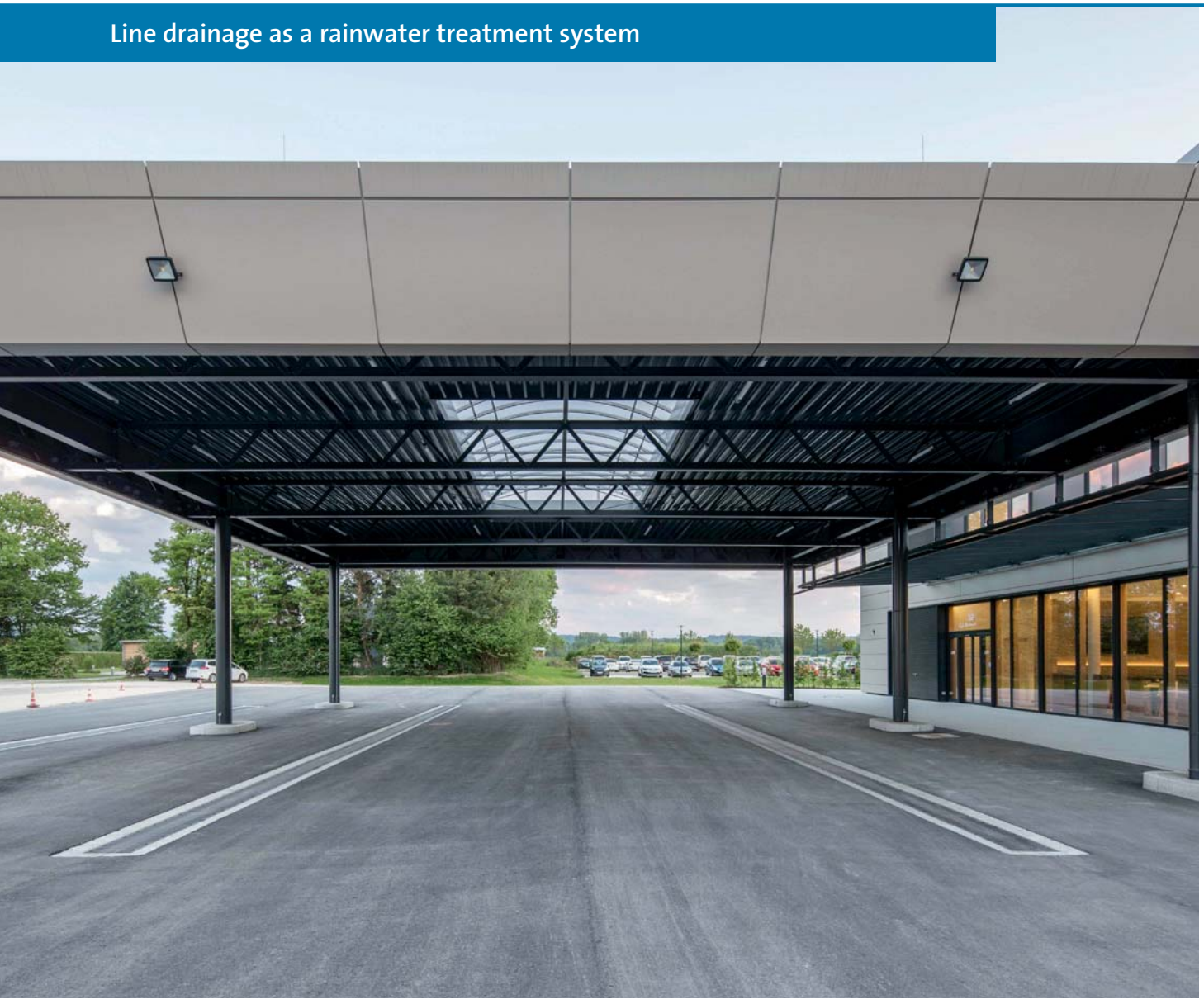
DRAINAGE IN
ITS BEST FORM BIRCO

The Water Cycle in Perfection: BIRCOpur®

Line drainage as a rainwater treatment system



BIRCOpur® | Rainwater treatment system to complete the water cycle

An ingenious, modular filter system cleans rainwater of substances from abrasion, combustion and leaching. It does so constantly and reliably throughout the entire service life – and is particularly easy to maintain. A fully sealed area of at least 20 m² can be connected to one running meter of channel.

+ A 15 to F 900

+ DIBt approval

+ Modular structure

Precipitation water treatment as an alternative to the biotic soil zone

BIRCOpur® | Application areas

+ Municipalities
+ Commercial companies
+ Industry
+ Private households

BIRCOpur® | Facts

+ Modular, two-stage filter system for near-surface rainwater treatment
+ The best value for the evaluation procedure according to DWA-M 153: permeability value 0.15
+ Channel system: NW 300 AS
+ Suitable for heavy rainfall
+ With float guard
+ 4 mm solid steel angle
+ Installation length: 1.00 meter
+ Load class: A 15 – F 900
+ Suitable for an area of at least 20 square meters per running meter of channel

BIRCOpur® | Reliable filtration according to the multi-stage principle

BIRCO is breaking new ground in rainwater filtration: the modular rainwater treatment system, developed together with the filter experts 3P Technik, combines functional reliability, reliable performance and easy maintenance – and offers decisive advantages too.

High level of planning freedom

+ Ability to connect to flowing water, infiltration systems or water tanks.
+ Corner and special lengths are also available.

The latest rainwater filtration

+ The modular structure of the filtration channel ensures optimum rainwater filtration and treatment.
+ With DIBt approval no. Z-84.2-10.

Reliable corrosion protection

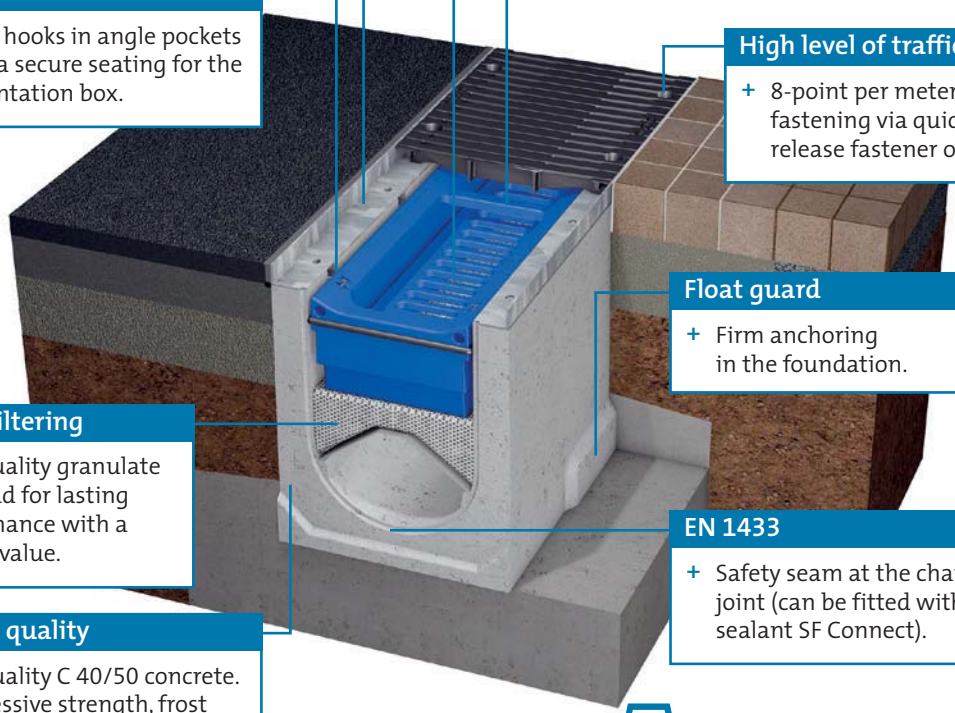
+ Stability and corrosion protection: 4 mm solid steel angle, coated with 70 µm zinc and anchored in concrete.
+ Flush connection of the surface covering to the solid steel angle.

Easy cleaning / maintenance

+ Removable sedimentation box for absorbing solids.

Safe lock

+ Locking hooks in angle pockets ensure a secure seating for the sedimentation box.



High level of traffic safety

+ 8-point per meter fastening via quick-release fastener or bolt.

Float guard

+ Firm anchoring in the foundation.

Reliable filtering

+ High-quality granulate filter pad for lasting performance with a high kf-value.

EN 1433

+ Safety seam at the channel joint (can be fitted with BIRCO sealant SF Connect).

Materials quality

+ High-quality C 40/50 concrete.
+ Compressive strength, frost and de-icing salt-resistant.

Large drain volume

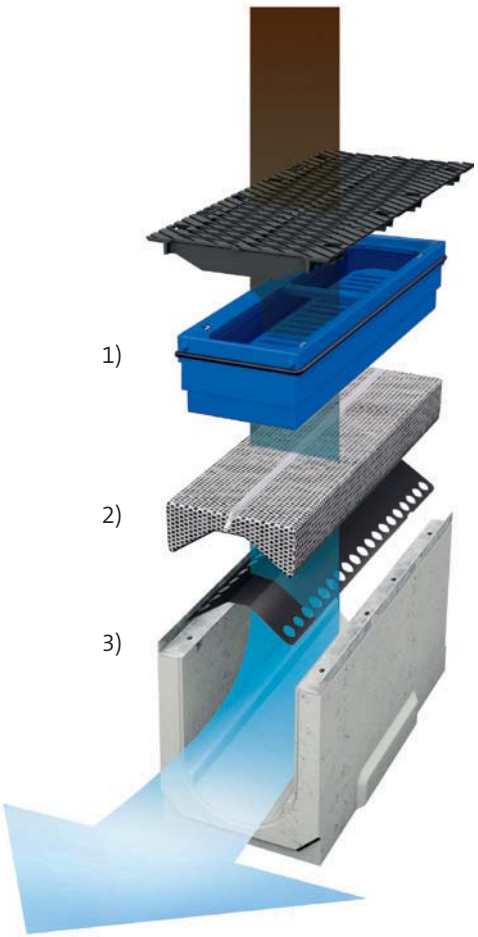
+ No additional lines required.
+ Direct drainage possible under the channel in the trenching.

Advantages for planners

+ Faster flow of large amounts of water
+ High kf-value with maximum cleaning performance
+ Near-surface water guidance
+ Compact rainwater treatment as an alternative to deep shafts
+ Long service life
+ Easy inspection and maintenance
+ Easy connection to trenching systems
+ Maximum load class

Direct discharge into, or replacement of, the biotic soil zone

The combined expertise of two long-standing drainage specialists, BIRCO and 3P Technik, was incorporated into the development of the filtration channel BIRCOpur®. Since 1993, 3P Technik has developed rainwater filters and ornamental rain tanks — and for around ten years it has been one of the most innovative leaders in rainwater treatment. BIRCOpur® was developed based on the tried and tested heavy-load channel BIRCOsir NW 300 AS, and takes a new course in rainwater filtration. The modular design separates sedimentation from the actual pollutant treatment, offering decisive advantages: a high level of efficiency, easy cleaning and long maintenance intervals. It is an economical and ecological contribution to groundwater remediation and forward-looking flood protection.



Modular structure for ecological drainage

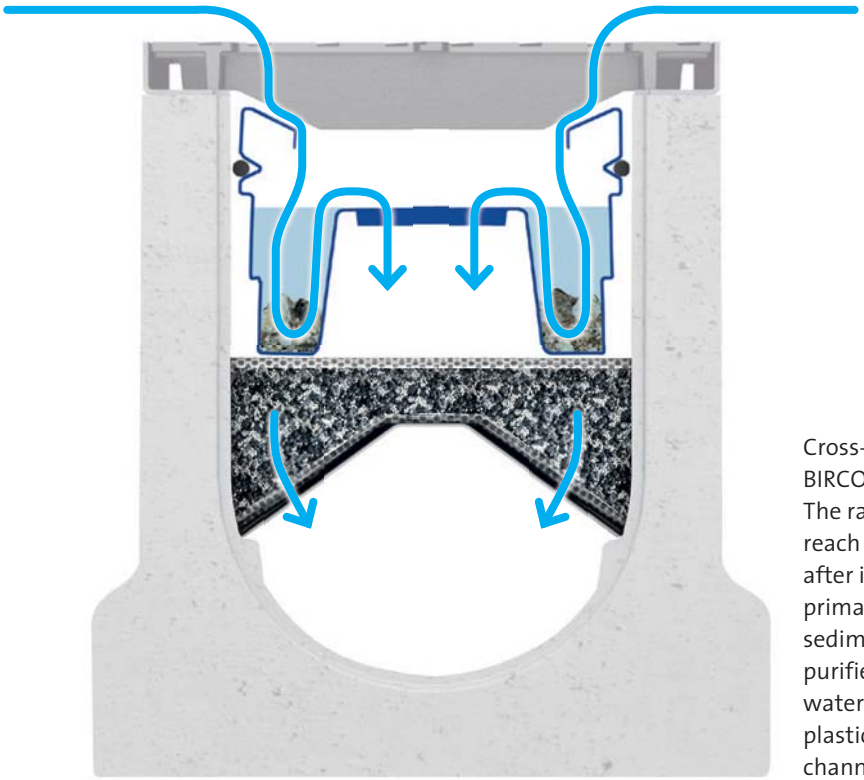
The basis of the innovative filtration solution is the concrete channel BIRCOsir with nominal width 300 AS. With a load capacity up to class F 900, it is perfectly suited to line drainage in public parking lots or very busy squares and streets. Therefore, planners do not have to take any significant changes to the drainage planning into account.

The modular inner life of the rainwater treatment system BIRCOpur®:

1) The sedimentation box collects all solids such as stones, leaves and suspended particles for the purpose of primary cleaning. A rubber lip ensures tightness at the edges – for safe demarcation for subsequent filtration.

2) The pre-cleaned rainwater flows through the granulate filter pad which removes organic and inorganic pollutants from the water.

3) The filtered water flows over the plastic carrier into the channel's empty drainage space. It is available for service water use, or is allowed to seep into underlying trenching or to drain into flowing water.



Cross-section of BIRCOpur®:
The rainwater does not reach the filter unit until after it has undergone primary cleaning in the sedimentation box. The purified and filtered water flows through the plastic carrier into the channel.

Sedimentation box: to be removed separately, easy to clean

Unlike conventional filtration channels, BIRCOpur® consists of separate modules: sedimentation box, granulate filter pad and plastic carrier. Since no filter cake forms, frequent maintenance of the filter materials is not necessary. Solids such as sand, leaves, stones and suspended particles are retained in the sedimentation box without reducing the performance of the filter unit. The advantage: the sedimentation box is easy to examine, remove, rinse and reinsert. Cleaning intervals depend on the respective local conditions. Locking hooks in the angle pockets ensure optimal seating of the sedimentation box in the channel element.

High-quality filter granulate, can be used for at least 10 years.

The granulate filter pad: made to last at least 10 years

The rainwater, pre-cleaned in the sedimentation box, flows through a pad with filter granulate. Adsorption and precipitation remove dissolved organic and inorganic pollutants from the water. Then the purified water flows through the open drain to a collection point where, if necessary, it is ready for service water use or allowed to seep/drain into flowing bodies of water. Thanks to the upstream primary cleaning, the high-quality filter granulate remains functional for a long time. The fine-grained granulate is embedded into the filter pad to ensure uniform grain distribution. This rules out separation of the granulate pack, e.g. due to freeze-thaw exchange. The filter pad must be replaced every 10 years at the earliest.

BIRCOpur® | The answer to future requirements

New legal basis for contaminated rainfall drainage

The new German Water Resources Act (WRA) has been in force since March 01, 2010. Among other things, it grants the German government expanded legislative powers in the area of water protection. The federal states are currently adapting their respective state water laws to the new regulations. New developments in the field of wastewater disposal include the requirement that for new structures, the rainwater must be allowed to seep away on site, be used on site or be diverted directly via a separate water system. Significant changes are therefore to be expected in the future, especially for mixed water sewage treatment.

Impact on rainwater management

According to the new WRA, rainwater should be allowed to seep away into localized systems and be cleaned if necessary. Local rainfall management takes priority. This means that rainwater can and should be used as a raw material for building technology and the natural water cycle, and this should be as local as possible. Construction measures for rainwater management must meet both water-management legislation and building regulations. The German Institute for Structural engineering (DIBt) therefore developed new approval principles for “Construction products and building types for the treatment and leaching of mineral oil-containing precipitation runoff” in 2011. For the first time, limit values are being set as the standard for approval tests for rainwater treatment systems.

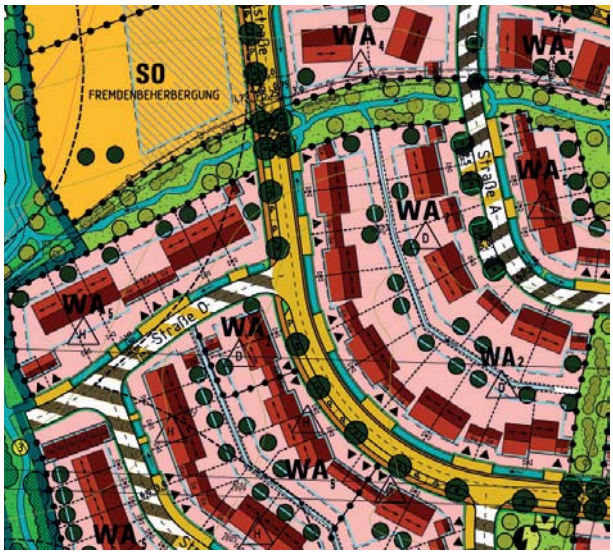
Special solutions in densely populated urban areas

In the future, it must be proven that rainwater from treatment systems does not pollute the groundwater through leaching, or only does so to a negligible degree. The pretreatment systems must therefore reliably remove particles and dissolved substances. That's why BIRCOpur® has a modular design. Municipalities, sewage disposal companies and planners can find information about the planning and operation of systems for treating contaminated precipitation runoff in the DWA data sheet A 138 and in the DWA data sheet M 153.

Optimally prepared with BIRCOpur® DIBt approval already granted

Operators and planners play it safe with BIRCOpur®, regardless of what the state water laws or government legislation stipulate. The filtration channel can clean contaminated surface water in an area of 20 m² per running meter of channel. Thanks to the sedimentation and the efficient filtration of organic and inorganic pollutants, it returns purified water back to the water cycle. The installed materials are tested and can be used without any reservations. The modular design makes maintenance easier than ever before. Convincing ecological and economical facts. A positive TÜV report on BIRCOpur® confirms the excellent filtration results. It provided the basis for the approval procedure at the DIBt.

DIBt approval Z-84.2-10



BIRCOpur® cleans rainwater and transports it to the desired location.

BIRCOpur® | More flexibility and greater planning reliability

Whether for private or municipal construction projects: BIRCOpur® is the innovative, environmentally-friendly solution for rainwater management.

Detached and semi-detached houses

+ Better ratio of sealed and unsealed areas – good for the environment
+ Rapid compensation of investment costs by increased savings of wastewater costs
+ Alternative to sedimentation systems
+ Unlike systems with shafts, no deep excavation required on the property
+ Cleaned, directly usable water
+ No conflict with high groundwater levels
+ Sustainable participation in groundwater protection

Residential areas/city planning/major projects

+ Greater planning reliability for urban developers
+ More flexibility in building development by doing without runoff troughs
+ Easy integration into traffic, open and residential areas
+ Retention, filtration and discharge all in one step
+ No conflict with high groundwater levels
+ Sustainable participation in groundwater protection
+ Use of smaller pipe cross-sections in the sewage system
+ Significant alleviation of (central) sewage treatment plants

Industrial areas/large areas/logistics

+ Alternative solution for large seepage areas or spacious green areas – more flexible planning, greater area availability
+ Avoids the use of large filter systems during introduction into flowing waters or seepage
+ Line drainage instead of many shafts
+ Efficient drainage: 20 m^2 area per running meter of channel
+ Easy maintenance due to the modular design
+ No conflict with high groundwater levels
+ Sustainable participation in groundwater protection
+ Use of smaller pipe cross-sections in the sewage system
+ Significant alleviation of (central) sewage treatment plants

Reliable filtration of precipitation outflows

BIRCOpur® is used to reliably clean rainwater of substances that contaminate the groundwater. The following substances are filtered out through adsorption and ion exchange:

+ Cadmium, copper, chromium, nickel, lead, zinc, ammonium
+ PAH (polycyclic aromatic hydrocarbons) from combustion and outgassing
+ Phosphates
+ Plant protection products
+ MOH (mineral oil hydrocarbons)

Comprehensively implemented – well-prepared

As part of European and national legislation, water and wastewater charges will inevitably increase in the coming years and must be individually graduated (split wastewater charge), both for the public sector as well as in industry and in private home construction. Smart drainage systems, cleaning technologies and concepts for directly using rainwater are not just environmentally sensible, they also make a significant contribution to keeping fees low and costs manageable. Implemented systems prove their efficiency.

| Berlin Collection Station

| Mittelbaden Clinic

| Audi Münchsmünster

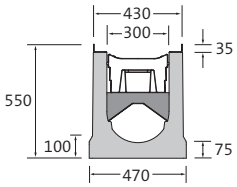
BIRCOpur® | Completing the water cycle

+ The near-surface rainwater treatment plant — with a transparent, easy-to-maintain system
+ Filtration, retention and discharge in one product
+ Easy installation, efficient filter performance and lasting functional reliability due to the modular design
+ Versatile line drainage system with connection to flowing waters, runoff troughs, underground seepage systems or water tanks
+ Greater safety and flexibility for planners

BIRCOpur® | NW 300 AS

Channel element with filtration set and gratings

+ Channel element made of C40/50 concrete with hot-dipped galvanized solid steel angle for combi closure system
+ Filtration set consisting of: Sedimentationbox in PEHD, 4 locking devices, Granulate Filter Cusion and PE deflector plate
+ Including ductile iron gratings (black immersion-lacquered) with 8 point per meter M12/A2 bolt connection
+ With safety sealing joint and anchoring system



Description	Length	Width at top/ at ground	Height	Weight	Inlet opening	Inlet cross opening	Load class EN 1433	Article No. bolted	Article No. Easylock
with ductile iron trapeze grating Cl. D 400	1000 mm	430/470 mm	550 mm	300.0 kg	SW 113/ 15 mm	950 cm²/m	A 15 – D 400	170394	–
with twofold ductile iron grating Cl. D 400	1000 mm	430/470 mm	550 mm	301.6 kg	SW 165/ 17,5 mm	1695 cm²/m	A 15 – D 400	170396	–
with twofold ductile iron grating Cl. E 600	1000 mm	430/470 mm	550 mm	314.0 kg	SW 142/ 20 mm	1522 cm²/m	A 15 – E 600	170399	170399e
with twofold ductile iron grating Cl. F 900	1000 mm	430/470 mm	550 mm	315.6 kg	SW 142/ 20 mm	1522 cm²/m	A 15 – F 900	170398	–
with ductile iron mesh grating Cl. E 600	1000 mm	430/470 mm	550 mm	309.6 kg	MW 20/ 30 mm	2008 cm²/m	A 15 – E 600	170397	170397e

End caps

Description	Width	for Height	Weight	Article No.
End cap, stainless steel (V2A)	430 mm	550 mm	3,3 kg	170340
End cap with outlet NW 160, stainless steel (V2A)	430 mm	550 mm	4,0 kg	170345

Bore hole in the bottom part of the channel

+ Vertical bore hole

Description	Article No.
Vertical bore hole NW 160	090104
Vertical bore hole NW 200	090107

Curve element

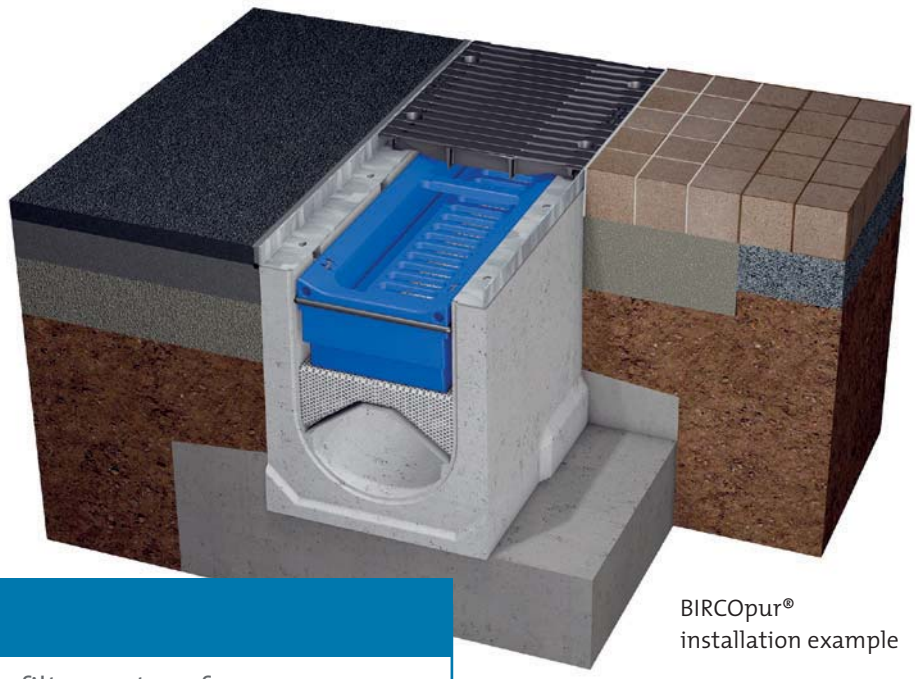
+ Radius appropriate to planning

Description	Article No.
Curve element	on demand

SW = slot width, MW = mesh width
Exception from D400: not for installation transversely to the lane on motorways and expressways.

BIRCOpur® readyset version | pre-assembled and ready-to-install!

An essential part of the service for the BIRCOpur® rainwater treatment system – if required, the components can be delivered ready-to-install, facilitating the daily work of construction companies and saving them time and money.



BIRCOpur®
installation example

BIRCOpur® | Facts

+ Modular, two-stage filter system for near-surface rainwater treatment
+ DIBt approval Z-84.2-10
+ The best value for the evaluation procedure according to DWA-M 153: permeability value 0.15
+ Channel system: NW 300 AS
+ Suitable for heavy rainfall
+ 4 mm solid steel angle
+ Installation length: 1.00 meter
+ Load class: A 15 – F 900
+ Suitable for an area of at least 20 square meters per running meter of channel

BIRCOpur® readyset version | Application areas

+ Municipalities
+ Commercial companies
+ Industry
+ Parking lots and courtyard surfaces

Intelligent overall concept for underground construction.

BIRCOpur® readyset version | Advantages

+ Fully pre-assembled and ready to install
+ Easy, affordable installation with laying hooks or common laying tools
+ Minimum space requirement for logistics and storage

Rainwater treatment system with sedimentation and filtration

1) Sedimentation box

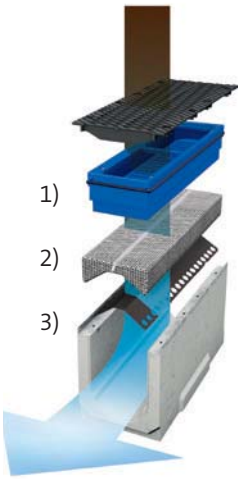
The sedimentation box collects all solids such as stones, leaves and suspended particles for the purpose of primary cleaning. A rubber lip ensures tightness at the edges – for safe demarcation for subsequent filtration.

2) Granulate filter pad

The pre-cleaned rainwater flows through the granulate filter pad, which removes organic and inorganic pollutants from the water.

3) Plastic carrier

The filtered water flows over the plastic carrier into the free drainage space of the channel. It is available for service water use, or is allowed to seep or drain into flowing water.



Function, service and stability — perfectly combined

BIRCOpur® is used to reliably clean rainwater of substances that contaminate the groundwater. The sedimentation and filtration capacity complies with federal, state and municipal legal requirements. BIRCO offers comprehensive planning services for every phase of the project — the pre-assembled service is the best example of that. With BIRCOpur®, you are also relying on a system with maximum stability up to load class F 900 in accordance with EN 1433.

Space-saving for logistics and storage

BIRCOpur® | Installation instructions

Certain details must be taken into consideration when installing BIRCOpur®. You will find an extensive description here.

The following general installation instructions must be observed in order to ensure flawless functioning and compliance with the requirements pursuant to EN 1433:

1. Prior to installation, the load class applicable for the respective application must be selected in accordance with EN 1433.

2. Due to the high level of stability, BIRCOpur® is installed on an earth-moist foundation strip, at least 20 cm high and made of concrete C 25/30, which you pull up wedge-shaped on both sides. There is no need for further lateral sheathing or bracing[1]. Start by installing the channel section with the highest channel number on the drain and create the channel section with the next lowest number in each case.

3. All adjoining surface coverings must be permanently approx. 3 to 5 mm higher **than the upper edge of the channel. In order to keep the adjacent surface covering permanently 3 to 5 mm above the upper edge, we recommend laying the first two to three rows in the mortar bed for paving coverings.** Due to the lack of sheathing, the surface covering can be guided up to the gutter. For slab or paving connections, a permanent sealing gap of about 10 mm must be maintained between the channel and the covering. The joints between the first two to three series of slab or paving connections must be permanently sealed. It must be ensured that no horizontal forces act on the paving laid in the mortar bed due to displacement or expansion of the paving covering.

4. During installation in concrete surfaces or in the case of reinforced concrete designs, running joints must be provided on both sides parallel to the channel in order to compensate for occurring horizontal forces. These joints should be installed at a distance of 1 m to 2 m parallel to the channel. Care must be taken to design the running joints from an engineering perspective and to execute them professionally. When compacting the adjacent surfaces, it must be ensured that mechanical damage to the channel elements is ruled out. Expansion joints running transverse to the channel section must be planned from an engineering standpoint and must be executed professionally. The expansion joints must be arranged in the adjacent concrete surfaces (in-situ concrete) so that they run through a channel joint. We recommend an arrangement of every 8 to 12 running meters (according to DIN 18318, valid version). The expansion joints (e.g. PE foam boards) must run across the entire channel cross-section through the foundation and the lateral concrete casing.

5. BIRCO drainage elements are provided with a safety seam at the channel joint. This can be prepared with plastic-modified mortar or with a permanently elastic jointing material (e.g. SF Connect) according to EN 1433.

6. The same applies when installing the drain trap.

7. Local conditions may require special types of installation which must be checked and taken into account by the planner. During installation, the current regulations and guidelines such as ZTVT, ZTV concrete, ZTV bit and RSTO, must be taken into account.

+ German construction contract procedures (VOB), part C DIN 18318 “Traffic route engineering”.
+ Additional technical regulations and guidelines for pavement surfaces in road construction (ZTVT-StB) and ZTV Asphalt.
+ Additional technical regulations and guidelines for ground work in road construction (ZTVT-StB).
+ Guidelines for the standardization of the pavement of public thoroughfares (RSTO).
+ Preparation of the ATV DIN 18299 performance description “General Regulations for Construction Work of all types”.
+ The respectively applicable load class in accordance with EN 1433, “Drainage channels for vehicular and pedestrian areas”.

[1] Exception:
When installing BIRCOpur® in heavily frequented heavy load areas, the channel must be laterally encased with concrete due to any occurring high horizontal forces. Please note the separate installation examples here for heavily frequented heavy load areas.

Quick and safe installation | Efficient time and cost control

+ The single-piece channel element Type M must only be partially covered in concrete. This reduces the formwork and concreting work.
+ Tender texts in all standard file formats can be downloaded from www.birco.com.

Special provisions in accordance with the general building approval

1. The installation of BIRCOpur® must be carried out by people with the required technical knowledge.

2. The systems must be installed based on the planning and measurement documents and according to the manufacturer's installation instructions.
   Contamination, such as from topsoil from adjacent green areas, rubble, etc., must be avoided. Should contamination still occur, this must be removed before introducing the plastic carriers, filter bags and sedimentation boxes.

3. Compliance of the built-in BIRCOpur® with the provisions of the general building approval must be confirmed in writing for each BIRCOpur® system by the installing company by means of a declaration of conformity. The basis for this is a visual inspection of the design to check its faultless condition. The result of the check must be recorded.
   If the test results are insufficient, the necessary measures to remedy the defect must be taken immediately by the installing company.
   After rectifying the defect (where technically possible and if required to prove the corrective action), the test must be repeated immediately.
   The installing company's declaration of conformity must at least include the following information:
   - Approval number
   - Designation of the construction project
   - Confirmation of the execution according to the planning documents, including proper execution of the preparatory work
   - Type of control
   - Date of the control
   - Results of the control and comparison with the requirements
   - Signature of the person responsible for the implementation control

   The records must be included in the construction records. They must be handed over to the operator and the DIBt, the responsible top site supervision authority or the competent water authority on request.

Provisions for self-checking and maintenance

1. The infiltration capacity and retention of the material can only be ensured in a lasting manner if the maintenance is carried out according to the following provisions.
   The operator is given a maintenance manual for every BIRCOpur® system. The maintenance manual contains provisions on maintenance and disposal. National statutory provisions for the control, maintenance and verification of the systems remain unaffected. The respective dates and results of the implemented checks and maintenance as well as the rectification of any defects identified must be documented by the operator. The documents must be kept by the operator and presented to the competent local supervisory authorities on request.

2. Impurities, such as litter and dust, must be removed regularly.

3. The systems must be checked at least every 12 months or if the system is flooded more frequently than provided for in the measurement. The following work must be carried out in the process:
   - Open the covers and check the individual components for the correct position and any damage; rectify any determine defects.
   - Measure the position of the sludge level and remove if the maximum sludge level of 57 mm above the bottom of the sedimentation box has been reached. The sedimentation boxes must be removed from the channels in order to remove the sludge. Any accumulated water must be diverted through the filter bags. The sludge must be sucked out and collected using suitable suction devices.
   - The granulate filter pad must be replaced at least every 10 years. Only granulate filter pads labeled with the conformity mark may be used for this purpose. Replacement of the filter pads and other maintenance work must be documented in the log book.

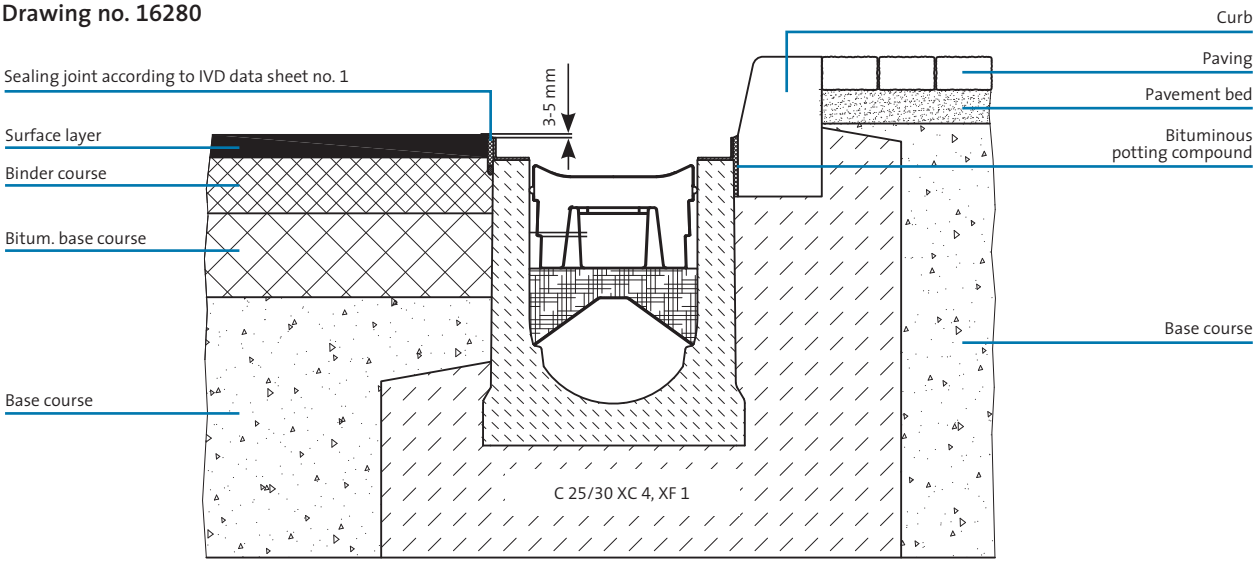
4. Substances taken from the system contain hydrocarbons and heavy metals and must be disposed of properly according to the applicable regulations.

BIRCOpur® installation examples

Installation instructions for traffic areas with high wheel loads.
Urban development | Industrial construction | Parking lots

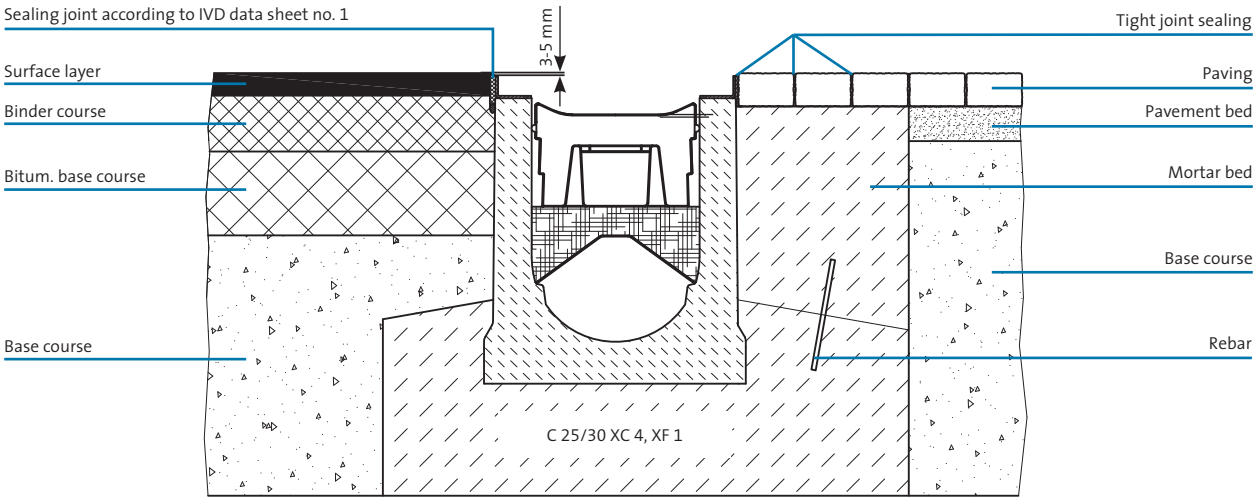
Class A 15 to E 600, Type M, NW 300 AS

Drawing no. 16280



Class A 15 to E 600, Type M, NW 300 AS

Drawing no. 16280



In the case of "vibrating" paving, it must be ensured that this is not pushed against the channel. The measurement of the lateral casing must be adapted to the local conditions and must be at least 20 cm. If no bond can be established between the substructure and the lateral covering, rebar or uplift restraints made from reinforced bars (Ø 8 mm) must be installed every 30 cm. The specified concrete qualities are minimum values. Requirements of the installation site, e.g. frost and de-icing resistance, must be taken into account when choosing the appropriate concrete according to DIN 1045-2 or EN 206-1.

A note on the bolt connection:

In heavily frequented, heavy load areas as well as in vehicle marshalling areas, we recommend using bolts rather than quick-fastening systems (e.g. Easylock). A tightening torque of 60 Nm must be applied for the bolt connection of the covers. The bolts on the covers must be tightened at regular intervals.

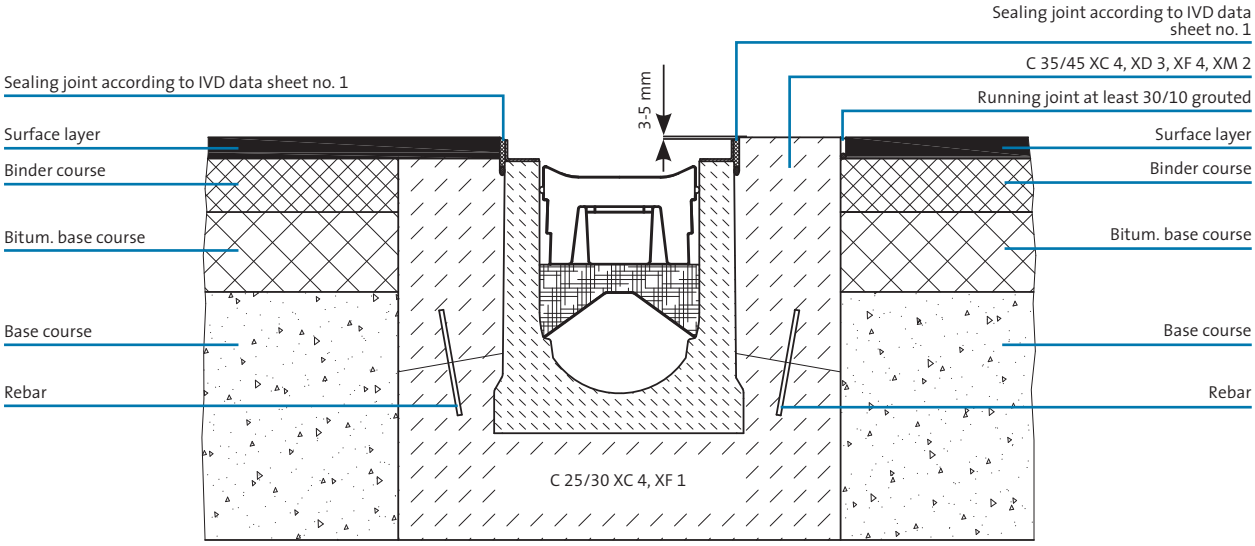
Expansion joints must be designed from an engineering perspective. In the event of a full covering of the channel section, expansion joints must be formed transversely to the channel section after 8 – 12 m. All installation examples are built according to RSTO [Guidelines for the standardization of pavement structures of traffic areas] with non-settling, frost-resistant base courses. Exception from D 400: not for installation transversely to the lane on motorways and expressways.

BIRCOpur® installation examples

**Expanded installation instructions for heavily frequented, heavy load areas.
Logistics centers | Transshipment centers | Marshalling areas | Airport surfaces**

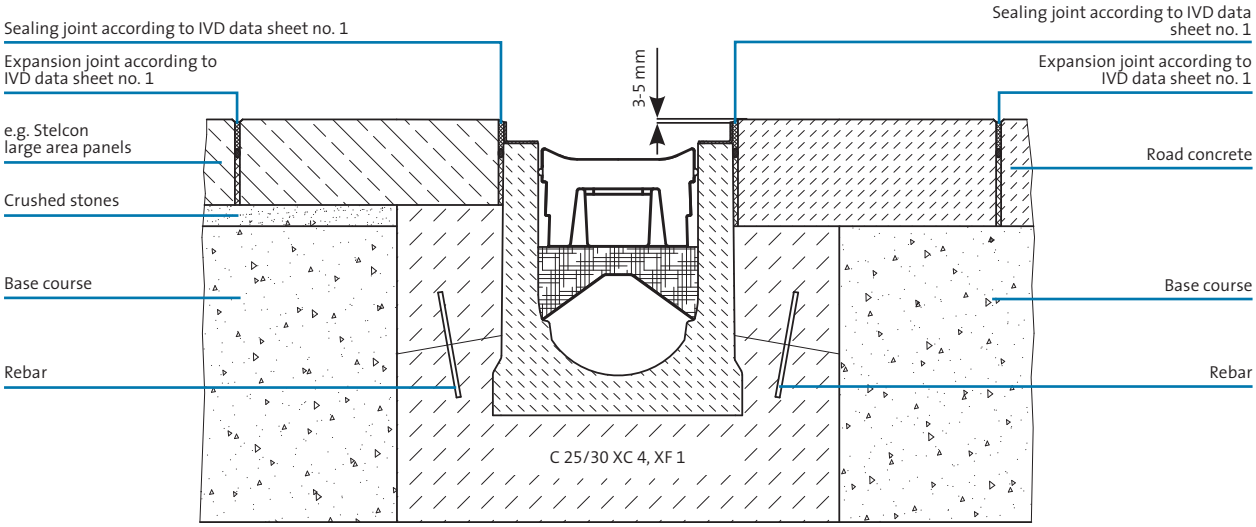
Class D 400 to F 900, Type M, NW 300 AS

Drawing no. 16280



Class D 400 to F 900, Type M, NW 300 AS

Drawing no. 16280



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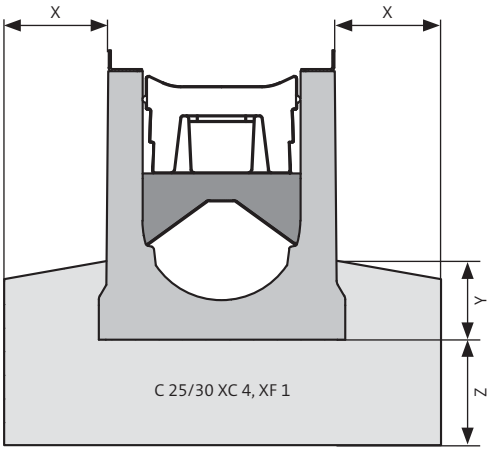
Exception from D 400: not for installation transversely to the lane on motorways and expressways.

Overview of concrete casing for BIRCOpur®

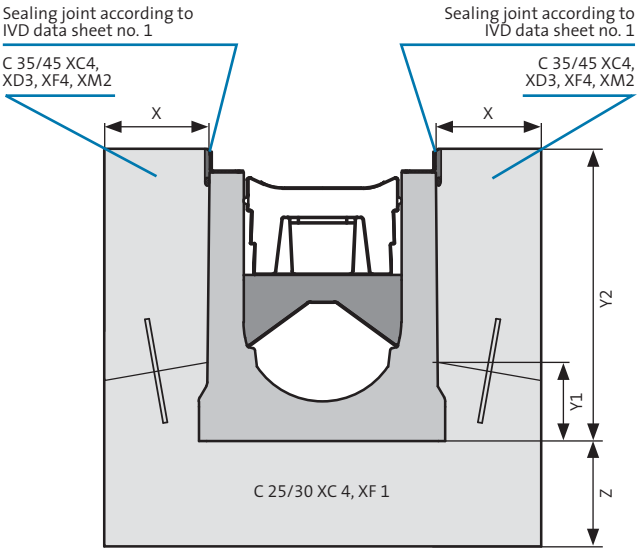
In order to meet the requirements according to EN 1433, the manufacturer's installation instructions must be taken into account.

BIRCOpur®

Nominal Width	Type	Load Class	X	Y/Y 1	Y 2	Z	Drawing No°	Page
BIRCOpur® 300 AS	M	A 15 – E 600	≥ 200	≥ 100	–	≥ 200	16280	87
BIRCOpur® 300 AS	M	D 400 – F 900	≥ 200	≥ 100	Bauhöhe + 5 mm	≥ 200	16280	88



Installation without lateral casing



Installation with lateral casing

BIRCOpur® Drainage performance

BIRCO's channel systems have excellent drainage capacities. In addition to this table, BIRCO offers a property-related hydraulic calculation service.

BIRCOpur® NW 300 AS

CL = 1000 mm	Drainage capacity at the channel end	Cross-sectional area at the channel end
Constr. height 550 mm	19,5 l/sec	351,37 cm²

Vertical bore hole

BIRCOpur® channels can be provided with factory-made vertical bore holes (100 mm minimum distance to the end of the channel) according to the plan specifications. The possible connections range from DN 110 to DN 200. The diameters are matched to KG pipes, other types of pipes and horizontal bore holes on request.

BIRCOpur® | Maximum bore hole diameter

Nominal Width	Maximum vertical bore hole
300 mm	DN 110
300 mm	DN 200

These tables can only provide the desired result in certain cases as the task largely depends on the local conditions, i.e. on the position of the existing drainage shafts, the number of sections, etc.
We therefore recommend our factory hydraulic calculations with an execution proposal.

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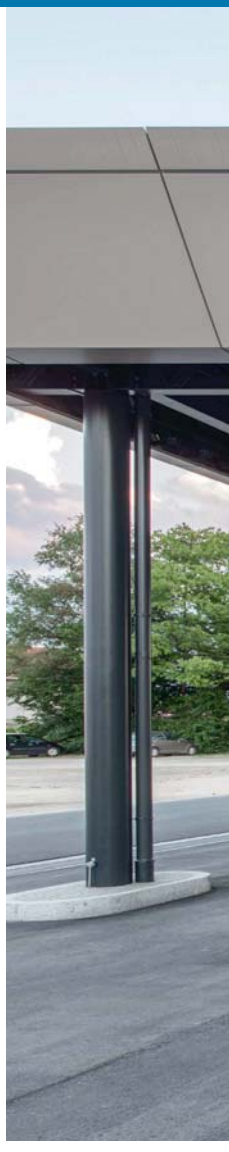
BIRCOpur



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