		
	Y				Top edge of side pocket*2)		
	Z				≥ 20		

*...) please see list of footnotes at beginning of chapter drawings

ACO DRAIN® Deckline P

Installation in asphalt or concrete areas, load class A 15 to C 250



Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

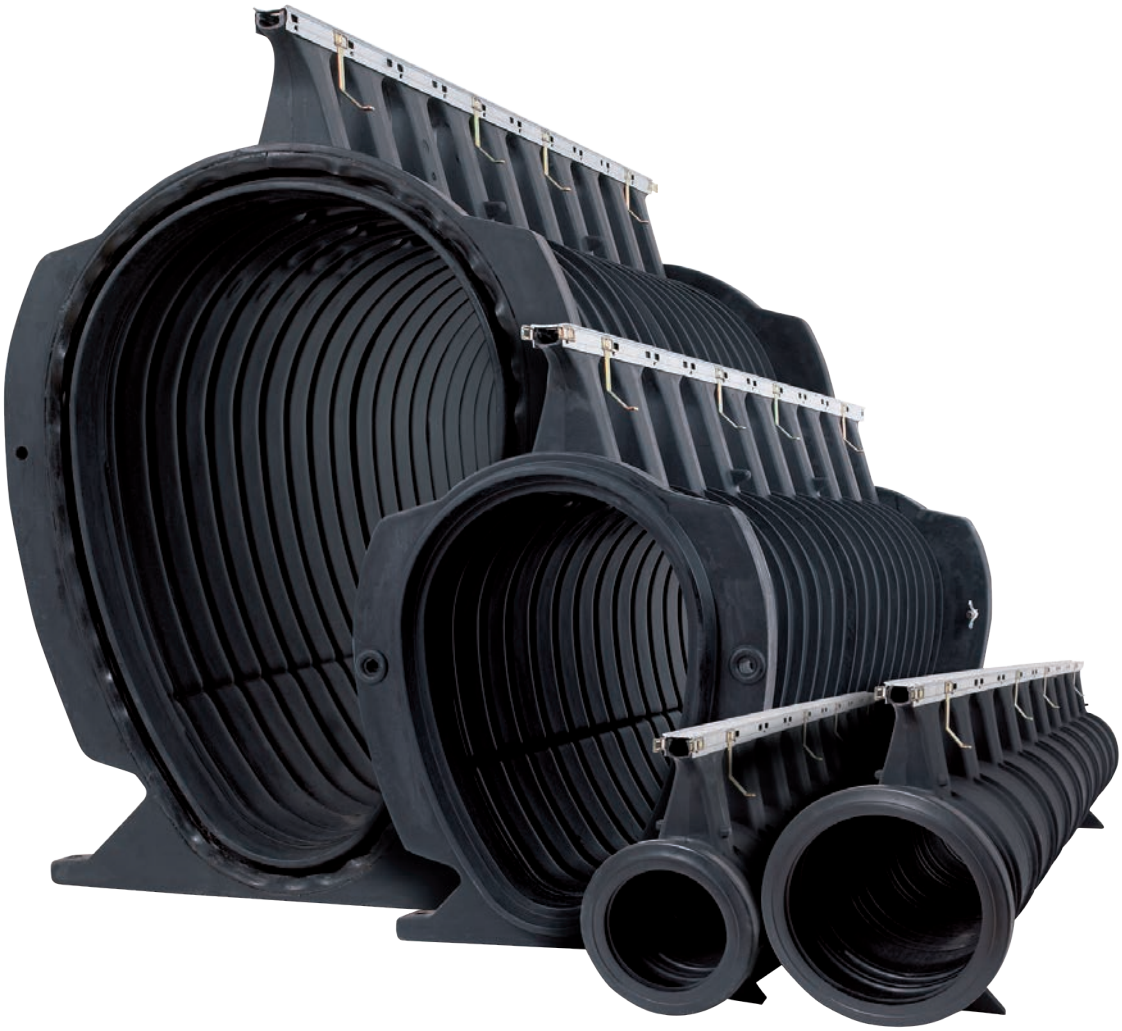
Load class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Bedding dimensions	X	≥ 3	≥ 3	≥ 3	This way of installation is not recommended for applications with load classes higher than C 250.		
	Y	≥ 1,5	≥ 1,5	≥ 1,5			
	Z	≥ 1,5	≥ 1,5	≥ 1,5			

*...) please see list of footnotes at beginning of chapter drawings

ACO DRAIN® Qmax

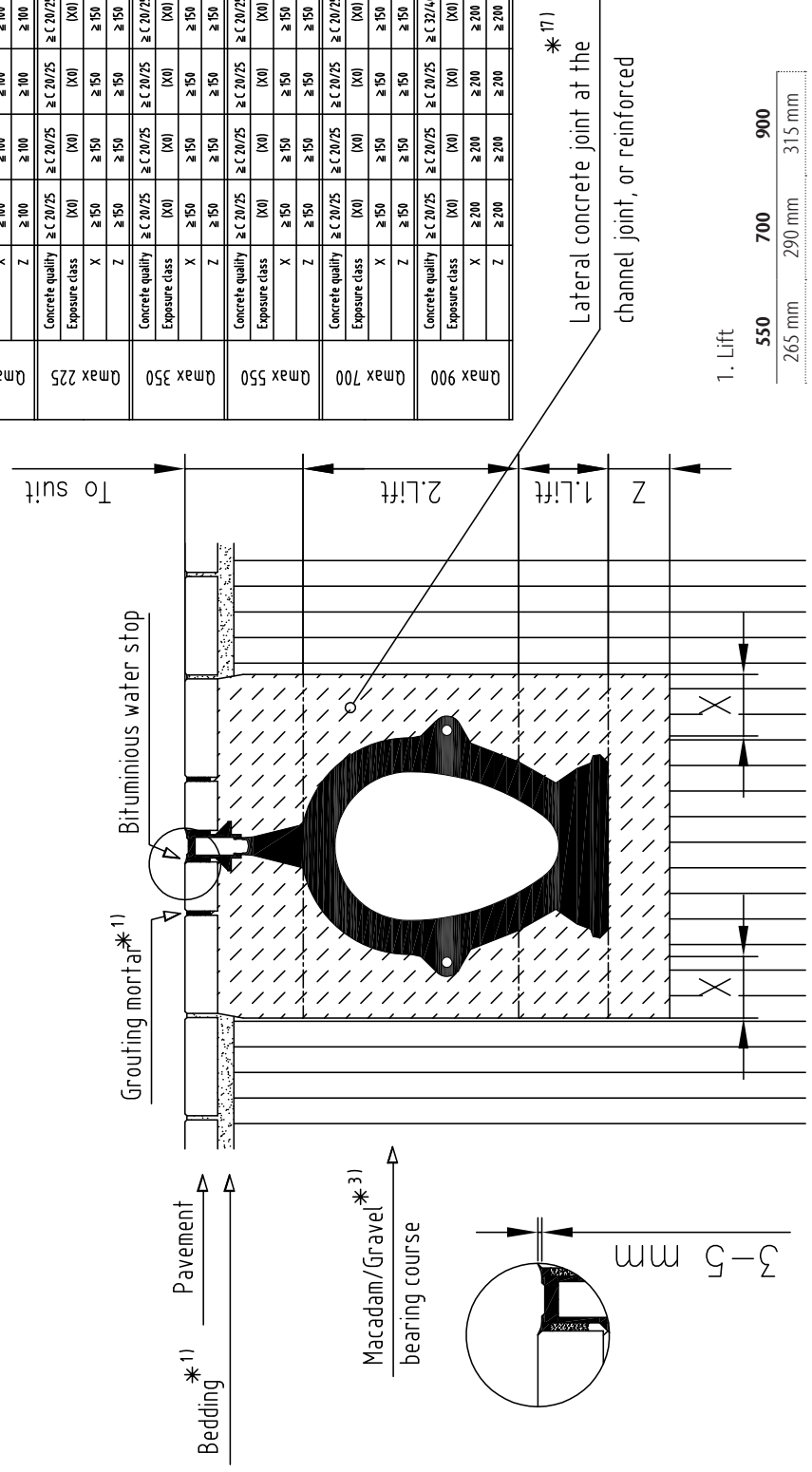
At all Qmax channels please ensure that the channels do not float while pouring concrete. Ensure the edge rail anchors are well embedded into the concrete.
The reinforcement required in the concrete surround varies with the application and has to be done by the planner or a consultant.
For temporary installations please consider the following:
A channel installation is not complete until the final surfacing is laid. In any temporary condition, i.e. with the channel walls projecting above an asphalt base course or concrete sub-base, 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 asphalt base course locally, to 3-5 mm above grating level, either side of a channel for a distance of 750 to 1.000 mm say, to form ramps. Concrete ramps should be formed in other pavements. Note that the channel load class should be adequate to carry the site traffic.



Installation in paved areas, load class A 15 to F 900

Channel size	Foundation	Load class and concrete requirements					
		A 15	B 125	C 250	D 400	E 600	F 900
Qmax 150	Concrete quality	≥ C 20/25	≥ C 20/25	≥ C 20/25	≥ C 20/25	Project specific, advice on demand	
	Exposure class X	(X0)	(X0)	(X0)	(X0)		
		≥ 100	≥ 100	≥ 100	≥ 100		
	Exposure class Z	≥ 100	≥ 100	≥ 100	≥ 100		
Qmax 225	Concrete quality	≥ C 20/25	≥ C 20/25	≥ C 20/25	≥ C 20/25		
	Exposure class X	(X0)	(X0)	(X0)	(X0)		
		≥ 150	≥ 150	≥ 150	≥ 150		
	Exposure class Z	≥ 150	≥ 150	≥ 150	≥ 150		
Qmax 350	Concrete quality	≥ C 20/25	≥ C 20/25	≥ C 20/25	≥ C 20/25		
	Exposure class X	(X0)	(X0)	(X0)	(X0)		
		≥ 150	≥ 150	≥ 150	≥ 150		
	Exposure class Z	≥ 150	≥ 150	≥ 150	≥ 150		
Qmax 550	Concrete quality	≥ C 20/25	≥ C 20/25	≥ C 20/25	≥ C 20/25		
	Exposure class X	(X0)	(X0)	(X0)	(X0)		
		≥ 150	≥ 150	≥ 150	≥ 150		
	Exposure class Z	≥ 150	≥ 150	≥ 150	≥ 150		
Qmax 700	Concrete quality	≥ C 20/25	≥ C 20/25	≥ C 20/25	≥ C 20/25		
	Exposure class X	(X0)	(X0)	(X0)	(X0)		
		≥ 150	≥ 150	≥ 150	≥ 150		
	Exposure class Z	≥ 150	≥ 150	≥ 150	≥ 150		
Qmax 900	Concrete quality	≥ C 20/25	≥ C 20/25	≥ C 20/25	≥ C 32/40		
	Exposure class X	(X0)	(X0)	(X0)	(X0)		
		≥ 200	≥ 200	≥ 200	≥ 200		
	Exposure class Z	≥ 200	≥ 200	≥ 200	≥ 200		



Installation in asphalt areas, load class A 15 to D 400

Channel size	Foundation	Load class and concrete requirements					
		A 15	B 125	C 250	D 400	E 600	F 900
Qmax 150	Concrete quality	≥ C 20/25	≥ C 20/25	≥ C 20/25	≥ C 20/25		
	Exposure class	(X0)	(X0)	(X0)	(X0)		
	X	≥ 100	≥ 100	≥ 100	≥ 100		
	Z	≥ 100	≥ 100	≥ 100	≥ 100		
	Y1	max 120	max 120	max 120	max 120		
	Y2	max 60	max 60	max 60	max 60		
Qmax 225	Concrete quality	≥ C 20/25	≥ C 20/25	≥ C 20/25	≥ C 20/25		
	Exposure class	(X0)	(X0)	(X0)	(X0)		
	X	≥ 150	≥ 150	≥ 150	≥ 150		
	Z	≥ 150	≥ 150	≥ 150	≥ 150		
	Y1	max 120	max 120	max 120	max 120		
	Y2	max 60	max 60	max 60	max 60		
Qmax 350	Concrete quality	≥ C 20/25	≥ C 20/25	≥ C 20/25	≥ C 20/25		
	Exposure class	(X0)	(X0)	(X0)	(X0)		
	X	≥ 150	≥ 150	≥ 150	≥ 150		
	Z	≥ 150	≥ 150	≥ 150	≥ 150		
	Y1	max 120	max 120	max 120	max 120		
	Y2	max 60	max 60	max 60	max 60		
Qmax 550	Concrete quality	≥ C 20/25	≥ C 20/25	≥ C 20/25	≥ C 20/25		
	Exposure class	(X0)	(X0)	(X0)	(X0)		
	X	≥ 150	≥ 150	≥ 150	≥ 150		
	Z	≥ 150	≥ 150	≥ 150	≥ 150		
	Y1	max 120	max 120	max 120	max 120		
	Y2	max 60	max 60	max 60	max 60		
Qmax 700	Concrete quality	≥ C 20/25	≥ C 20/25	≥ C 20/25	≥ C 20/25		
	Exposure class	(X0)	(X0)	(X0)	(X0)		
	X	≥ 150	≥ 150	≥ 150	≥ 150		
	Z	≥ 150	≥ 150	≥ 150	≥ 150		
	Y1	max 120	max 120	max 120	max 120		
	Y2	max 60	max 60	max 60	max 60		
Qmax 900	Concrete quality	≥ C 20/25	≥ C 20/25	≥ C 20/25	≥ C 32/40		
	Exposure class	(X0)	(X0)	(X0)	(X0)		
	X	≥ 200	≥ 200	≥ 200	≥ 200		
	Z	≥ 200	≥ 200	≥ 200	≥ 200		
	Y1	max 120	max 120	max 120	max 120		
	Y2	max 60	max 60	max 60	max 60		

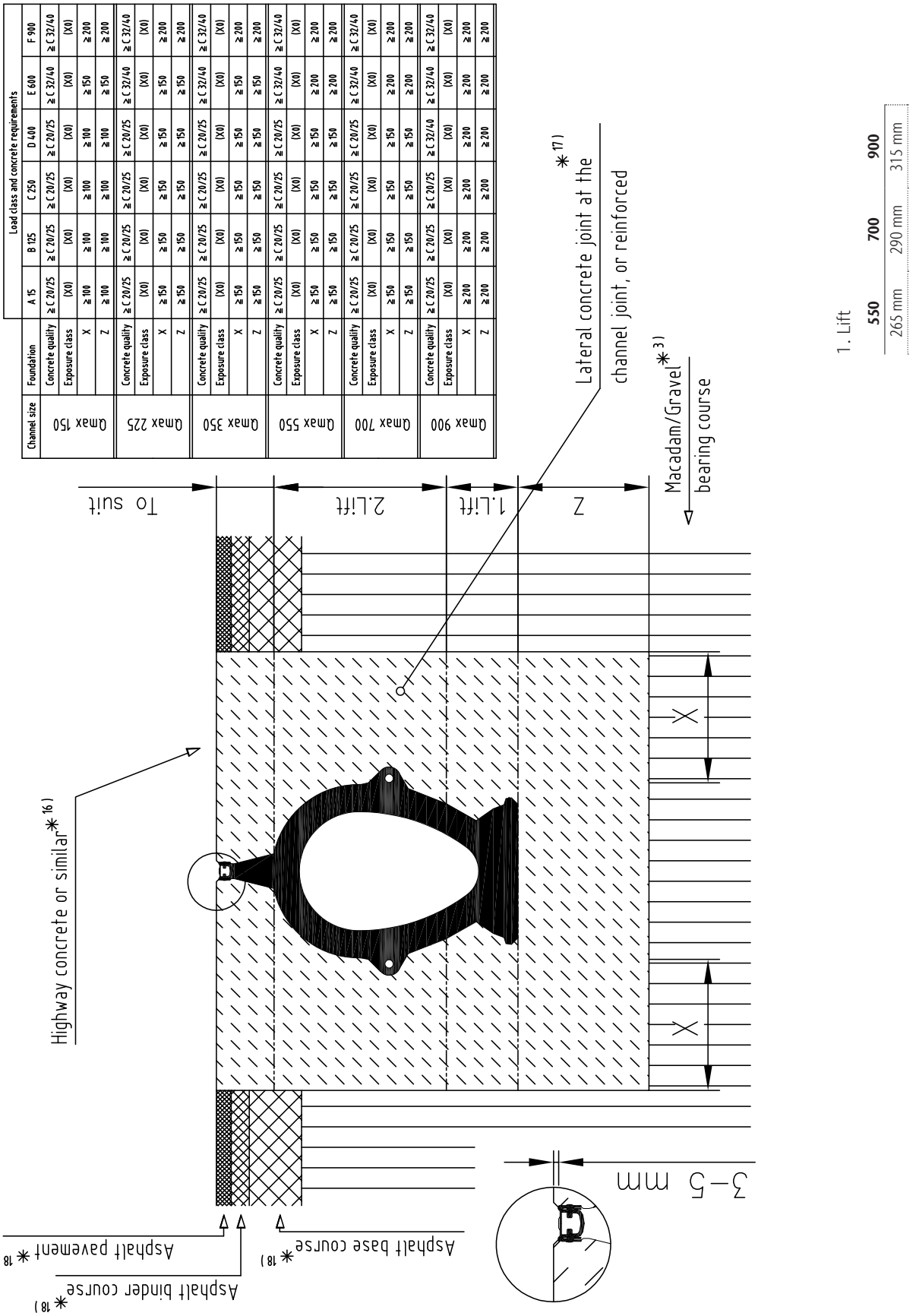
Project specific, advice on demand

1. Lift

550	700	900
265 mm	290 mm	315 mm

Installation in asphalt areas, load class A 15 to F 900

Channel size	Foundation	Load class and concrete requirements					
		A 15	B 125	C 250	D 400	E 600	F 900
Qmax 150	Concrete quality	≥ C 20/25	≥ C 20/25	≥ C 20/25	≥ C 20/25	≥ C 32/40	≥ C 32/40
	Exposure class	(X0)	(X0)	(X0)	(X0)	(X0)	(X0)
	X	≥ 100	≥ 100	≥ 100	≥ 100	≥ 150	≥ 200
	Z	≥ 100	≥ 100	≥ 100	≥ 100	≥ 150	≥ 200
Qmax 225	Concrete quality	≥ C 20/25	≥ C 20/25	≥ C 20/25	≥ C 20/25	≥ C 32/40	≥ C 32/40
	Exposure class	(X0)	(X0)	(X0)	(X0)	(X0)	(X0)
	X	≥ 150	≥ 150	≥ 150	≥ 150	≥ 150	≥ 200
	Z	≥ 150	≥ 150	≥ 150	≥ 150	≥ 150	≥ 200
Qmax 350	Concrete quality	≥ C 20/25	≥ C 20/25	≥ C 20/25	≥ C 20/25	≥ C 32/40	≥ C 32/40
	Exposure class	(X0)	(X0)	(X0)	(X0)	(X0)	(X0)
	X	≥ 150	≥ 150	≥ 150	≥ 150	≥ 150	≥ 200
	Z	≥ 150	≥ 150	≥ 150	≥ 150	≥ 150	≥ 200
Qmax 550	Concrete quality	≥ C 20/25	≥ C 20/25	≥ C 20/25	≥ C 20/25	≥ C 32/40	≥ C 32/40
	Exposure class	(X0)	(X0)	(X0)	(X0)	(X0)	(X0)
	X	≥ 150	≥ 150	≥ 150	≥ 150	≥ 200	≥ 200
	Z	≥ 150	≥ 150	≥ 150	≥ 150	≥ 200	≥ 200
Qmax 700	Concrete quality	≥ C 20/25	≥ C 20/25	≥ C 20/25	≥ C 20/25	≥ C 32/40	≥ C 32/40
	Exposure class	(X0)	(X0)	(X0)	(X0)	(X0)	(X0)
	X	≥ 150	≥ 150	≥ 150	≥ 150	≥ 200	≥ 200
	Z	≥ 150	≥ 150	≥ 150	≥ 150	≥ 200	≥ 200
Qmax 900	Concrete quality	≥ C 20/25	≥ C 20/25	≥ C 20/25	≥ C 32/40	≥ C 32/40	≥ C 32/40
	Exposure class	(X0)	(X0)	(X0)	(X0)	(X0)	(X0)
	X	≥ 200	≥ 200	≥ 200	≥ 200	≥ 200	≥ 200
	Z	≥ 200	≥ 200	≥ 200	≥ 200	≥ 200	≥ 200

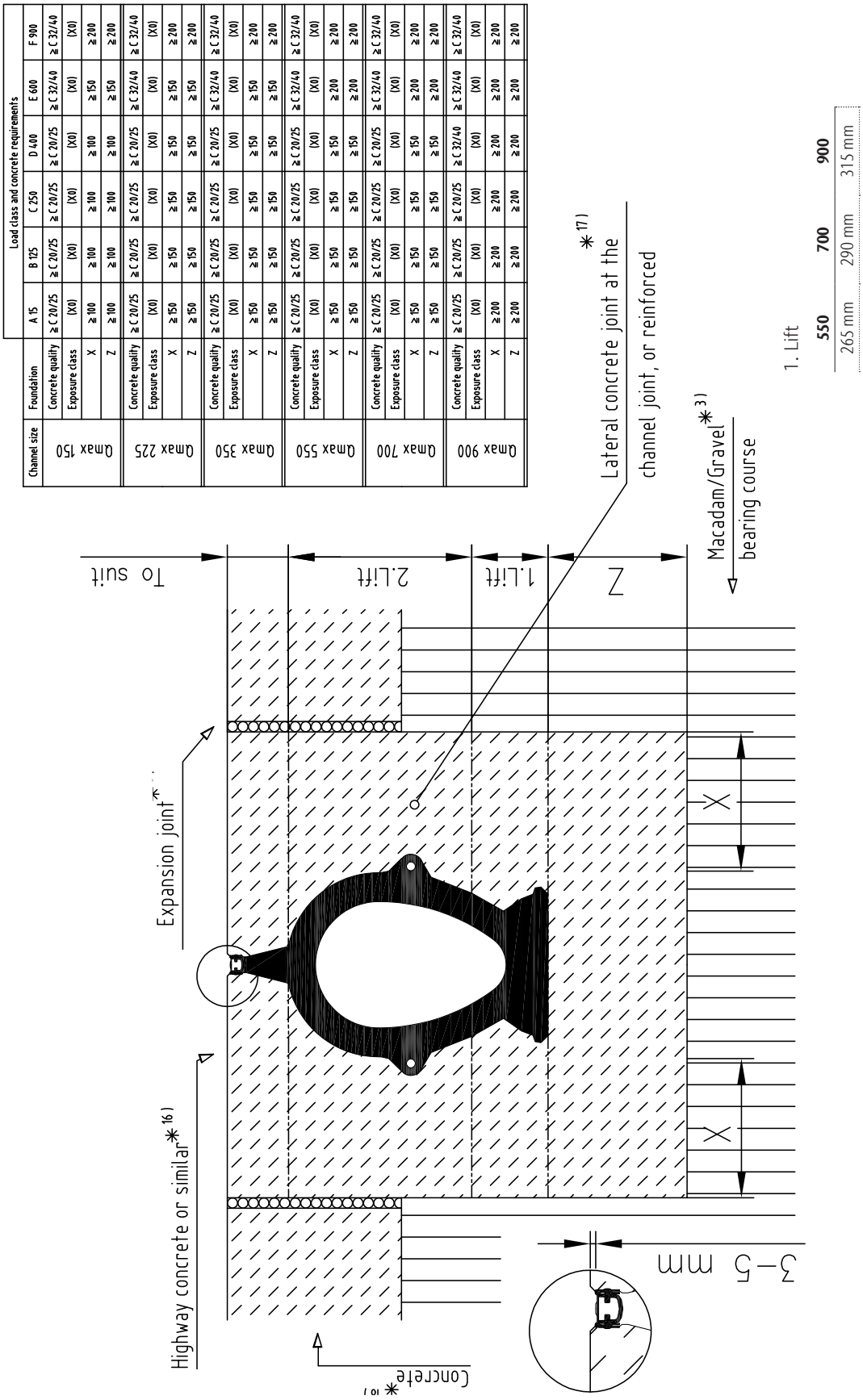


1. Lift

550	700	900
265 mm	290 mm	315 mm

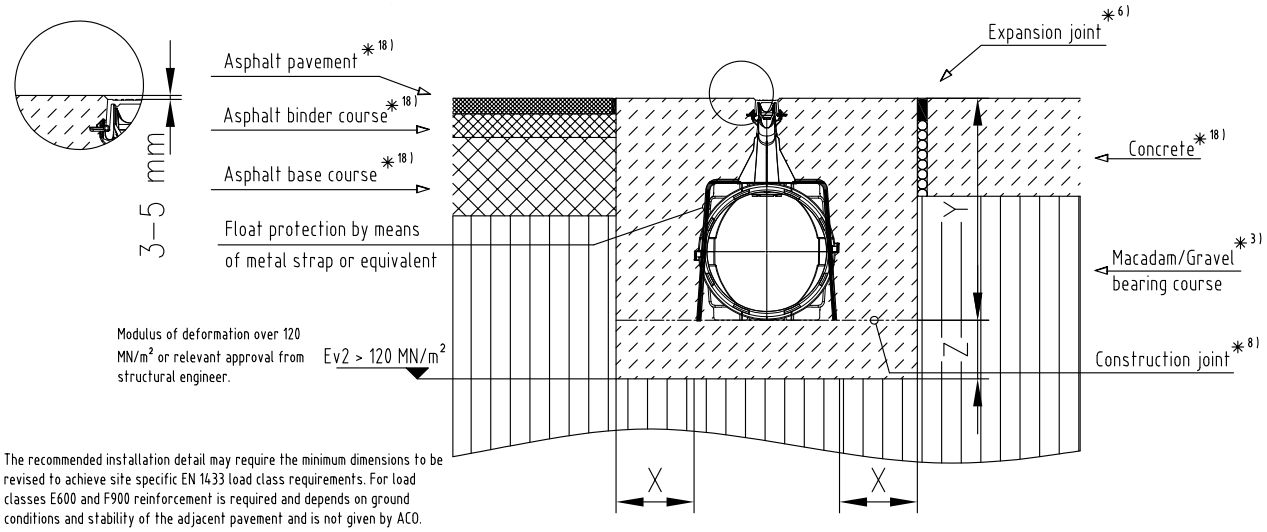
Installation in concrete areas, load class A 15 to D 400

Channel size	Foundation	Load class and concrete requirements									
		A 15	B 125	C 250	D 400	E 600	F 900				
Qmax 150	Concrete quality	≥ C 20/25	≥ C 20/25	≥ C 20/25	≥ C 20/25	≥ C 32/40	≥ C 32/40				
	Exposure class	(X0)	(X0)	(X0)	(X0)	(X0)	(X0)				
	X	≥ 100	≥ 100	≥ 100	≥ 100	≥ 150	≥ 200				
	Z	≥ 100	≥ 100	≥ 100	≥ 100	≥ 150	≥ 200				
Qmax 225	Concrete quality	≥ C 20/25	≥ C 20/25	≥ C 20/25	≥ C 20/25	≥ C 32/40	≥ C 32/40				
	Exposure class	(X0)	(X0)	(X0)	(X0)	(X0)	(X0)				
	X	≥ 150	≥ 150	≥ 150	≥ 150	≥ 150	≥ 200				
	Z	≥ 150	≥ 150	≥ 150	≥ 150	≥ 150	≥ 200				
Qmax 350	Concrete quality	≥ C 20/25	≥ C 20/25	≥ C 20/25	≥ C 20/25	≥ C 32/40	≥ C 32/40				
	Exposure class	(X0)	(X0)	(X0)	(X0)	(X0)	(X0)				
	X	≥ 150	≥ 150	≥ 150	≥ 150	≥ 150	≥ 200				
	Z	≥ 150	≥ 150	≥ 150	≥ 150	≥ 150	≥ 200				
Qmax 550	Concrete quality	≥ C 20/25	≥ C 20/25	≥ C 20/25	≥ C 20/25	≥ C 32/40	≥ C 32/40				
	Exposure class	(X0)	(X0)	(X0)	(X0)	(X0)	(X0)				
	X	≥ 150	≥ 150	≥ 150	≥ 150	≥ 200	≥ 200				
	Z	≥ 150	≥ 150	≥ 150	≥ 150	≥ 200	≥ 200				
Qmax 700	Concrete quality	≥ C 20/25	≥ C 20/25	≥ C 20/25	≥ C 20/25	≥ C 32/40	≥ C 32/40				
	Exposure class	(X0)	(X0)	(X0)	(X0)	(X0)	(X0)				
	X	≥ 150	≥ 150	≥ 150	≥ 150	≥ 200	≥ 200				
	Z	≥ 150	≥ 150	≥ 150	≥ 150	≥ 200	≥ 200				
Qmax 900	Concrete quality	≥ C 20/25	≥ C 20/25	≥ C 20/25	≥ C 32/40	≥ C 32/40	≥ C 32/40				
	Exposure class	(X0)	(X0)	(X0)	(X0)	(X0)	(X0)				
	X	≥ 200	≥ 200	≥ 200	≥ 200	≥ 200	≥ 200				
	Z	≥ 200	≥ 200	≥ 200	≥ 200	≥ 200	≥ 200				



ACO DRAIN® Qmax neo

Installation in concrete or asphalt areas, load class D 400 to F 900



The recommended installation detail may require the minimum dimensions to be revised to achieve site specific EN 1433 load class requirements. For load classes E600 and F900 reinforcement is required and depends on ground conditions and stability of the adjacent pavement and is not given by ACO.

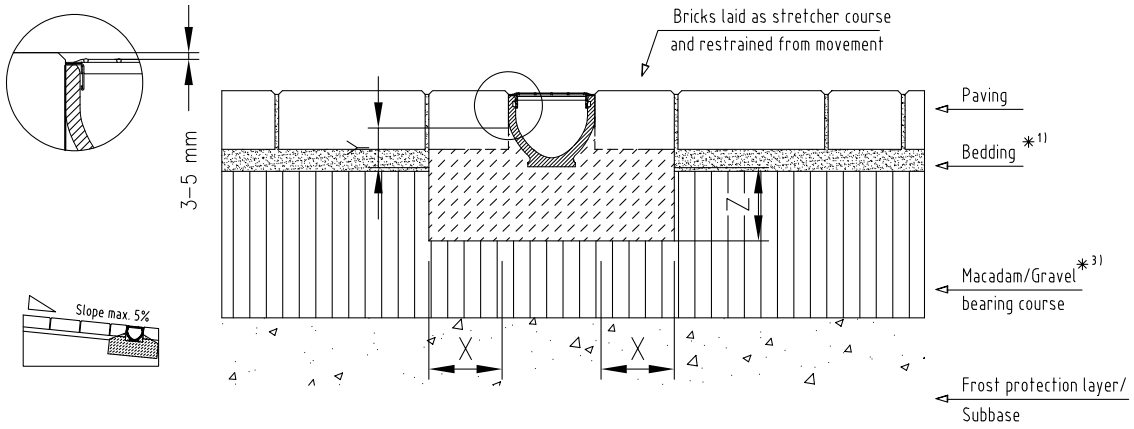
Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	**A 15**	**B 125**	**C 250**	**D 400**	**E 600**	**F 900**
Min. quality for bedding concrete	(ref. EN 206-1)				≥ C 20/25	≥ C 30/37	≥ C 30/37
Exposure class *16)					(X0)	(X0)	(X0)
Bedding dimensions (ref. EN 1433)	**X**				≥ 20	≥ 20	≥ 20
	Y				Height of channel		
	Z				≥ 15	≥ 20	≥ 20

*...) please see list of footnotes at beginning of chapter drawings

ACO Self® Euroline

Installation in paved areas, load class A 15

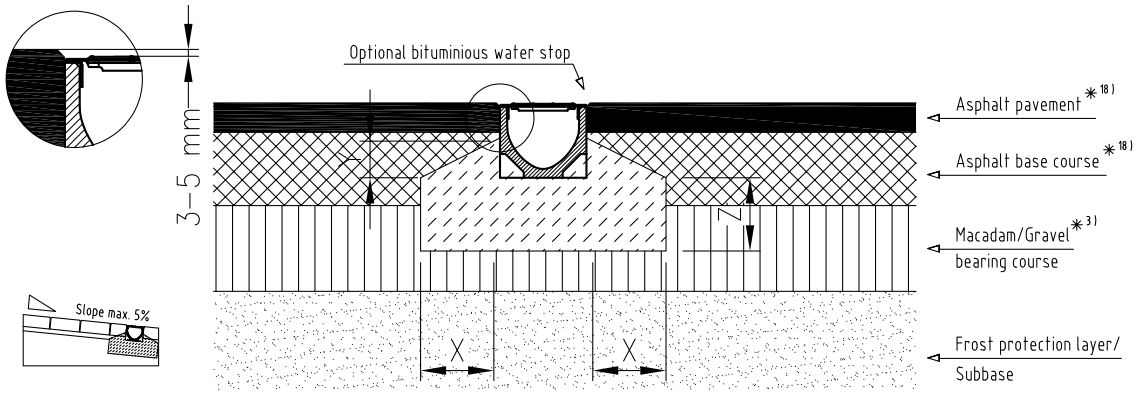


Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. quality for bedding concrete	(ref. EN 206-1)	≥ C 12/15	Not available for this load class, please use appropriate channel system like Multiline, PowerDrain, SK, Qmax or Monoblock				
Exposure class *16)		(X0)					
Bedding dimensions	X	≥ 10					
	Y	Bottom of strechter					
	Z	≥ 10					

*...) please see list of footnotes at beginning of chapter drawings

Installation in asphalt areas, load class A 15

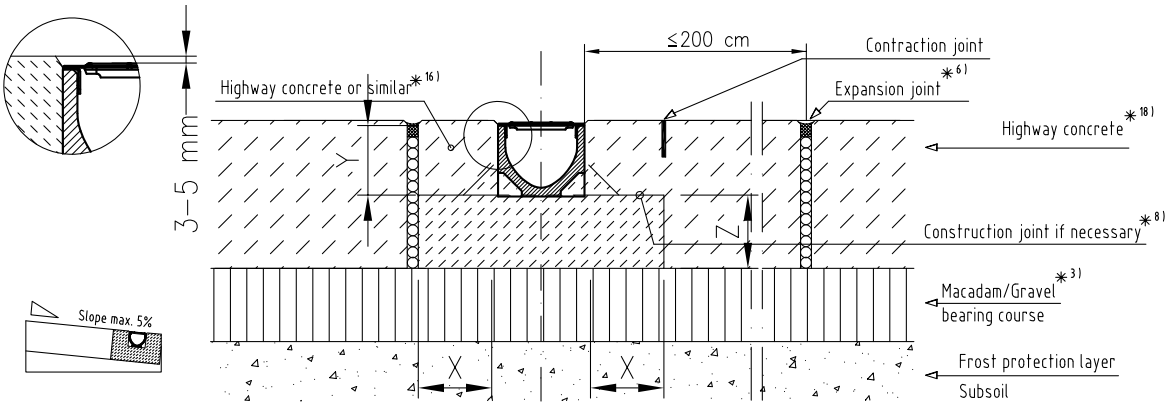


Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. quality for bedding concrete	(ref. EN 206-1)	≥ C 12/15	Not available for this load class, please use appropriate channel system like Multiline, PowerDrain, SK, Qmax or Monoblock				
Exposure class *16)		(X0)					
Bedding dimensions	X	≥ 10					
	Y	≥ 5					
	Z	≥ 10					

*...) please see list of footnotes at beginning of chapter drawings

Installation in concrete areas, load class A 15

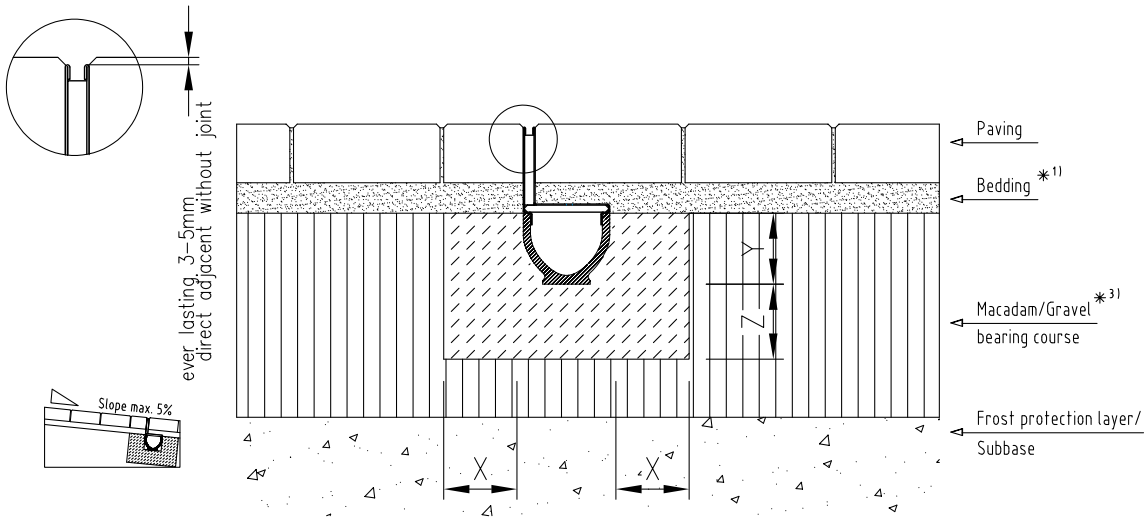


Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. quality for bedding concrete	(ref. EN 206-1)	≥ C 12/15	Not available for this load class, please use appropriate channel system like Multiline, PowerDrain, SK, Qmax or Monoblock				
Exposure class *16)		(X0)					
Bedding dimensions	X	≥ 10					
	Y	Height of channel					
	Z	≥ 10					

*...) please see list of footnotes at beginning of chapter drawings

Installation in paved areas, load class A 15 with Brickslot

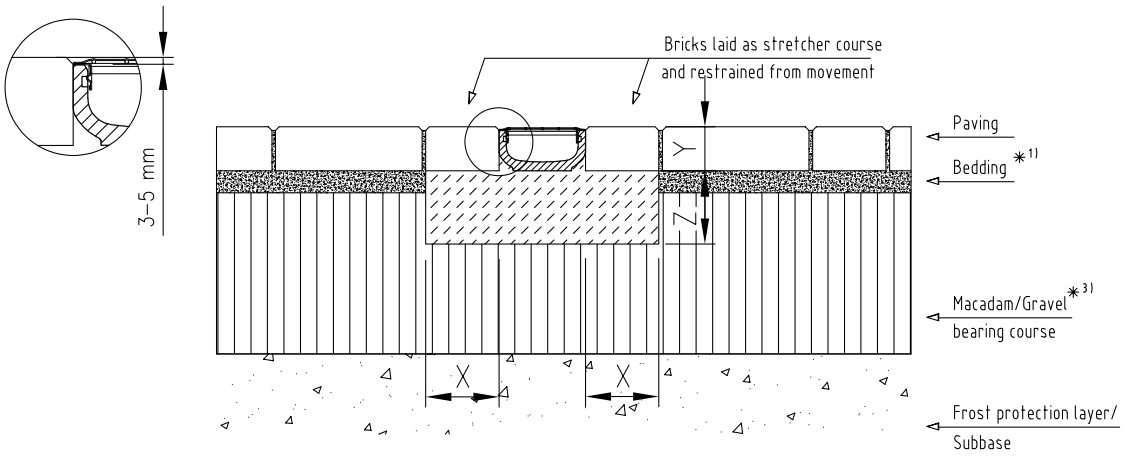


Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load Class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. quality for bedding concrete	(ref. EN 206-1)	≥ C 12/15	Not available for this load class, please use appropriate channel system like Multiline, PowerDrain, SK, Qmax or Monoblock				
Exposure class *16)		(X0)					
Bedding dimensions	X	≥ 10					
	Y	Height of channel					
	Z	≥ 10					

*...) please see list of footnotes at beginning of chapter drawings

Installation in paved areas, load class A 15



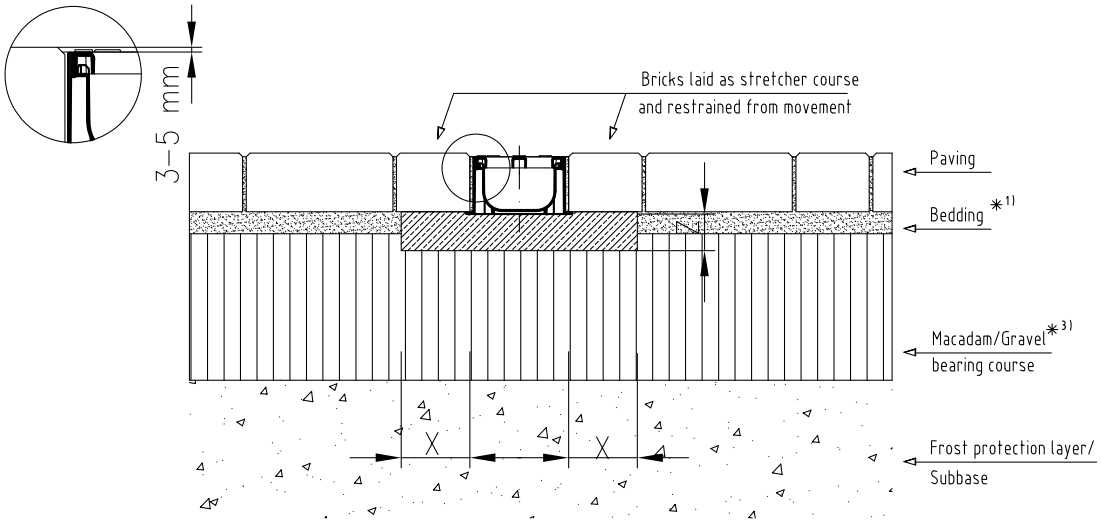
Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	**A 15**	**B 125**	**C 250**	**D 400**	**E 600**	**F 900**
Min. quality for bedding concrete	(ref. EN 206-1)	≥ C 12/15	Not available for this load class, please use appropriate channel system like Multiline, PowerDrain, SK, Qmax or Monoblock				
Exposure class *16)		(X0)					
Bedding dimensions	**X**	≥ 10					
	Y	Paving					
	Z	≥ 10					

*...) please see list of footnotes at beginning of chapter drawings

ACO Self® Hexaline

Installation in paved areas, load class A 15

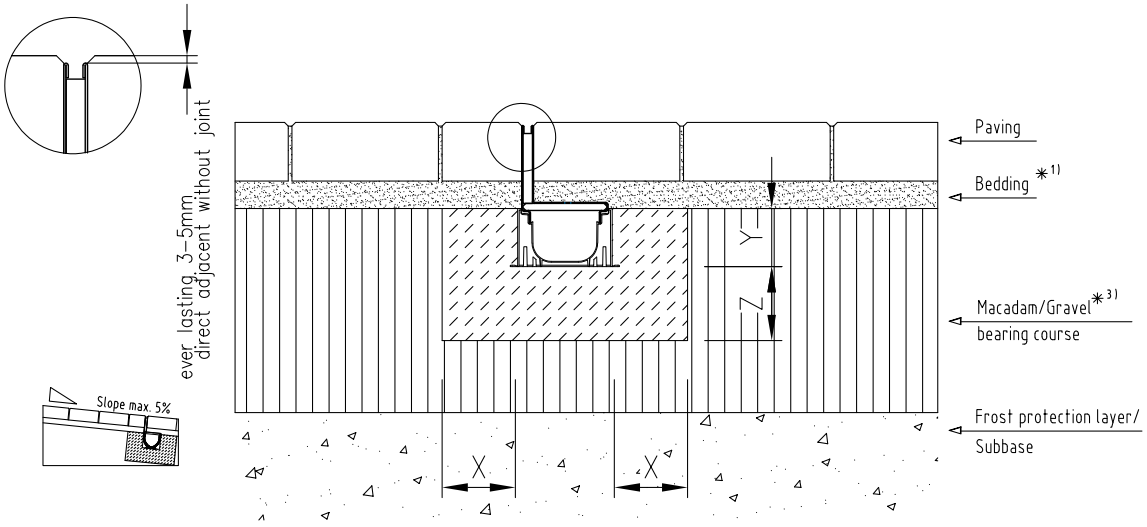


Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. quality for bedding concrete	(ref. EN 206-1)	≥ C 12/15	Not available for this load class, please use appropriate channel system like Multiline, PowerDrain, SK, Qmax or Monoblock				
Exposure class *16)		(X0)					
Bedding dimensions	X	≥ 10					
	Y	Bottom of strechter					
	Z	≥ 10					

*...) please see list of footnotes at beginning of chapter drawings

Installation in paved areas, load class A 15 with brickslot



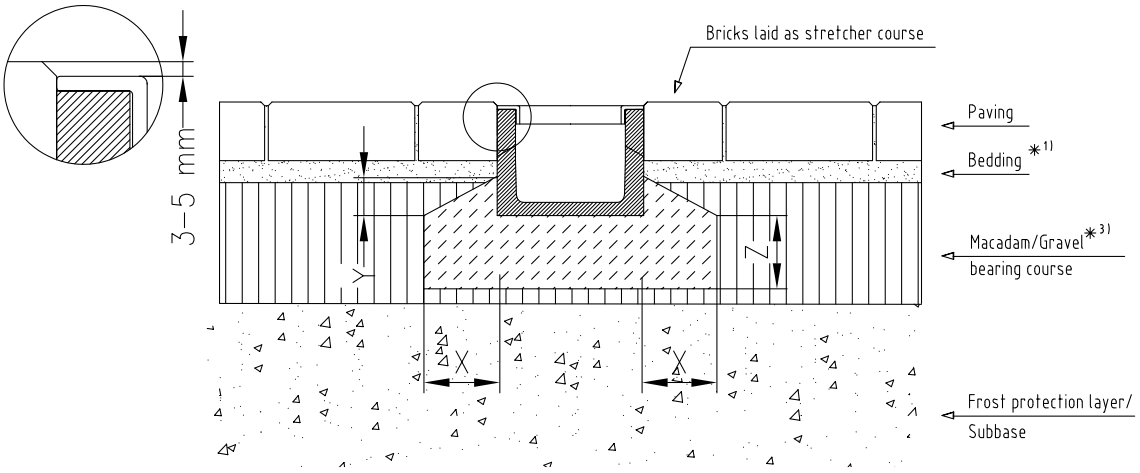
Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. quality for bedding concrete	(ref. EN 206-1)	≥ C 12/15	Not available for this load class, please use appropriate channel system like Multiline, PowerDrain, SK, Qmax or Monoblock				
Exposure class *16)		(X0)					
Bedding dimensions	X	≥ 10					
	Y	Height of channel					
	Z	≥ 10					

*...) please see list of footnotes at beginning of chapter drawings

ACO Self® 200

Installation in paved areas, load class A 15

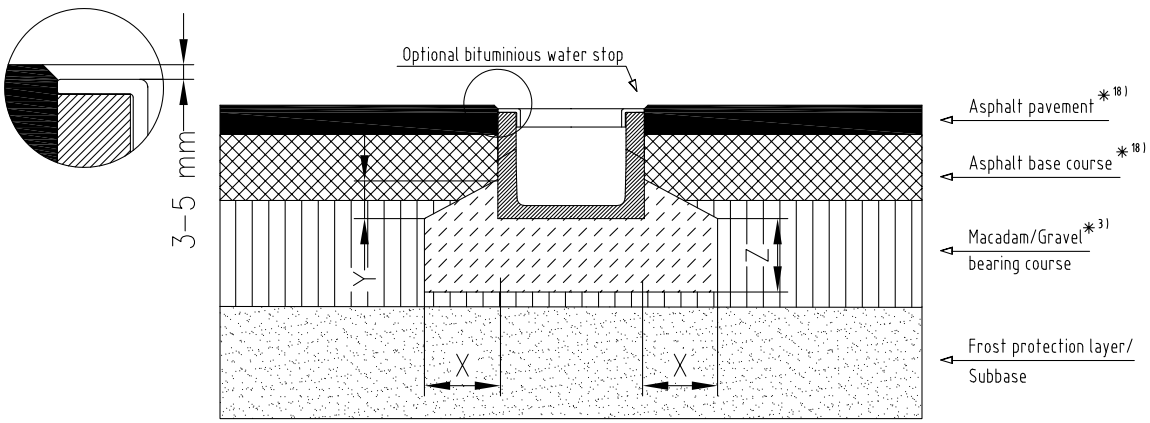


Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. quality for bedding concrete	(ref. EN 206-1)	≥ C 12/15	Not available for this load class, please use appropriate channel system like Multiline, PowerDrain, SK, Qmax or Monoblock				
Exposure class *16)		(X0)					
Bedding dimensions	X	≥ 10					
	Y	≥ 0					
	Z	≥ 10					

*...) please see list of footnotes at beginning of chapter drawings

Installation in asphalt areas, load class A 15

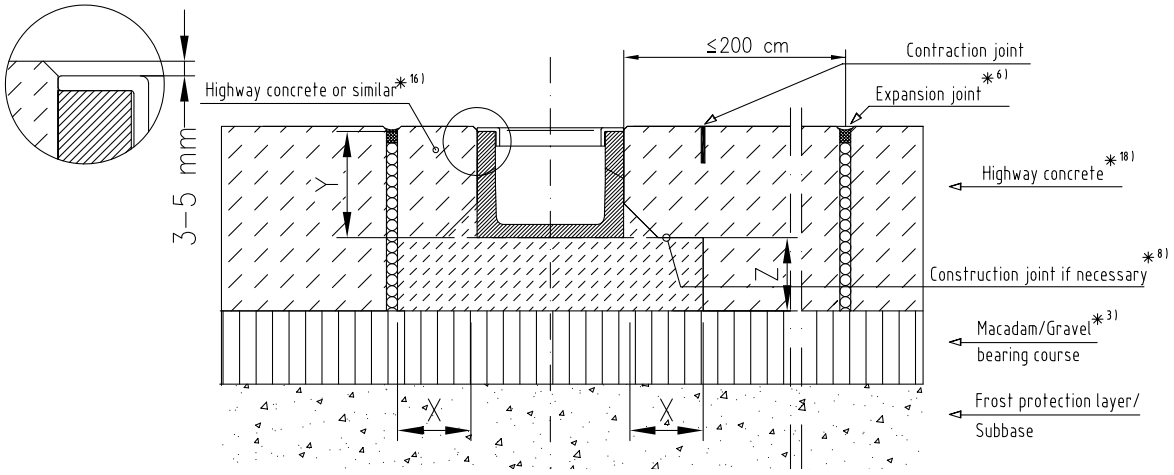


Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. quality for bedding concrete	(ref. EN 206-1)	≥ C 12/15	Not available for this load class, please use appropriate channel system like Multiline, PowerDrain, SK, Qmax or Monoblock				
Exposure class *16)		(X0)					
Bedding dimensions	X	≥ 10					
	Y	≥ 0					
	Z	≥ 10					

*...) please see list of footnotes at beginning of chapter drawings

Installation in concrete areas, load class A 15



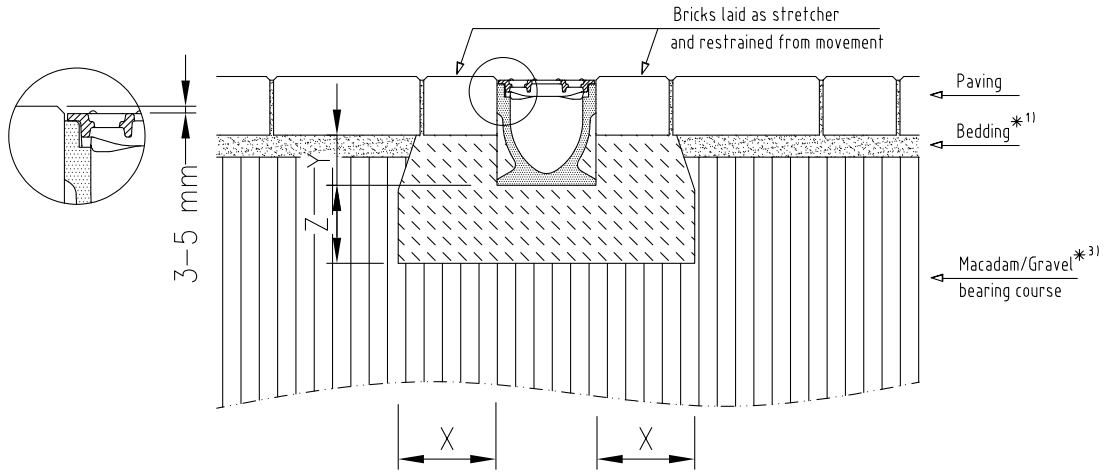
Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	**A 15**	**B 125**	**C 250**	**D 400**	**E 600**	**F 900**
Min. quality for bedding concrete	(ref. EN 206-1)	≥ C 12/15	Not available for this load class, please use appropriate channel system like Multiline, PowerDrain, SK, Qmax or Monoblock				
Exposure class *16)		(X0)					
Bedding dimensions	**X**	≥ 10					
	Y	Height of channel					
	Z	≥ 10					

*...) please see list of footnotes at beginning of chapter drawings

ACO Galaline

Installation in paved areas, load class A 15 to C 250

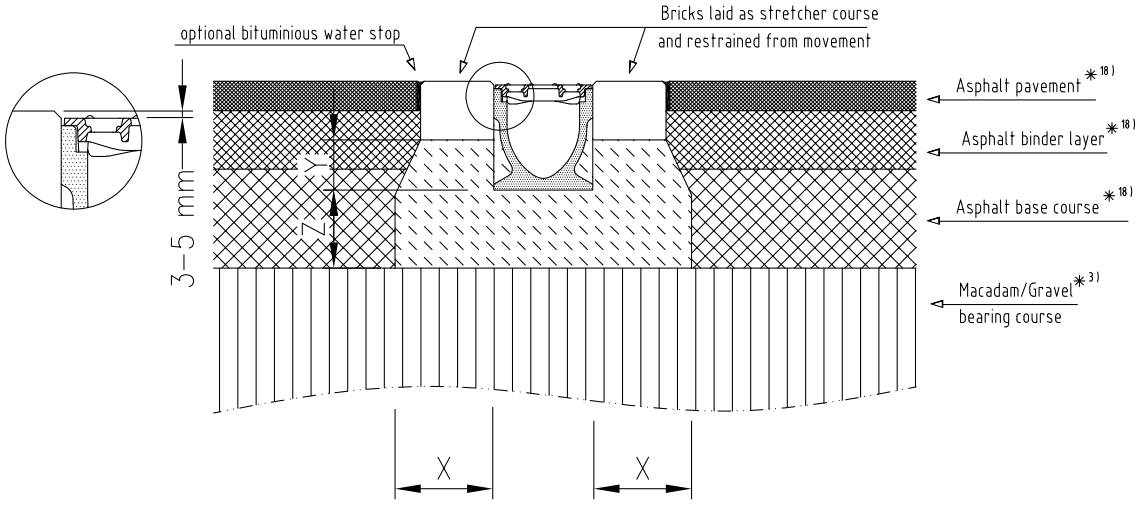


Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. quality for bedding concrete	(ref. EN 206-1)	≥ C 12/15	≥ C 12/15	≥ C 20/25	Not available for this load class, please use appropriate channel system like Multiline, PowerDrain, SK, Qmax or Monoblock		
Exposure class *16)		(X0)	(X0)	(X0)			
Bedding dimensions	X	≥ 10	≥ 10	≥ 15			
	Y	Bottom of stretcher					
	Z	≥ 10	≥ 10	≥ 15			

*...) please see list of footnotes at beginning of chapter drawings

Installation in asphalt areas, load class A 15 to C 250



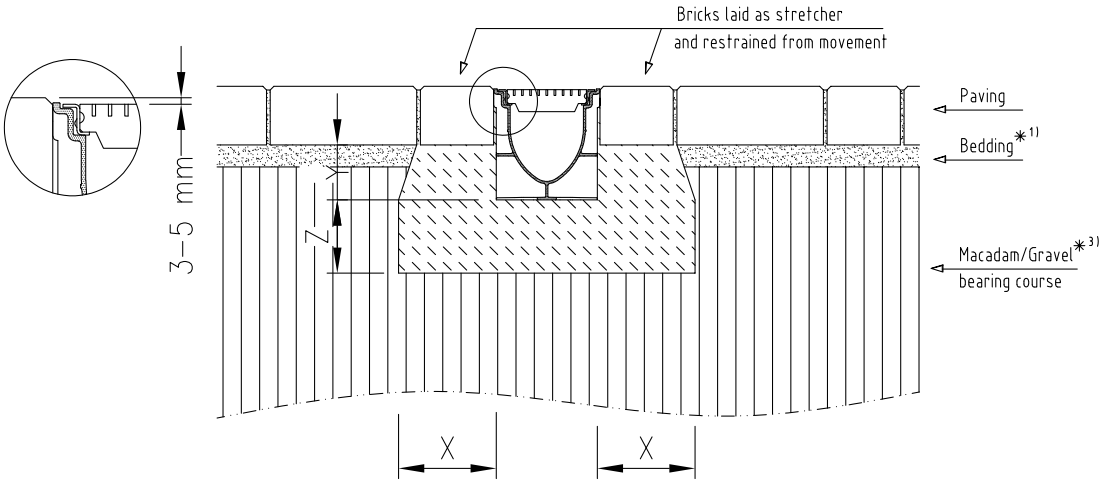
Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load Class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. quality for bedding concrete	(ref. EN 206-1)	≥ C 12/15	≥ C 12/15	≥ C 20/25	Not available for this load class, please use appropriate channel system like Multiline, PowerDrain, SK, Qmax or Monoblock		
Exposure class *16)		(X0)	(X0)	(X0)			
Bedding dimensions	X	≥ 10	≥ 10	≥ 15			
	Y	Bottom of stretcher					
	Z	≥ 10	≥ 10	≥ 15			

*...) please see list of footnotes at beginning of chapter drawings

ACO Galaline PP

Installation in paved areas, load class A 15 to B 125

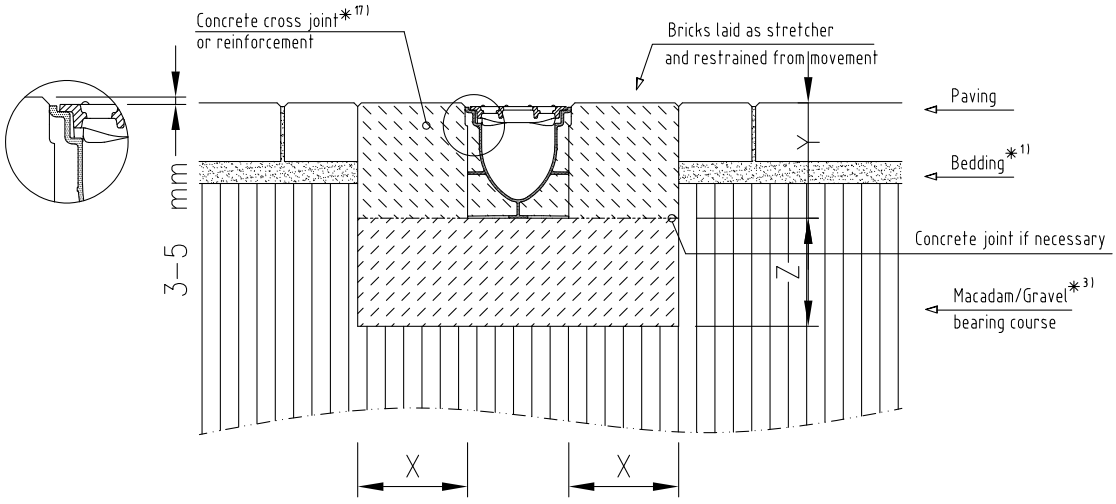


Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. quality for bedding concrete	(ref. EN 206-1)	≥ C 12/15	≥ C 12/15	Not available for this load class, please use appropriate channel system like Multiline, PowerDrain, SK, Qmax or Monoblock			
Exposure class *16)		(X0)	(X0)				
Bedding dimensions	X	≥ C 10	≥ C 10				
	Y	Bottom of stretcher					
	Z	≥ C 10	≥ C 10				

*...) please see list of footnotes at beginning of chapter drawings

Installation in paved areas, load class C 250



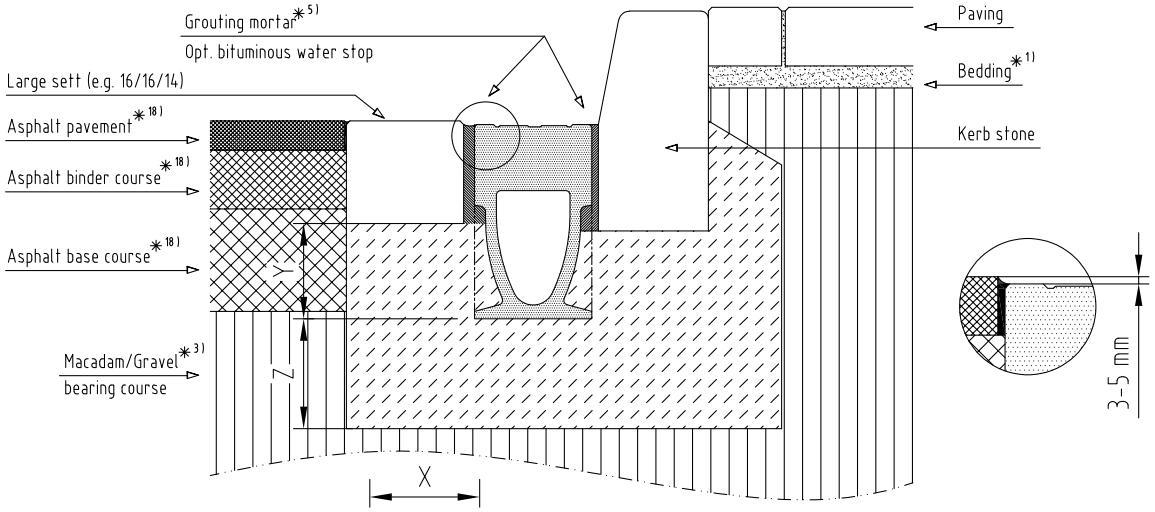
Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. quality for bedding concrete	(ref. EN 206-1)			≥ C 20/25	Not available for this load class, please use appropriate channel system like Multiline, PowerDrain, SK, Qmax or Monoblock		
Exposure class *16)				(X0)			
Bedding dimensions	X			≥ 15			
	Y			Bottom of stretcher			
	Z			≥ 15			

*...) please see list of footnotes at beginning of chapter drawings

Special installation advices for ACO DRAIN® channels for various applications

Installation of Monoblock RD or PowerDrain at roadside, load class C 250 to D 400

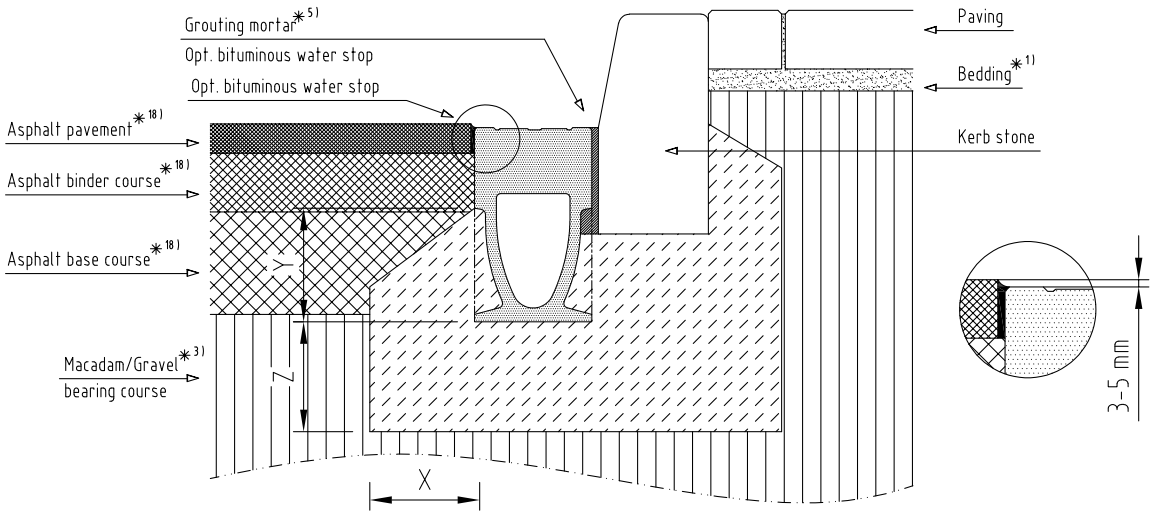


Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. quality for bedding concrete	(ref. EN 206-1)			≥ C 20/25	≥ C 25/30		
Exposure class *16)				(X0)	(X0)		
Bedding dimensions	X			≥ 15	≥ 20		
	Y			Bottom of large sett			
	Z			≥ 15	≥ 20		

*...) please see list of footnotes at beginning of chapter drawings

Installation of Monoblock RD or PowerDrain at roadside, load class C 250 to D 400

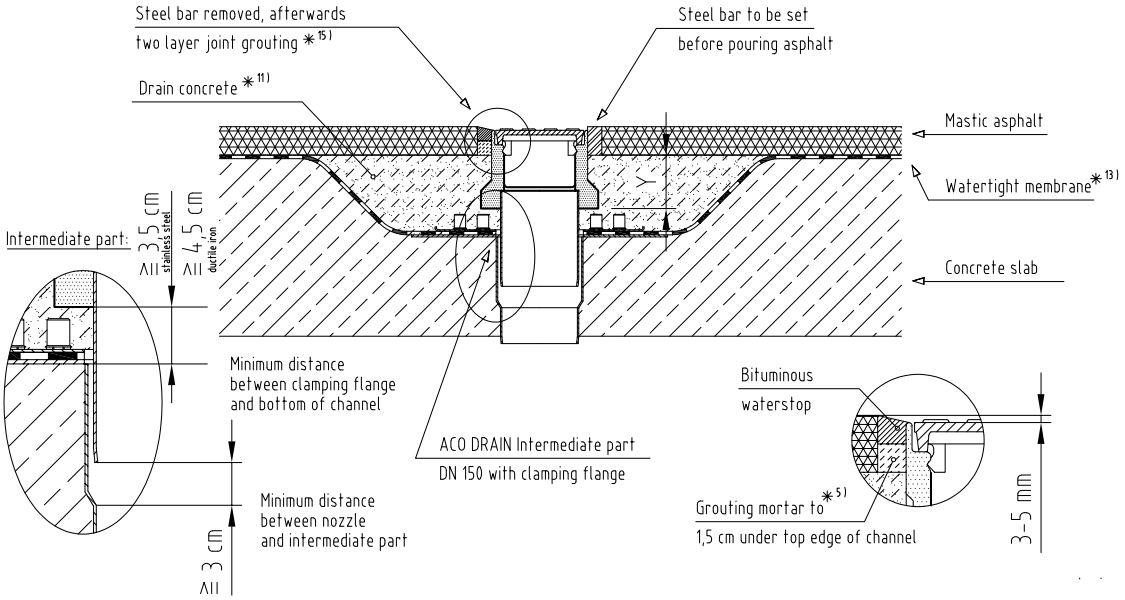


Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. quality for bedding concrete	(ref. EN 206-1)			≥ C 20/25	≥ C 25/30		
Exposure class *16)				(X0)	(X0)		
Bedding dimensions	X			≥ 15	≥ 20		
	Y	Top edge of side pocket*2)					
	Z			≥ 15	≥ 20		

*...) please see list of footnotes at beginning of chapter drawings

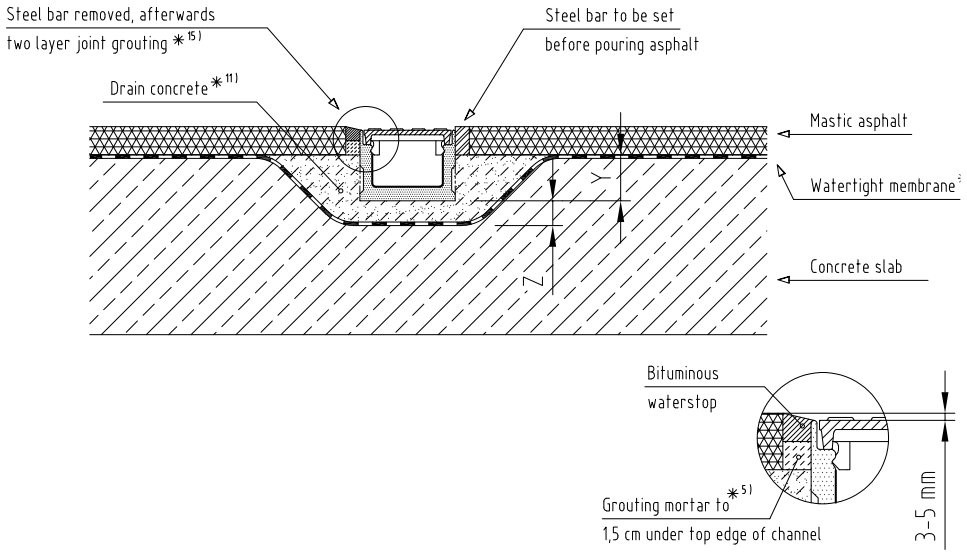
Installation in concrete slab with connection of second layer, load class A 15 to E 600



		ACO DRAIN Multiline			ACO DRAIN PowerDrain		
Load class (ref. EN 1433)		**A 15**	**B 125**	**C 250**	**D 400**	**E 600**	**F 900**
Min. quality for bedding concrete (ref. EN 206-1)	**Z**	≥ 2 resp. in area of intermediate part as shown in detail					
	Y	Heigt of channel, minus mastic asphalt layer					

*...) please see list of footnotes at beginning of chapter drawings

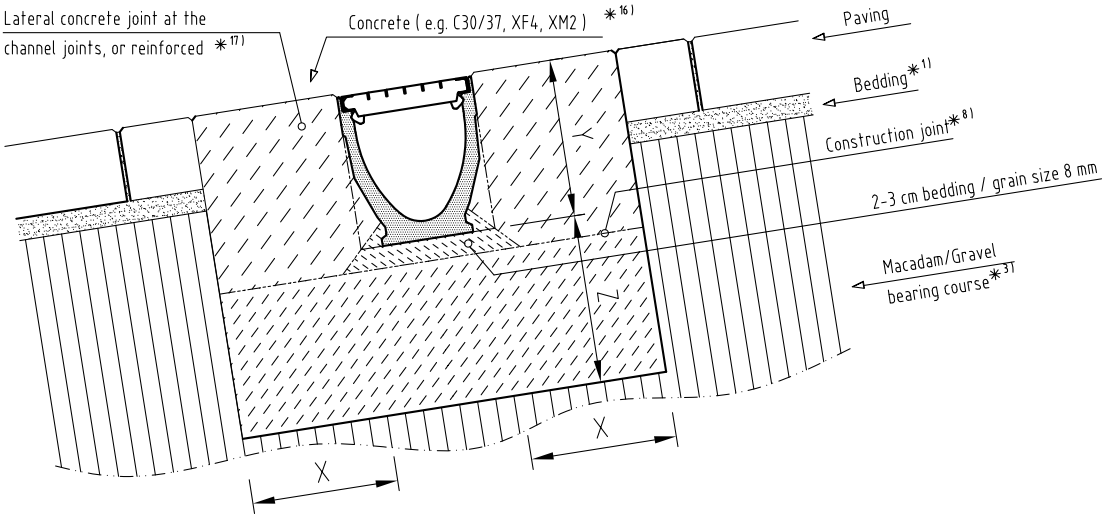
Installation in concrete slab, load class A 15 to E 600



Load class	(ref. EN 1433)	**A 15**	**B 125**	**C 250**	**D 400**	**E 600**	**F 900**
Min. quality for bedding concrete	(ref. EN 206-1)	Cementitious or resin-based mortar					
	X/Z*5)	≥ 2	≥ 2	≥ 2	≥ 2	≥ 2	≥ 2
	Y	Height of channel					

*...) please see list of footnotes at beginning of chapter drawings

Installation in concrete ramp, load class B 125 to C 250

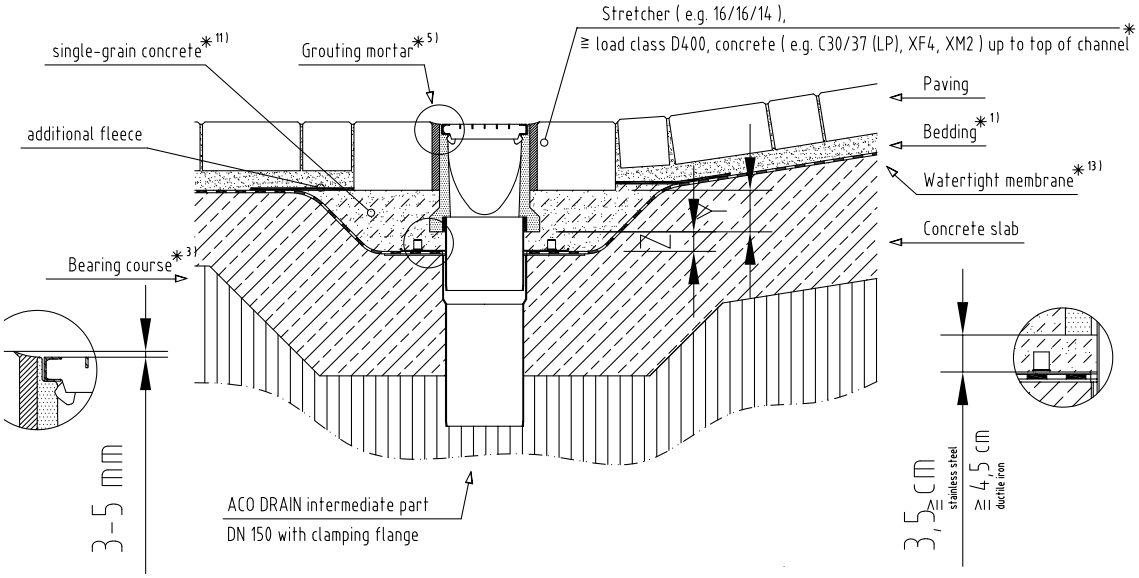


Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

		ACO DRAIN Multiline			ACO DRAIN PowerDrain		
Load class	(ref. EN 1433)	**A 15**	**B 125**	**C 250**	**D 400**	**E 600**	**F 900**
Min. quality for bedding concrete	(ref. EN 206-1)		≥ C 12/15	≥ C 20/25	Project specific design might be required.		Not available for this load class, please use appropriate channel system like Multiline, PowerDrain, SK, Qmax or Monoblock
Exposure class *16)			(X0)	(X0)			
Bedding dimensions	**X**		≥ 15	≥ 15			
	Y		Height of channel				
	Z		≥ 15	≥ 15			

*...) please see list of footnotes at beginning of chapter drawings

Installation in paved ramp, load class B 125 to C 250

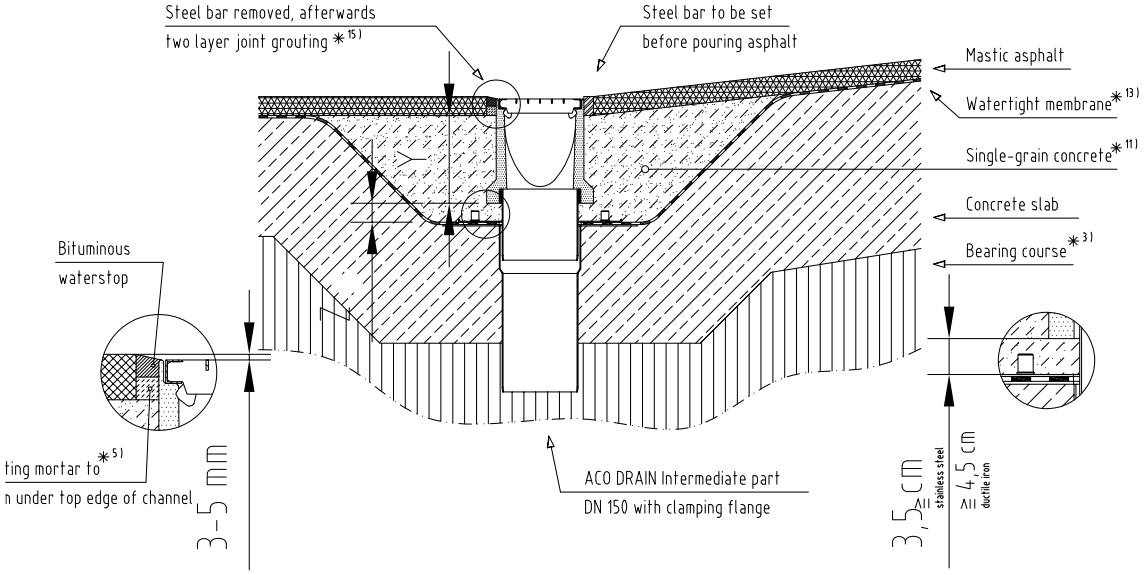


Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

		ACO DRAIN Multiline			ACO DRAIN PowerDrain	
Load class	(ref. EN 1433)	**A 15**	**B 125**	**C 250**	**D 400**	**E 600**
Meassurement for foundation – Type M (ref. EN 206-1)	**Z**		≥ 2 (above intermediate part see Detail)		on demand	on demand
	Y	Height of channel, minus height of stretcher				

*...) please see list of footnotes at beginning of chapter drawings

Installation in asphalt ramp, load class B 125 to C 250

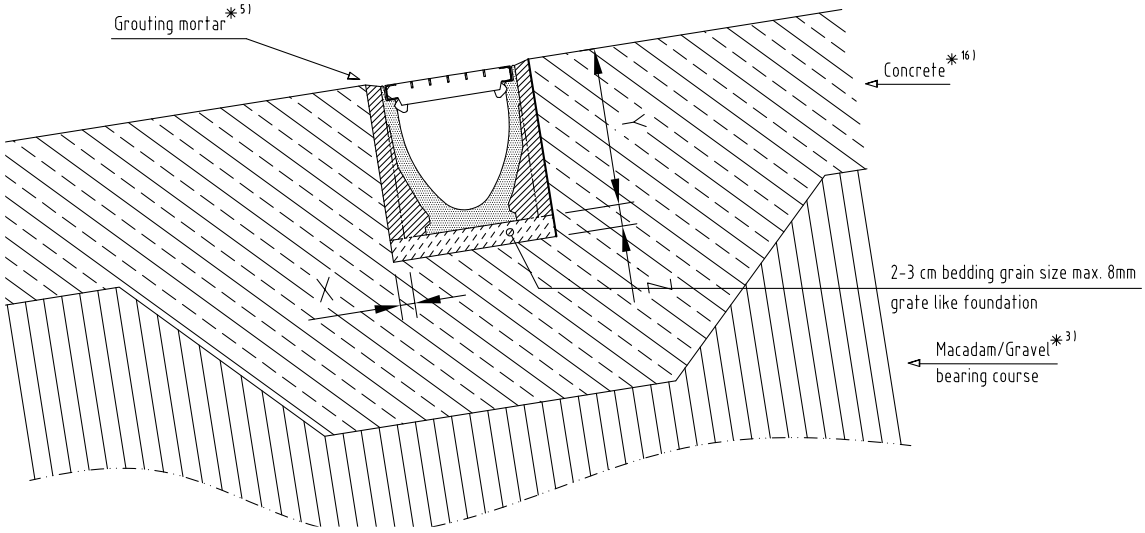


Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

		ACO DRAIN Multiline			ACO DRAIN PowerDrain	
Load class	(ref. EN 1433)	**A 15**	**B 125**	**C 250**	**D 400**	**E 600**
Meassurement for foundation – Type M (ref. EN 206-1)	**Z**		≥ 2 (above intermediate part see Detail)		on demand	on demand
	Y	Height of channel, minus height of stretcher				

*...) please see list of footnotes at beginning of chapter drawings

Installation in concrete ramp, load class B 125 to C 250



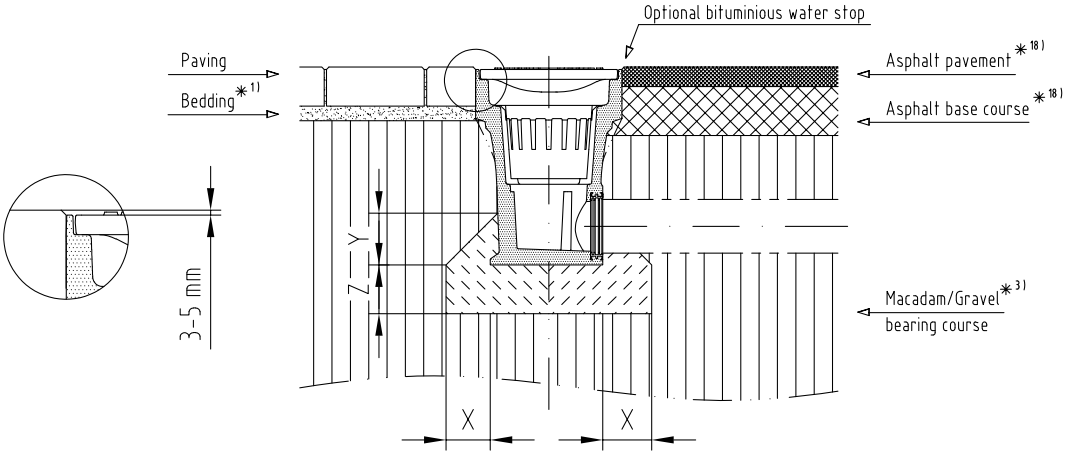
Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

		ACO DRAIN Multiline			ACO DRAIN PowerDrain	
Load class	(ref. EN 1433)	**A 15**	**B 125**	**C 250**	**D 400**	**E 600**
Meassurement for foundation – Type M (ref. EN 206-1)	**Z**		≥ 2	≥ 2	on demand	on demand
	Y		Height of channel			

*...) please see list of footnotes at beginning of chapter drawings

ACO DRAIN® Multipoint

Installation in paved/asphalt areas, load class A 15 to B 125

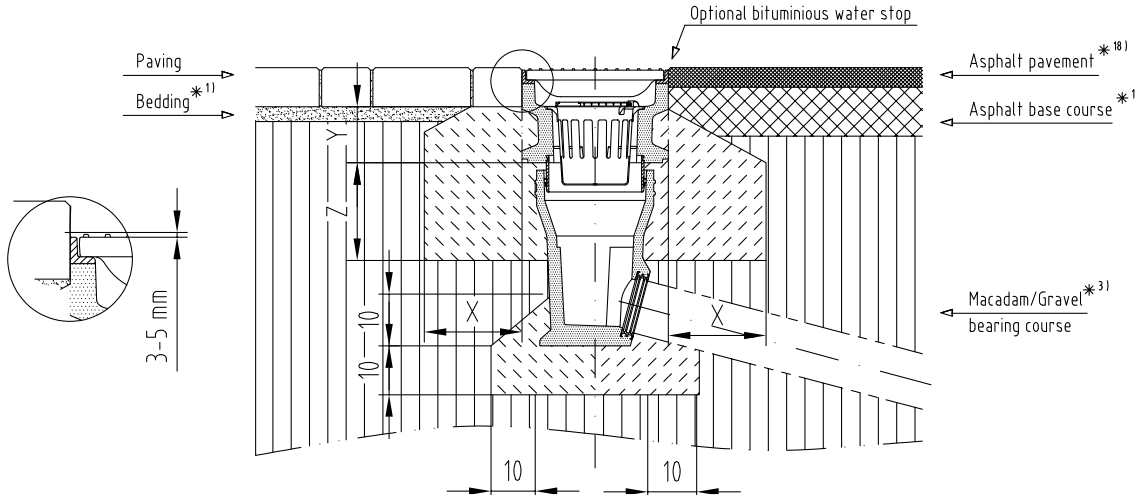


Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. quality for bedding concrete	(ref. EN 206-1)	≥ C 12/15	≥ C 12/15	This way of installation is NOT recommended for applications with load classes higher than B 125.			
Exposure class *16)		(X0)	(X0)				
Bedding dimensions – type M	X / Y / Z	≥ 10	≥ 10				

*...) please see list of footnotes at beginning of chapter drawings

Installation in paved/asphalt areas, load class A 15 to D 400

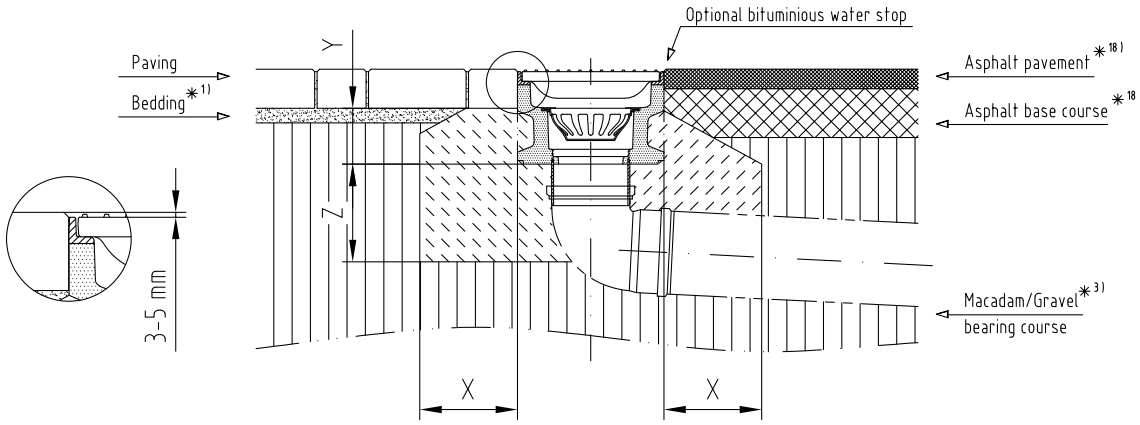


Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. quality for bedding concrete	(ref. EN 206-1)	≥ C 12/15	≥ C 12/15	≥ C 20/25	≥ C 25/30	Not available for this load class. Please use appropriate gullies like Combipoint or ACO DRAIN© Point gullies for load classes up to F 900.	
Exposure class *16)		(X0)	(X0)	(X0)	(X0)		
Bedding dimensions	X	≥ 10	≥ 10	≥ 20	≥ 20		
	Y	≥ 5	≥ 5	Top edge of side pocket*2)	Top edge of side pocket*2)		
	Z	≥ 10	≥ 10	≥ 20	≥ 20		

*...) please see list of footnotes at beginning of chapter drawings

Installation in paved/asphalt areas, load class A 15 to D 400



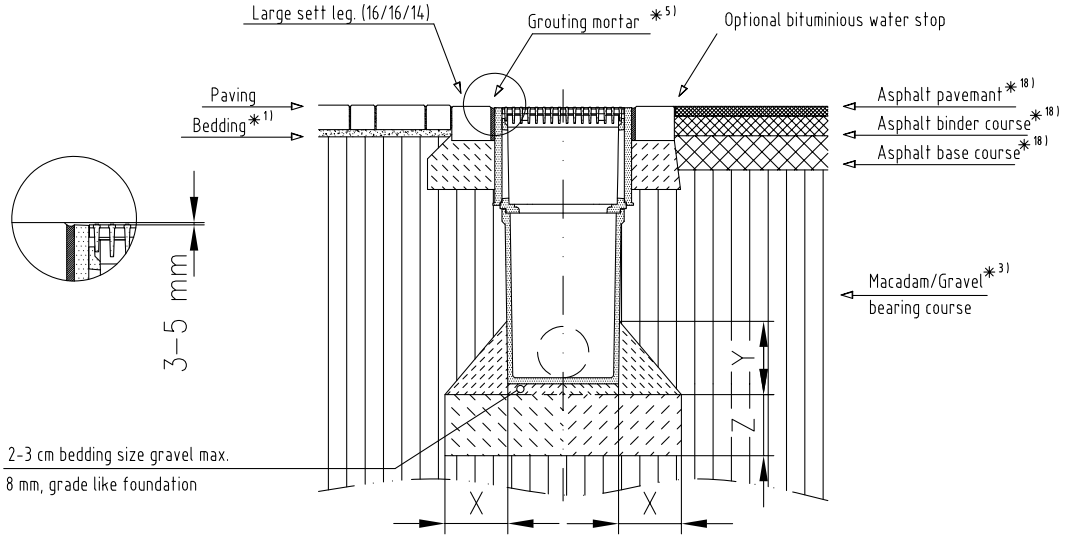
Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load Class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. Quality for Bedding Concrete	(ref. EN 206-1)	≥ C 12/15	≥ C 12/15	≥ C 20/25	≥ C 25/30	Not available for this load class. Please use appropriate gullies like Combipoint or ACO DRAIN© Point gullies for load classes up to F 900.	
Exposure class *16)		(X0)	(X0)	(X0)	(X0)		
Bedding Dimensions	X	≥ 10	≥ 10	≥ 20	≥ 20		
	Y	≥ 5	≥ 5	Top edge of side pocket*2)	Top edge of side pocket*2)		
	Z	≥ 10	≥ 10	≥ 20	≥ 20		

*...) please see list of footnotes at beginning of chapter drawings

ACO DRAIN® gully

Installation in paved/asphalt areas, load class D 400 to E 600



Not for lateral crossing on high frequent roads, in housing estates or in front of railway crossings!

Load class	(ref. EN 1433)	A 15	B 125	C 250	D 400	E 600	F 900
Min. quality for bedding concrete	(ref. EN 206-1)				≥ C 25/30	≥ C 25/30	Project specific design might be required.
Exposure class *16)					(X0)	(X0)	
Bedding dimensions – type M	X / Y / Z				≥ 20	≥ 20	

*...) please see list of footnotes at beginning of chapter drawings

Special installation advices for ACO Combipoint PP

Installation advice Combipoint PP
This street gully is a modular system based on 5 different plastic parts and fitting frames with grate.
All 5 parts are prefabricated plastic parts made of solid polypropylene PP and are made analogous to concrete parts acc. 4052. The cone, middle and top parts are telescopic, rotatable, tilt able and water-tight up to 0,5 bar pressure acc. 4060. Frames and Grates are acc. EN 124. They have an all-round dripping edge which fits into the top part and cone.

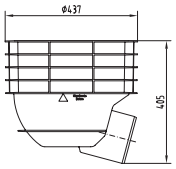
Because of the design of the slots it is usable for pedestrian areas, beside kerbstones, inside streets, for industrial areas and for all direction overdrive.
For installation in streets always use grates for class D 400 application.
Attention: For safety reasons always grab the frame for transportation.

General installation advice
As the producer we give general valid proposals for the installation of gullies in trafficked areas. The specified way of installation is always to give by the planner under considering the local circumstances. During installation of Combipoint grates have following standards to be considered:
- For setup of specifications ATV 18299
- For installation VOB/C, 18318
- ZTVT-StB
- RStO

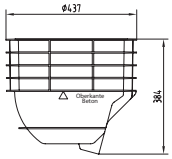
Before installation all parts have to checked in respect of damage.
For installation beside kerbstone both directions for slots is allowable. For a better hydraulic performance we recommend to put the slots across driving direction.

Raiser
Final height can be adjusted up to 12 cm by using a raiser. Height 12 cm, cuttable on site, PE.

- For Combipoint PP 300 x 500 mm – art.no.: 89063
- For Combipoint PP 500 x 500 mm – art.no.: 89064

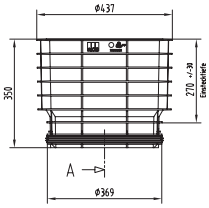


Combipoint PP bottom 1a,
round, turnable, with socket DN/OD 160, connection angel 15°, weight: 2,6 kg, height: 35 cm, material polypropylene
Art. no. 89010

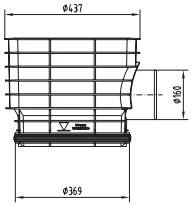


Combipoint PP bottom 2a,
round, turnable, without socket for application silt trap, weight: 2,5 kg, height: 35 cm, material polypropylene,
Art. no. 89011

Combipoint PP cone 11
with EPDM-seal, 8% tilt allowable, weight: 2,6 kg, height: 35 cm, inserted height: 270 mm ±30mm, material polypropylene,
Art. no. 89012



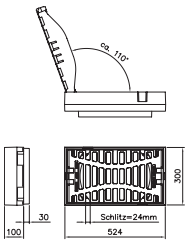
Combipoint PP top-/middle part 5b/6a, with EPDM-seal, 8% tilt allowable, weight: 2,6 kg, height: 35 cm, inserted height: 270 mm ±30mm, material polypropylene,
Art. no. 89013



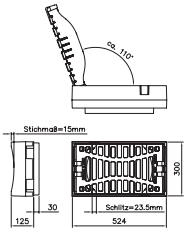
Combipoint PP middle part 3
with EPDM-seal, with socket DN/OD 160, 8% tilt allowable, weight: 2,8 kg, height: 35 cm, inserted height: 280 mm +10/-5 mm, material polypropylene,
Art. no. 89014

Overview of frame with grate acc. EN 124 and E 1229

For Combipoint PP 300 x 500 mm, load class C 250/D 400

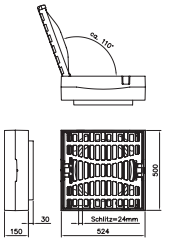


console shaped

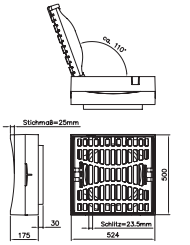


channel shaped

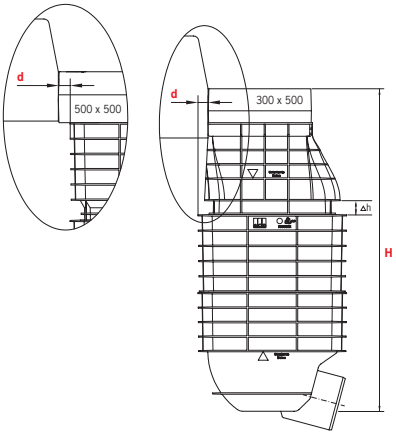
For Combipoint 500 x 500 mm, load class C 250/D 400



console shaped

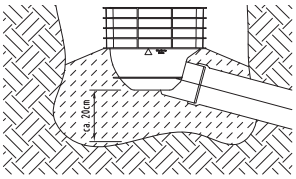


channel shaped

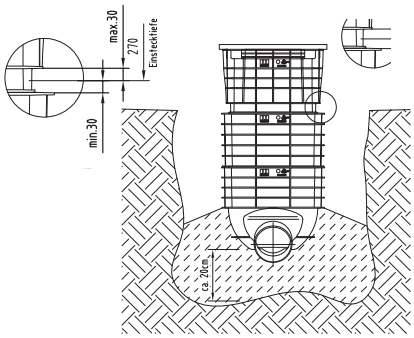


For installation of Combipoint PP the general rules of construction technology have to be considered. Especially EN 1610, 18196 and 18316 have to be considered. The respective height is depending on the chosen application and frame with grate.
A tolerance in height of ± 30mm is given by the telescopic feature of the top part. Installation height can be increased by 230mm with each additional middle part.

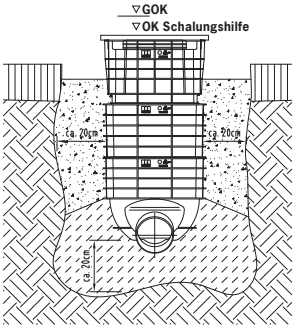
Kind of grating		300 x 500		500 x 500	
		console shape	channel shape	console shape	channel shape
Height of frame (mm)		100	125	150	170
Height (mm)	short version	720	745	770	795
	long version	950	975	1000	1025
Distance to kerbstone d (mm)		-30	-30	+33	+33



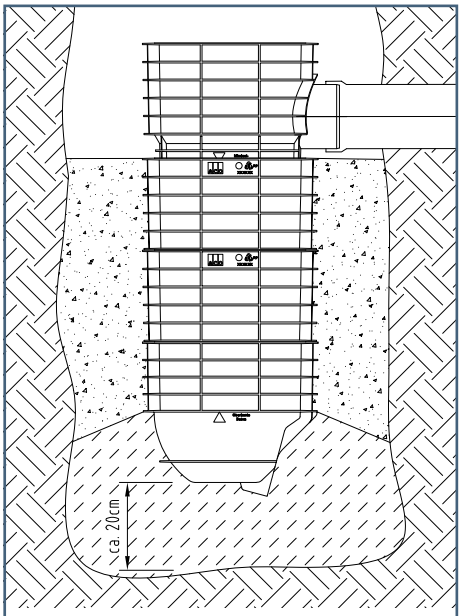
1. Connect Combipoint PP bottom 1a to ground pipe and set it on foundation. Fill concrete up to the first rib of the Combipoint bottom part.



2. Connect all following parts to the bottom. Before connecting remove the protection membrane and check the sealant in respect of breakage. It´s advisable to lubricate the sealant before connecting. Consider minimum insertion depth (270mm +/- 30mm for part 89012 and 280mm +/- 10mm for part 89013). Pins for installation support will break during installation. Only top part should be installed at minimum insertion depth if necessary. All middle parts should be connected with a height of 240mm.

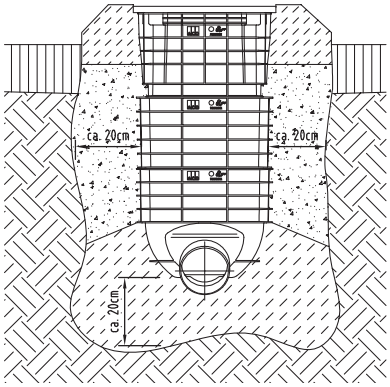


3. Fill in gravel/sand 0 -32 mm up to the mark of the top part. Compact the filling material to a Proctor-density of 95% with light weight compaction equipment only. Don´t get in contact with the PP-parts during compaction. Please use the EPS-formwork for a smart installation.

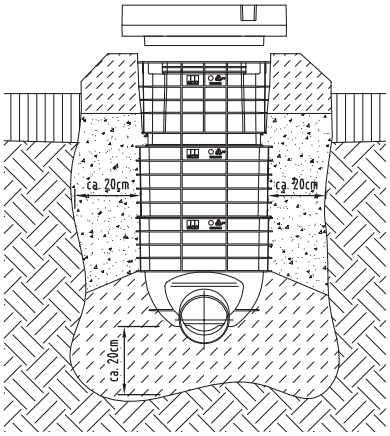


Please consider for application silt trap:
Connect bottom 2a and middle parts 6a like described in point 1. - 3. Install middle part 3 with socket at the needed height.
Inserted height of 280 mm +10/-5 mm.

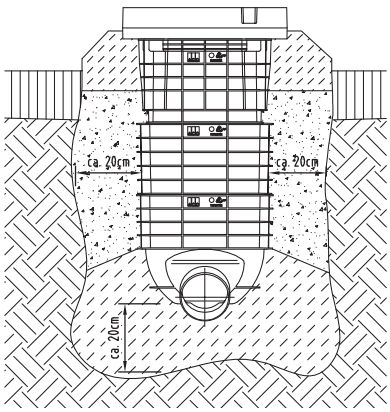
Kind of grating	300 x 500		500 x 500	
	console shape	channel shape	console shape	channel shape
Distance from surface street to top edge of Combipoint (mm)	80	100	130	155



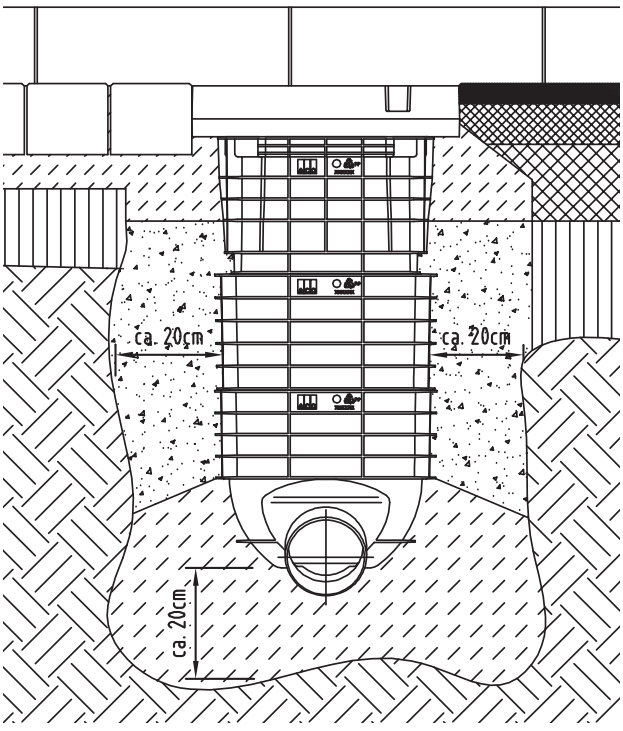
4. Pour concrete (C12/15) around top part acc. to EN 206-1. Use the formwork to build up the perfect height of 2 cm above the top part.

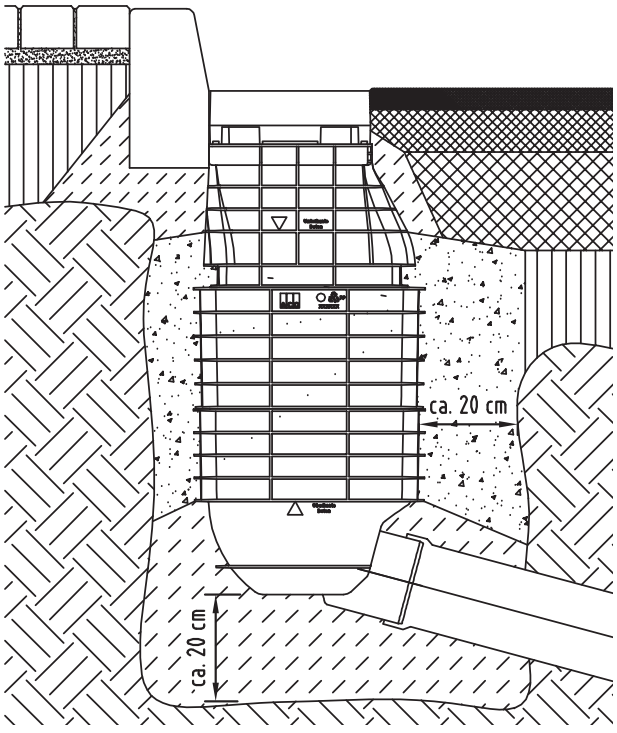


5. Remove the EPS-formwork and press the cover (frame and grating) into the fresh/ wet concrete down to the edge of the top part. Please consider the final height of the gully. The all-round dripping edge on the downside of the frame fits into the opening of the top part and makes the whole system stiffer.



6. After breaking the edges of the EPS-formwork you can use it as a dirt cover during remaining works on site.





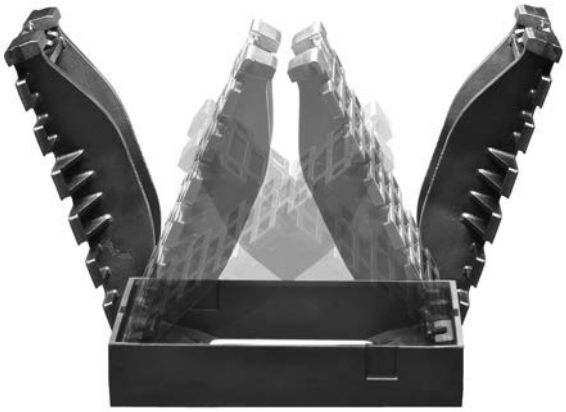
7. Please act according local rules and regulatives when installing adjacent surface.

Operation of the frame with grate

Open the grate

1. Insert suitable tool, e.g. Multitop handling tool (art.no.: 600643), at one of the recesses at the head side of the frame and press tool down to lift the grate.

2. Open grate until stop collar.



Attention: Grate cannot be removed from frame in open position. In very steep location we recommend opening the grate downhill.

Closing the open grate

1. Optical check of frame, grate and damping inlet. Replace broken or damaged parts.
2. Clean contact areas.
3. Close grate.
4. Step on grate to lock it.

Remove grate

1. Loosen both sides of grate like described in point 1. in chapter “Open the Grate”.
2. Lift the grate with two hands and store it outside the frame.

Replace and arrest the grate

1. Optical check of frame, grate and damping inlet. Replace broken or damaged parts.
2. Clean contact areas.
3. Close grate.
4. Step on grate to arrest it.

General installation advice

As the producer of draining systems we give general valid proposals for the technical correct way of installation this system inside trafficked areas. The specified way of installation is always to give and to check by the planner under considering the local circumstances and the standards of construction technology.

ACO SPORT® systems

All ACO SPORT® systems are made for applications on sport fields, stadiums and playgrounds, where no regular traffic will take place. To have a proper track or field drainage system a careful planning, a correct installation and a regular maintenance are necessary.

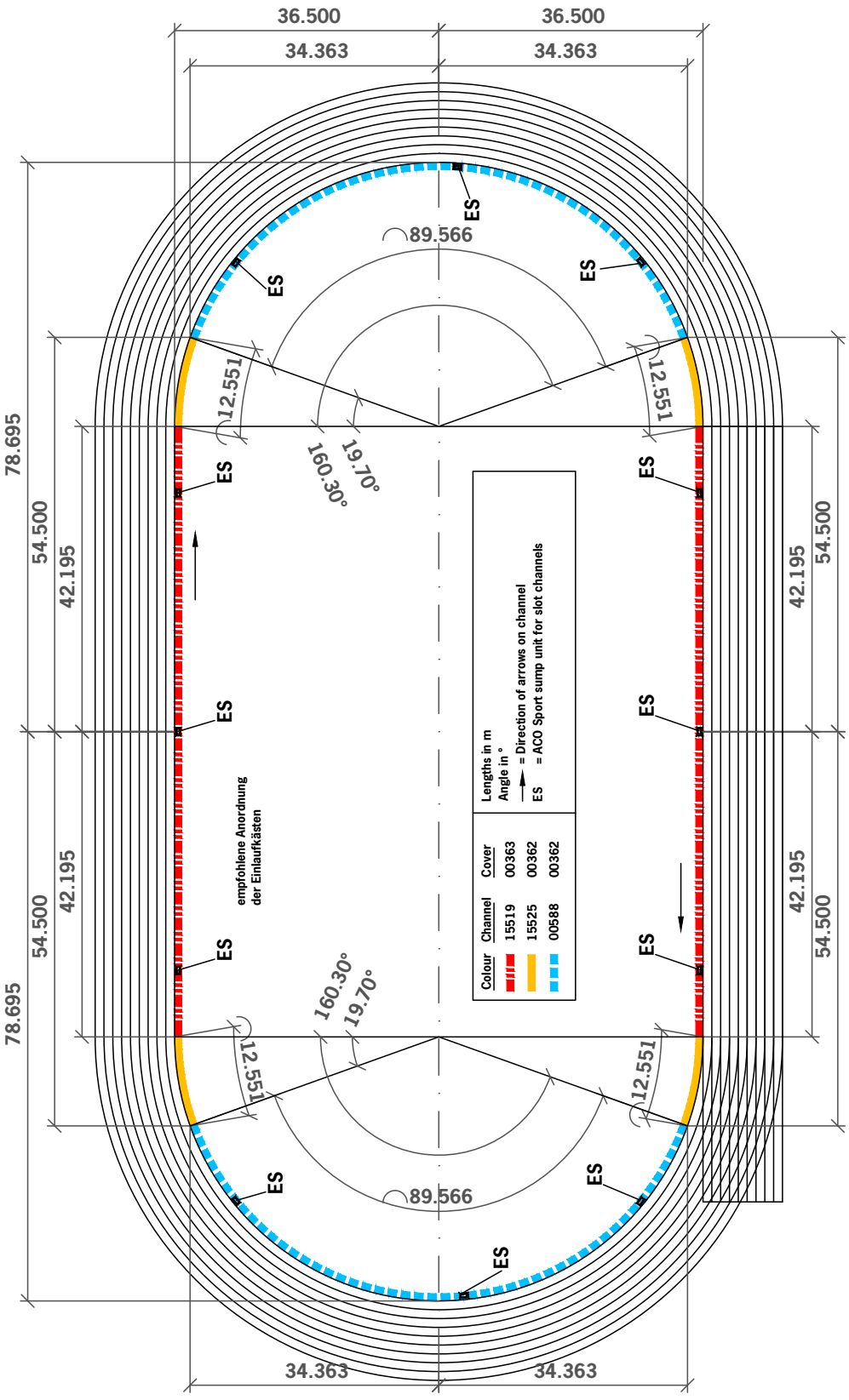
All concrete features given in following details are minimum values. Especially local circumstances have to be considered by the planer. Generally the installation only should take place according an installation advice confirmed by the planer.

Please always consider all previous recommendations regarding polyester resin concrete made channels in this guideline if you need information about expansion joints, cutting of channels or gluing parts together.

All following installation advices are not according any load class. The products themselves are produced according 18035 and are conform to the regulation of the IAAF (International Association of Athletics Federations). The main target is to drain down the running track as fast and safe as possible.

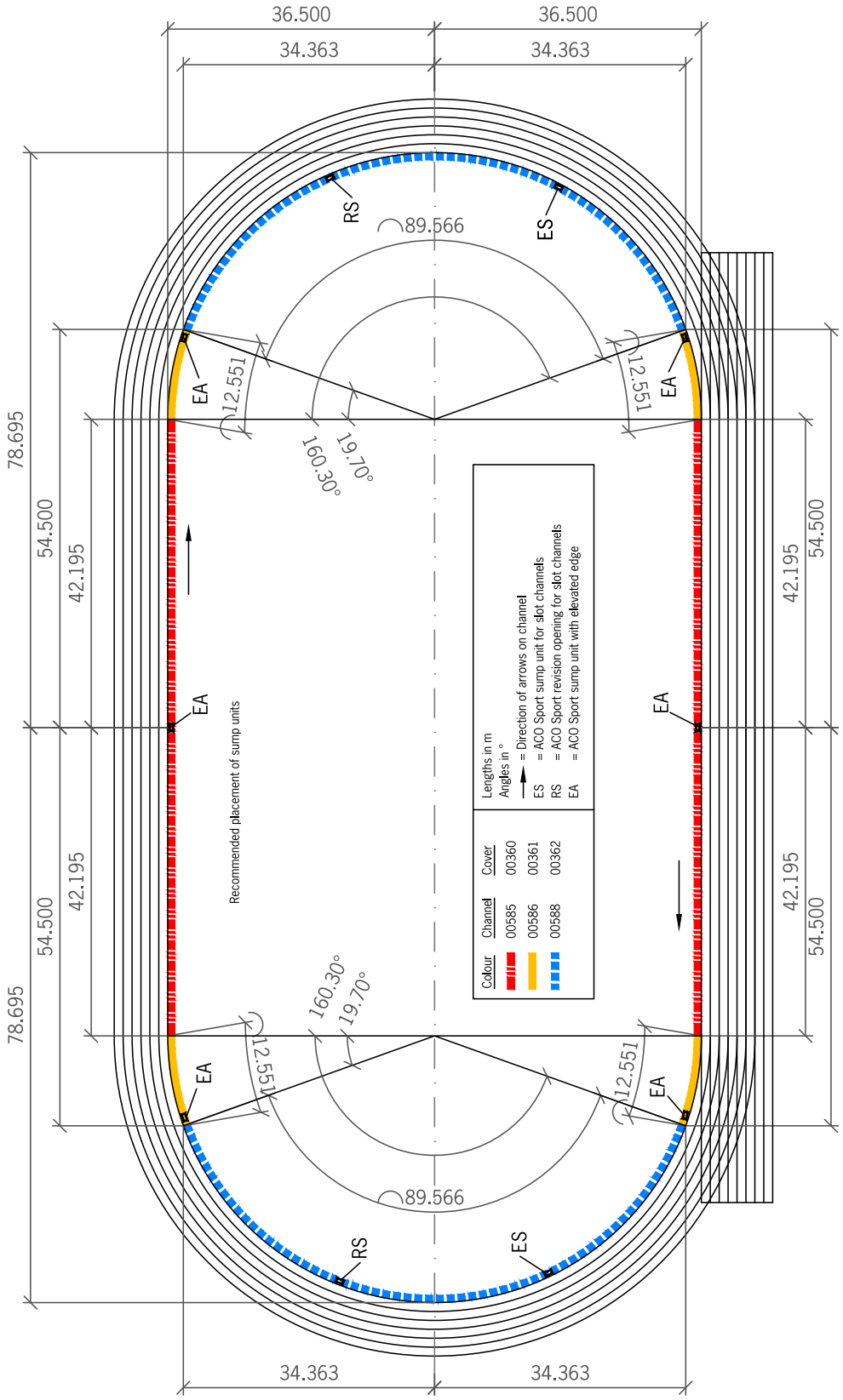
Laying plan example for track type A at following circumstances:

- Track and field have same level
- Artificial layer of track and sector
- Lawn as field

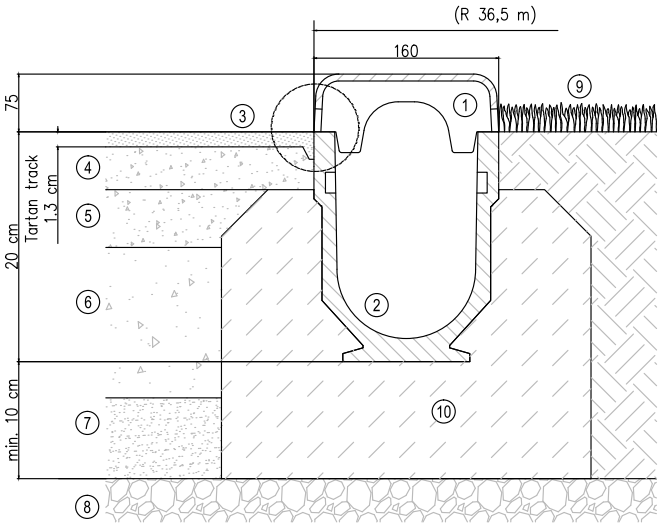


Laying plan example for track type B at following circumstances:

- Field 5 cm higher than track and sector. Track and sector of same level
- Artificial layer on track and sector
- Lawn or filled artificial turf as field

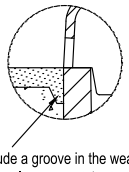


Installation of ACO SPORT® box channel



1 ACO SPORT composite cover
2 ACO SPORT channel NW 125
3 Tartan layer 13 mm (Running track)
4 Wearing course
5 Base course
6 Sub-base course
7 Filter layer
8 Planum
9 Lawn
10 Concrete bed and haunching
Concrete grade acc. EN 206-1: C 12/15

Detail

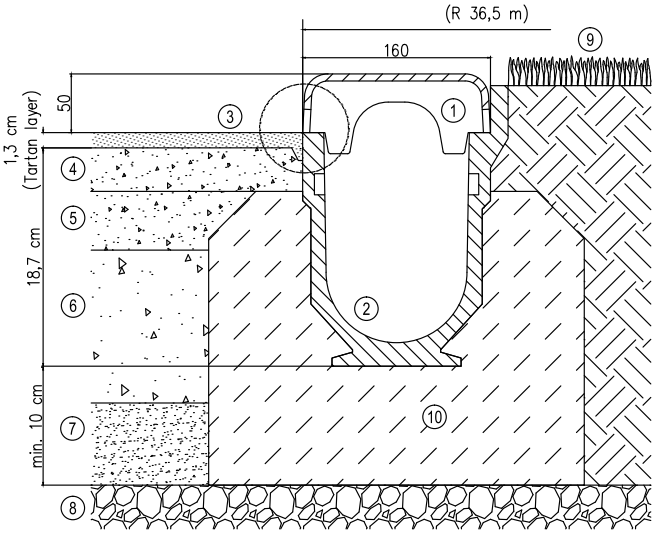


Include a groove in the wearing course alongside the channel to connect the tartan layer proper to the edge of the running track. For a optimized adherence of the tartan layer please paint the channel edge with primer before laying the running track.

Installation advice:

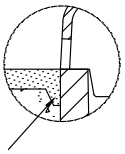
Place the channels onto an unhardened concrete bedding with min. 100mm depth and 80mm wide haunching. The wooden spacers must remain in the channel until all surface works have been completed. The composite covers are connected to each other by a plug and pin system.

Installation of ACO SPORT® box channel



1 ACO SPORT composite cover
2 ACO SPORT channel NW 125
3 Tartan layer 13 mm (Running track)
4 Wearing course
5 Base course
6 Sub-base course
7 Filter layer
8 Planum
9 Lawn
10 Concrete bed and haunching
Concrete grade acc. EN 206-1: C 12/15

Detail

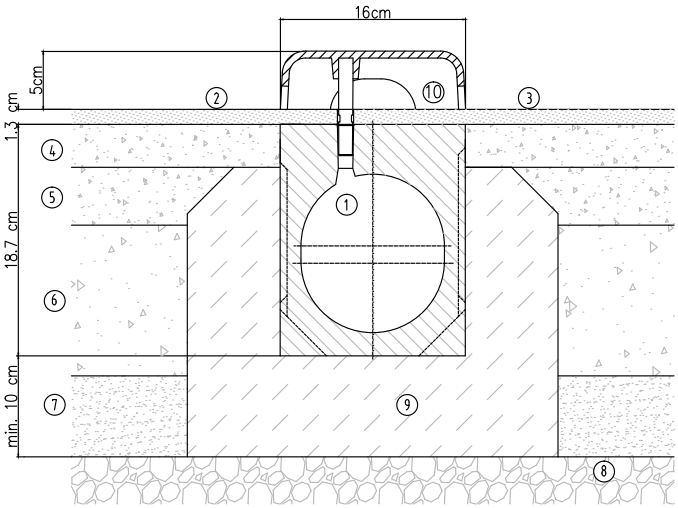


Include a groove in the wearing course alongside the channel to connect the tartan layer proper to the edge of the running track. For a optimized adherence of the tartan layer please paint the channel edge with primer before laying the running track.

Installation advice:

Place the channels onto an unhardened concrete bedding with min. 10cm depth and 80mm wide haunching. The wooden spacers must remain in the channel until all surface works have been completed. The composite covers are connected to each other by a plug and pin system.

Installation of ACO SPORT® slot channel, completely coatable

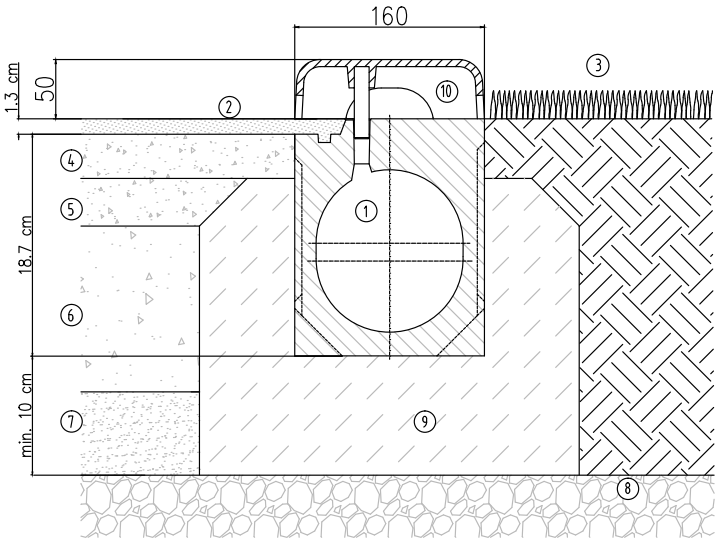


Installation advice:

Place the channels onto an unhardened concrete bedding with min. 100mm depth and 80mm wide haunching. The composite covers are connected to each other by a plug and pin system.

1. ACO SPORT channel NW 125
2. Tartan layer 13 mm (Running track)
3. Tartan layer 13 mm (Infield)
4. Wearing course
5. Base course
6. Sub-base course
7. Filter layer
8. Planum
9. Concrete bed and haunching
   Concrete grade acc. EN 206-1: C 12/15
10. Composite cover

Installation of ACO SPORT® slot channel, one side coatable

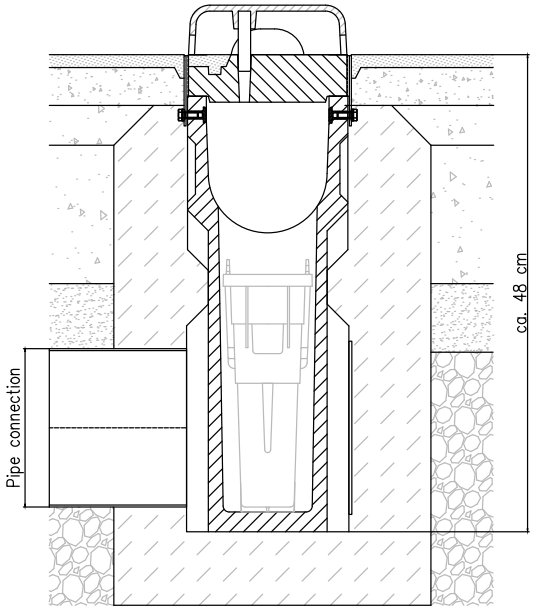


Installation advice:

Place the channels onto an unhardened concrete bedding with min. 100mm depth and 80mm wide haunching. The composite covers are connected to each other by a plug and pin system. By moving the bushings it is possible to adjust the covers..

1. ACO SPORT channel NW 125
2. tartan layer 13 mm (Running Track)
3. Lawn
4. Wearing course
5. Base course
6. Sub-base course
7. Filter layer
8. Planum
9. Concrete bed and haunching
   Concrete grade acc. EN 206-1: C 12/15
10. Composite cover

Installation of ACO SPORT® box or slot channel



Installation advice:

Installation according to appropriate channel system. Please place expansion joints like described in "Installation of ACO SPORT trough channel, to right and left of the sump unit.

At sump units for slot channels please install sump unit with top edge of steel frame 1–2mm under surface.

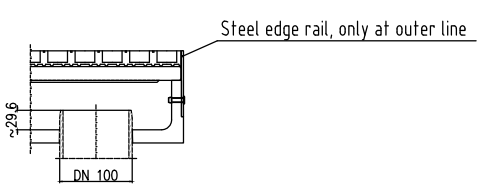
Connection of pipes to the preinstalled lip labyrinth sealing on the needed side of sump. Close other hole with attached plug.

The included plastic silt bucket is to be inserted from above.

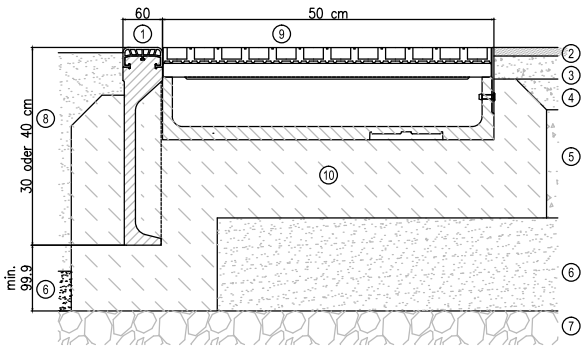
Installation of ACO SPORT® sand trap, single line

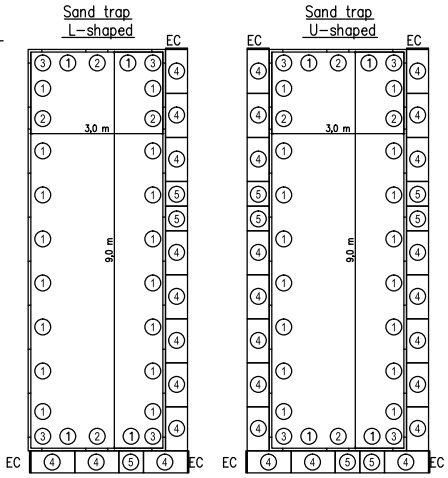
Installation advice:

ACO SPORT Elastic Sandtrap are installed together with ACO SPORT Elastic Kerb stone in a concrete bedding of minimum quality of C 12/15 acc. EN 206–1. After a leveled and aligned installation of the long jump pit the installation of the sand trap can be done. Sand traps shall be installed in areas where synthetic surface is, but not on take–off board side. Edges of channels shall be flush to the sand pit edge. Channels can be cutted on site with a grinder.Please pay attention, that at least one preformed knockout is open and connected to a DN100 pipe, which reaches app. 3cm high into the channel to avoid sand entering the pipe.



Outside channel





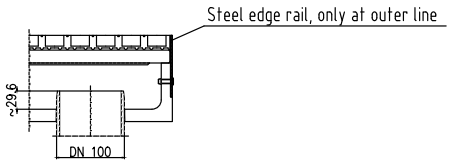
Pos.	Description	Art.-No.	pcs.
①	Kerb stone 100x40x6 cm, white elastic edge	00964	20
②	Kerb stone 50x40x6 cm, white elastic edge	01572	4
③	Cornerl 25/25x40x6 cm, white elastic edge	00969	4
④	Sand trap outer line 100x50 cm	01475	19
⑤	Sand trap outer line 56x50 cm	01477	6
EC	End cap for sand trap	15571	4

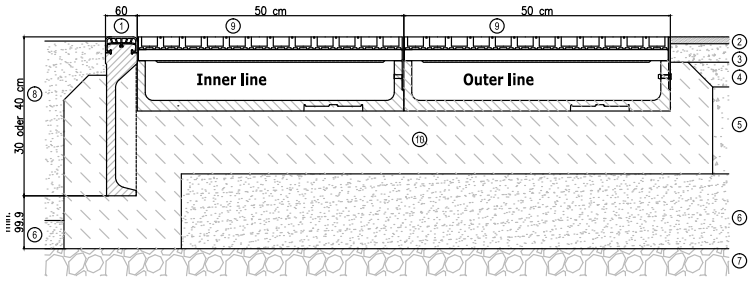
① ACO SPORT Elastic kerb stone
② Tartan layer 13 mm (Running Track)
③ Wearing course
④ Base course
⑤ Sub–base course
⑥ Filter layer
⑦ Planum
⑧ Sand (Long jump pit)
⑨ ACO SPORT Sand trap
⑩ Concrete bed and haunching
Concrete grade acc. EN 206–1: C 12/15

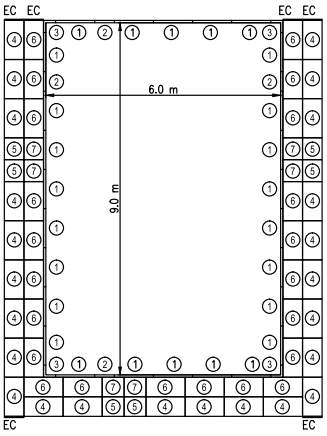
Installation of ACO SPORT® sand trap, double line

Installation advice:

ACO SPORT Elastic Sandtrap are installed together with ACO SPORT Elastic Kerb stone in a concrete bedding of minimum quality of C 12/15 acc. EN 206-1. After a leveled and aligned installation of the long jump pit the installation of the sand trap can be done. Sand traps shall be installed in areas where synthetic surface is, but not on take-off board side. Edges of channels shall be flush to the sand pit edge. Channels can be cutted on site with a grinder.Please pay attention, that at least one preformed knockout is open and connected to a DN100 pipe, which reaches app. 3cm high into the channel to avoid sand entering the pipe.



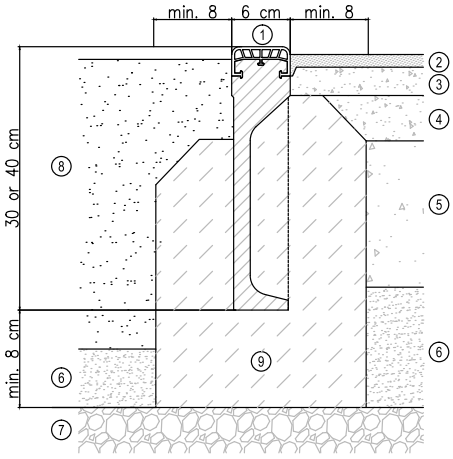


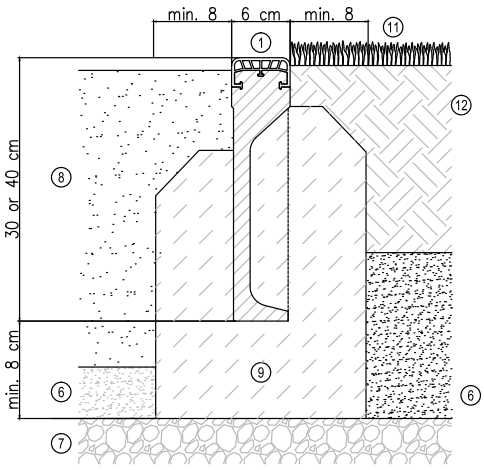


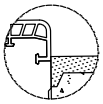
Pos.	Description	Art.-No.	pcs.
①	Kerb stone 100x40x6 cm, white elastic edge	00964	26
②	Kerb stone 50x40x6 cm, white elastic edge	01572	4
③	Corner stone 25/25x40x6 cm, white elastic edge	00969	4
④	Sand trap outer line 100x50 cm	01475	24
⑤	Sand trap outer line 56x50 cm	01477	6
⑥	Sand trap inner line 100x50 cm	01474	22
⑦	Sand trap inner line 56x50 cm	01476	6
EC	End cap for sand trap	15571	6

① ACO SPORT Elastic kerb stone
② Tartan layer 13 mm (Running Track)
③ Wearing course
④ Base course
⑤ Sub-base course
⑥ Filter layer
⑦ Planum
⑧ Sand (Long jump pit)
⑨ ACO SPORT Sand trap
⑩ Concrete bed and haunching
Concrete grade acc. EN 206-1: C 12/15

Installation of ACO SPORT®, elastic kerb stone







Detail:

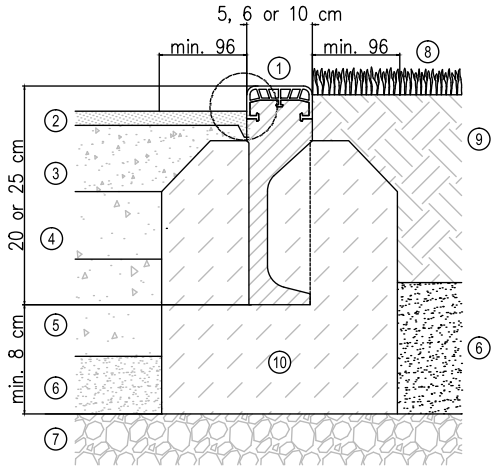
Create a groove in the upper base course along the channel to give the synthetic surface a possibility to attach to the upper base layer. To provide a proper adhesion between kerb stone and synthetic surface coat the kerb stone with primer before laying the synthetic layer.

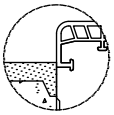
Installation advice:

ACO SPORT Elastic kerb stones have to be installed in concrete to keep them in place. After excavating the trench a leveled and aligned installation on a 10cm thick concrete bedding and between 8cm wide concrete haunches with a minimum concrete quality of C 12/15 acc. EN 206-1 is following.

① ACO SPORT Elastic kerb stone
② Tartan layer 13 mm (Running Track)
③ Wearing course
④ Base course
⑤ Sub-base course
⑥ Filter layer
⑦ Planum
⑧ Long jump pit, sand
⑨ Concrete bed and haunching
Concrete grade acc. EN 206-1: C 12/15
⑩ Lawn
⑪ Lawn bearing course

Installation of ACO SPORT®, elastic kerb stone





Detail:

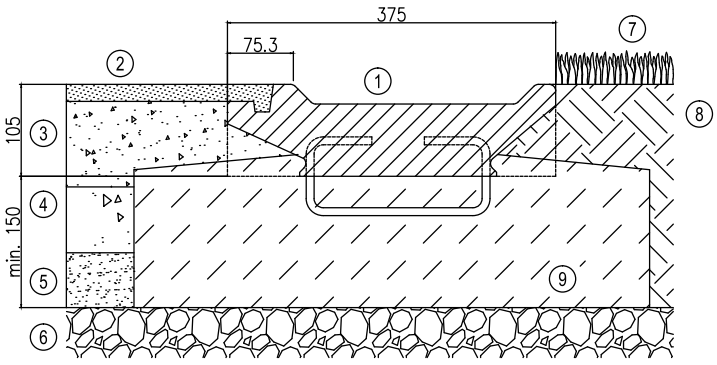
Create a groove in the upper base course along the channel to give the synthetic surface a possibility to attach to the upper base layer. To provide a proper adhesion between kerb stone and synthetic surface coat the kerb stone with primer before laying the synthetic layer.

Installation advice:

ACO SPORT Elastic kerb stones have to be installed in concrete to keep them in place. After excavating the trench a leveled and aligned installation on a 10cm thick concrete bedding and between 8cm wide concrete haunches with a minimum concrete quality of C 12/15 acc. EN 206–1 is following.

1. ACO SPORT Elastic kerb stone
2. Tartan layer 13 mm (Running Track)
3. Wearing course
4. Base course
5. Sub-base course
6. Filter layer
7. Planum
8. Lawn
9. Lawn bearing course
10. Concrete bed and haunching
    Concrete grade acc. EN 206-1: C 12/15

Installation of ACO SPORT® trough channel



1. ACO SPORT Trough channel with installation groove
2. Tartan track
3. Wearing courses
4. Base course
5. Sub base course
6. Planum
7. Lawn
8. Soil
9. Concrete bed and haunching
   Concrete grade EN 206-1: C 12/15

Installation advice:

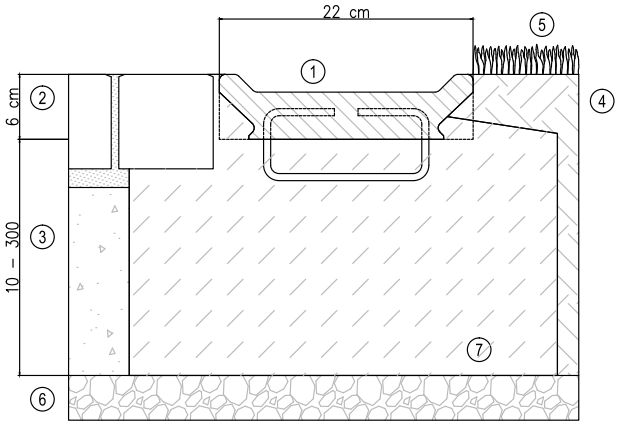
Place a 10 - 15cm deep concrete bedding of minimum concrete grade C12/15 on frostproofed planum.

Press on trough channel and adjust it in level and direction.

Changhes in length caused by different temperatures from day to night are to be compensated by expansion joints on both sides of sump unit (max. distance of 20m). Expansion joints can be realized by using expansion joint kit art.-no. 15708 or by using a UV- and ozone resistant, closed cell and smooth elastomer joint profile.

Please consider differences in height of elastic running track due to compaction.

Installation of ACO SPORT® trough channel



1 ACO SPORT Trough channel
2 Paving or tartan track
3 wearing courses
4 Soil
5 Lawn
6 Planum
7 Concrete bed and haunching
Concrete grade EN 206-1: C 12/15

Installation advice:

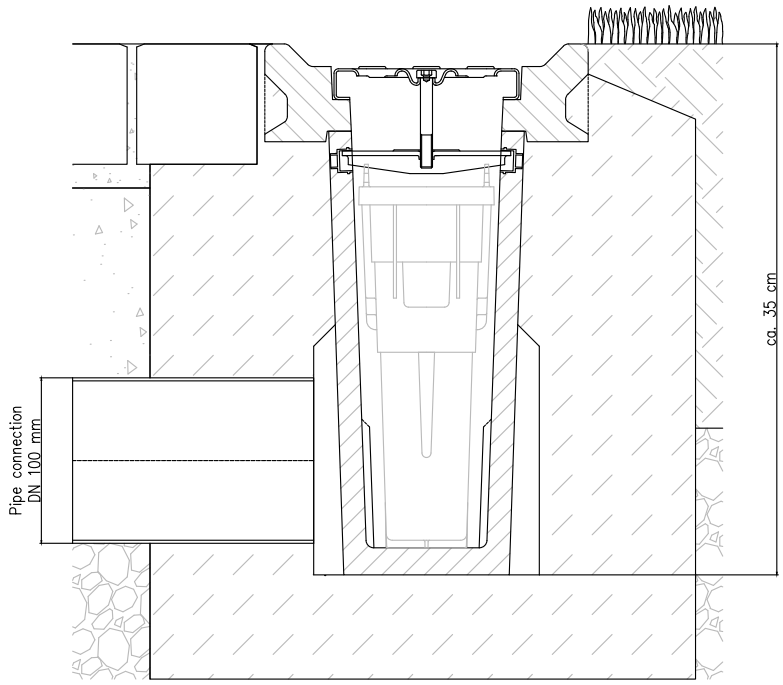
Place a 10 - 15cm deep concrete bedding of minimum concrete grade C12/15 on frostproofed planum.

Press on trough channel and adjust it in level and direction.

Changhes in length caused by different temperatures from day to night are to be compensated by expansion joints on both sides of sump unit (max. distance of 20m). Expansion joints can be realized by using expansion joint kit art.-no. 15708 or by using a UV- and ozone resistant, closed cell and smooth elastomer joint profile.

Please consider differences in height of elastic running track due to compaction.

Installation of ACO SPORT® trough channel



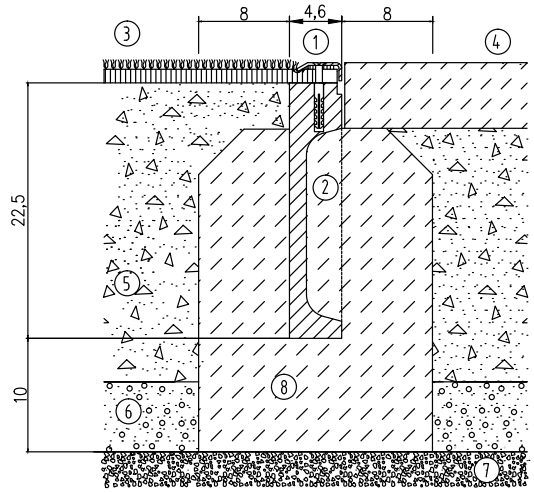
Installation advice:

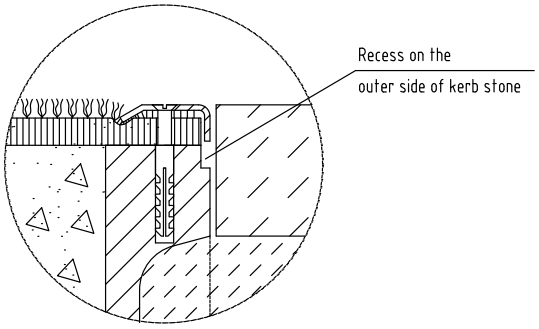
Installation according to appropriate channel system. Please place expansion joints like described in "Installation of ACO SPORT trough channel, to right and left of the sump unit.

Connection of pipes to the preinstalled lip labyrinth sealing on the needed side of sump. Close other hole with attached plug.

The included plastic silt bucket is to be inserted from above.

Installation of ACO SPORT® kerb stone with clamping edge



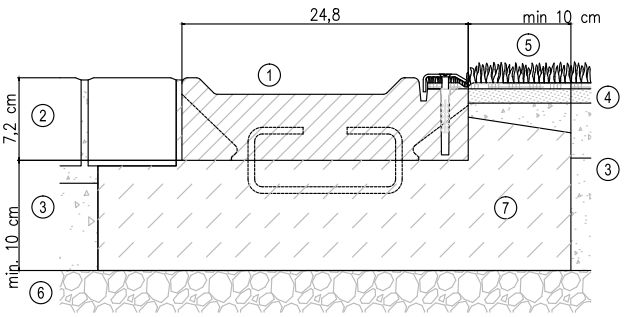


① ACO SPORT clamping rail
② ACO SPORT Kerb stone
③ Artificial turf
④ Concrete tile
⑤ Bearing course
⑥ Filter layer
⑦ Planum
⑧ Concrete bedding C12/15 (EN 206-1)

Installation advice:

Installation of ACO SPORT kerb stones with clamping rail has to be done on a 10cm thick bedding and between 8cm wide haunches made of concrete C12/15 acc. EN 206-1. After installation of all layers do the laying of the artificial turf layer. Cut the turf to the outer edge of kerb stone and put the clamping rail on top and tighten it with 4 screws each meter.

Installation of ACO SPORT® kerb stone with clamping rail



① ACO SPORT Trough channel
② Tartan track
③ Wearing courses
④ Lawn
⑤ Soil
⑥ Planum
⑦ Concrete bed and haunching
Concrete grade EN 206-1: C 12/15

Installation advice:

Place a 10 - 15cm deep concrete bedding of minimum concrete grade C12/15 on frostproofed planum.

Press on trough channel and adjust it in level and direction.

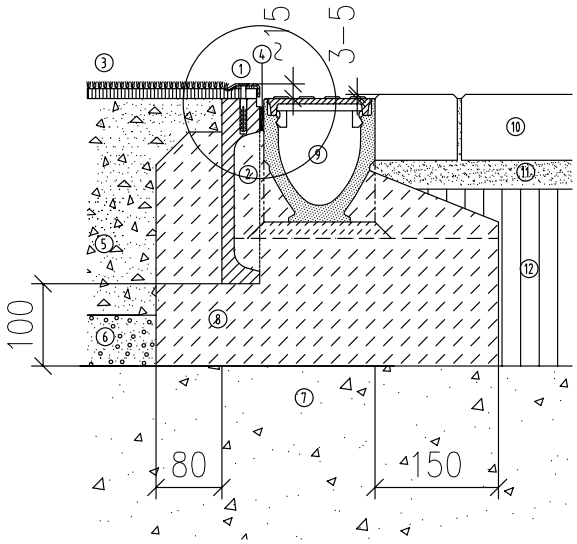
For load class A15 or B 125 install min. 10 cm deep/wide bedding and haunches, made of C12/15. For load class C250 please install min 15 cm deep/wide bedding and haunches, made of C 20/25 concrete.

Changes in length caused by different temperatures from day to night are to be compensated by expansion joints on both sides of sump unit (max. distance of 20m). Expansion joints can be realized by using expansion joint kit art.-no. 15708 or by using a UV- and ozone resistant, closed cell and smooth elastomer joint profile.

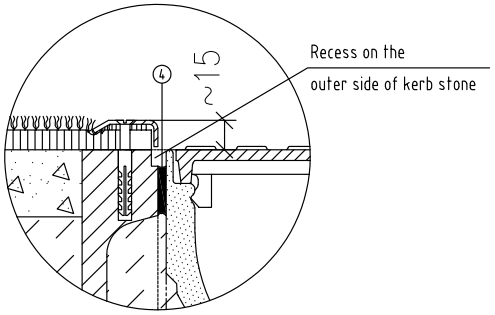
Please consider differences in height of elastic running track due to compaction.

After installation of all layers do the laying of artificial turf layer. Cut the turf to the clamping groove and put the clamping steel edge on top and tighten it with 4 screws per meter.

Installation of ACO SPORT® kerb stone with clamping edge, next to Multiline



① ACO SPORT clamping rail
② ACO SPORT Kerb stone
③ Artificial turf
④ ACO Waterseal
⑤ Bearing course
⑥ Filter layer
⑦ Planum
⑧ Concrete bedding C12/15 (EN 206-1)
⑨ ACO Drain Multiline V 100
⑩ Brick pavement
⑪ Bedding
⑫ Gravel bearing course



Installation advice:

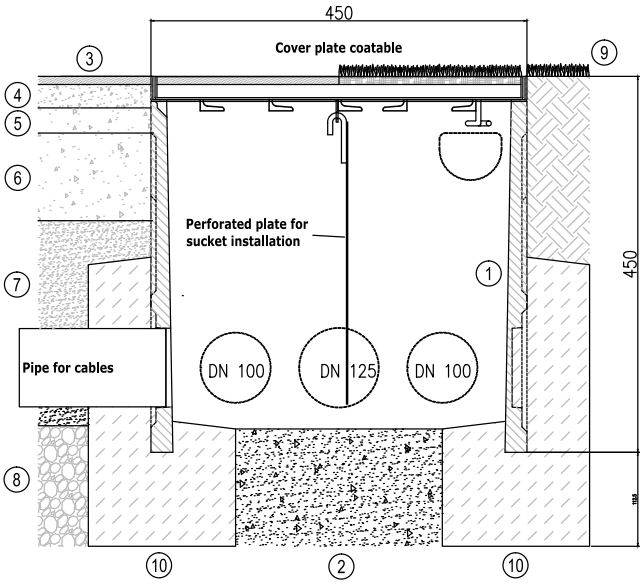
Installation of ACO SPORT kerb stones with clamping rail next to ACO Drain Multiline V100 should be done in two steps.

1. Remove clamping rail and install kerb stone in line and level
2. Install channel on same level like kerb stone, but with a gap of ~5mm to kerb stone. Hollow spaces between kerb stone and channel should be filled with mortar or concrete to prevent damages caused by frost.

All concrete works have to be done with a C 12/15 concrete or better. The given dimesions of concrete foundation and haunches are designed for a maximum traffic load of A15. If higher load classes are required please get in contact with ACO International Technical Support.

3. Cut the turf to the outer edge of kerb stone and put the clamping rail on top and tighten it with 4 screws each meter.

Installation of ACO SPORT® cable distribution box



1. ACO SPORT cable distibution box
2. Gravel package
3. Artificial sports paving
4. Upper bearing course
5. Lower bearing course
6. Gravel bearing course
7. Frost protection layer
8. Soil, underground
9. Lawn, playground
10. Bedding, Foundation

Installation advice:

The bottom of the ACO SPORT cabel distribution box is open, to make it possible for incoming water to drain down through the bottom. The bottom part of the box has to be bedded on a ≥ 15 cm deep foundation, consisting of C 12/15 concrete acc. to the EN 206-1.

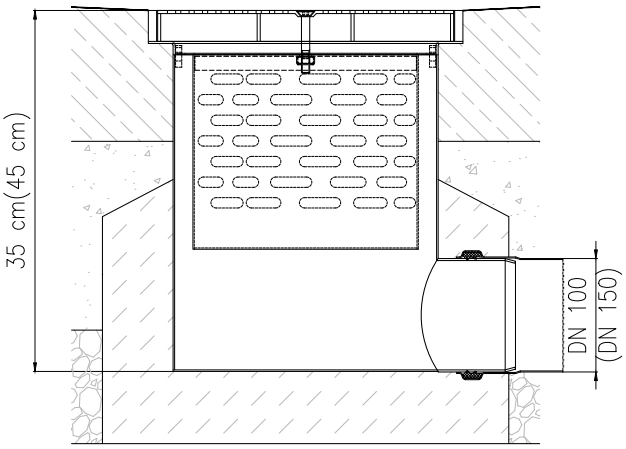
A package of gravel has to be installed deep enough in the center of the bottom, to make sure that the water can reach the impermeabel soil under the installation. All the way round the box has to be supported by a ≥ 10 cm wide concrete haunches consisting of C 12/15 concrete acc. the EN 206-1.

To put the cables into the box you just have to remove the prefabricated knockouts. To make sure you won´t brake the box, please perforate it with a drill.

To install sockets please hang the delivered perforated plate under the coverplate.

The cabel box cover plate with a prefabricated deepening of 13 mm can be covered by artificial sports layer or with ca. 15 mm thick artificial turf.

Installation of ACO SPORT® gully for skate park



Installation advice:

Installation of gully on a min 10cm thick concrete bedding and min. 10cm wide haunches made of C12/15 acc. EN 206–1.

Locking of grating is done by bolt, screwed into silt bucket.

Notes

ACO. creating
the future of drainage

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

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