GRASPOINTNER
Sustainable innovation.

BG-FILCOTEN Trench Drain
Installation Manual

FILCOTEN HPC (High Performance Concrete)
Trench Drain Systems

Technology
in harmony
with nature.

BG-FILCOTEN

High performance
concrete trench drains

Contents

Modular Range

BG-FILCOTEN TRENCH DRAIN SYSTEM IS A FULL RANGE OF MODULAR CHANNELS WITH GRATINGS. BG-FILCOTEN IS MADE OF ENVIRONMENTALLY HARMLESS FILCOTEN HPC (HIGH PERFORMANCE CONCRETE); THE SYSTEMS INCLUDE CATCH BASINS, FRONT/END CAPS, NO HUB BOTTOM OUTLETS AND OTHER ACCESSORIES.

WHEN INSTALLED AS PER MANUFACTURER'S GUIDELINES, BG-FILCOTEN PRODUCTS ARE DESIGNED TO WITHSTAND LOADS UP TO CLASS E FOR TRENCH DRAINS WITH GALVANIZED OR STAINLESS STEEL RAILS AND UP TO CLASS F FOR TRENCH DRAINS WITH CAST IRON RAIL, AS CLASSIFIED BY EN 1433/DIN 19580 (THE ONLY STANDARDS WRITTEN SPECIFICALLY FOR TRENCH DRAIN SYSTEMS).

Note: For any queries please contact us at technical@bg-graspointner.com

Getting Started

BG-FILCOTEN products should be handled with care as they can be damaged by impact from other product or machinery.

The typical necessary equipment for an installation may include:

- Excavating equipment
- String-line and laser level
- Measuring tools
- Masonry drill, grinder and/or saw
- Rubber mallet
- Concrete - 4,000 psi minimum compressive strength
- Eye protection, gloves, breathing protection
- Concrete vibrator
- Shovel, trowel, rake, hammer

Health and Safety

FILCOTEN HPC is free from synthetic resins, curing agents, heavy metals and VOC.

FILCOTEN HPC is certified by the Institute of Building Biology (Institut für Baubiologie Rosenheim GmbH) to be 100% sustainable, and completely harmless to the environment.

The main hazards are:

- Inhalation of dust from grinding, cutting or drilling.

Eye protection, breathing protection and gloves, should be worn to avoid these hazards.

Grates made from metals are either cast or fabricated.

The main hazards are:

- Abrasive damage/cuts to hands.
- Inhalation of dust from grinding or cutting.
- Grinding, cutting, etc. may generate sparks; flammable items should be removed from the area.

Eye protection, breathing protection and gloves, should be worn to avoid these hazards. Operations should be conducted away from areas of fire or explosion hazard.

Installations

Sections

THE SUPPLIED ILLUSTRATIONS ARE A GUIDE FOR TYPICAL GROUND CONDITIONS ONLY AND MAY NOT BE SPECIFIC TO YOUR PROJECT. ENGINEERING ADVICE AND DIRECTION SHOULD ALWAYS BE GIVEN PRIORITY.

Drawings available at:
https://hydrotrenchdrains.com/installation-drawings/

An installed BG-FILCOTEN Trench Drain System should incorporate the following:

- Correct grate type
- Correct channel type and size
- Minimum grade 4,000 psi compressive strength cement concrete surround
- Surrounding concrete dimensions are **minimum** dimensions and engineering guidance should be taken to confirm the appropriate needs and dimensions for any specific project

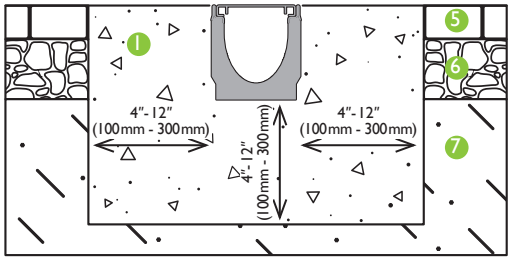
Poor site conditions and low load bearing pavement will require an increase in these dimensions to meet both vertical and lateral loads.

Reinforced steel may be required within the slab and around the trench drain. Engineering guidance should be taken to confirm appropriate needs and dimensions for any specific project.

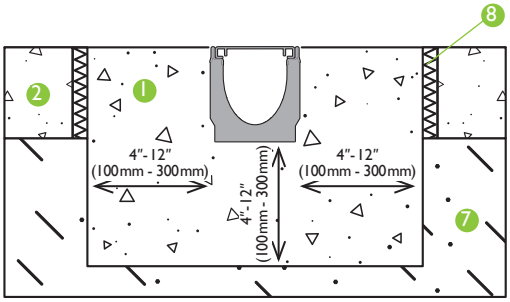
Legend:

1. Concrete surrounding
2. Concrete pavement
3. Asphalt base layer
4. Asphalt finishing layer
5. Pavers
6. Compacted gravel
7. Gravel base
8. Expansion joint
9. Synthetic mortar layer

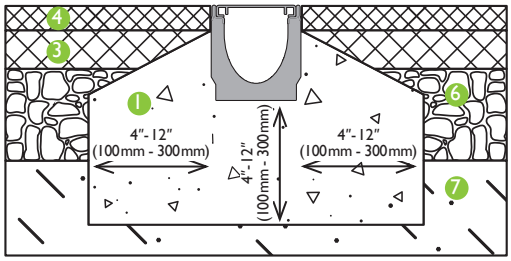
Paver pavement – load class A-F



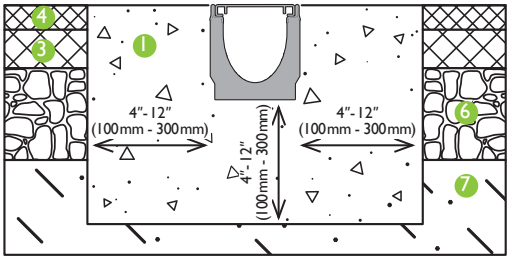
Concrete pavement – load class A-F



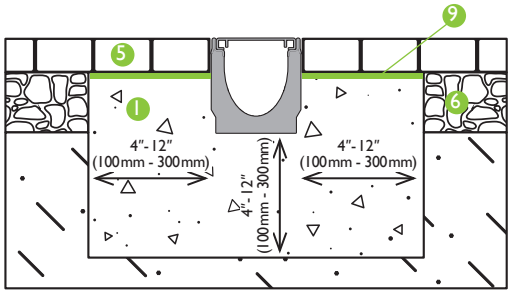
Asphalt pavement-Hidden concrete – load class A-D



Asphalt pavement – load class A-F



Paver pavement-Hidden concrete – load class A-C



** The first three rows of pavers need to be glued.*

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1 Excavation

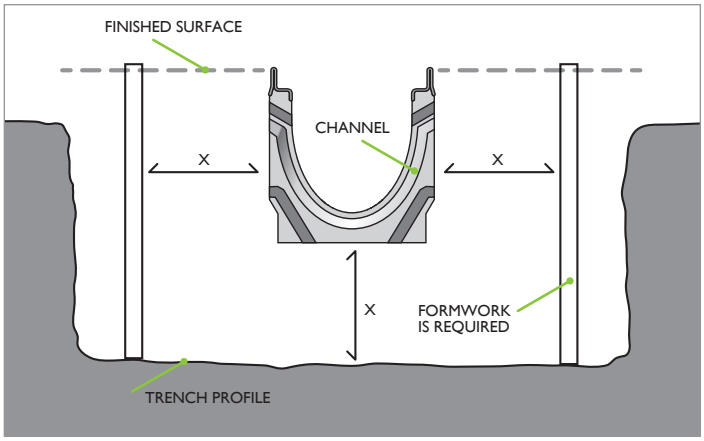
Excavate a trench to accommodate the drain system. The excavation must be made around the center line of the proposed drainage run and the catch basin.

The trench excavation must be large enough to accommodate each of the following:

a) The channel/catch basin width and the depth dimensions

b) The surrounding concrete dimensions*

Concrete surround dimensions

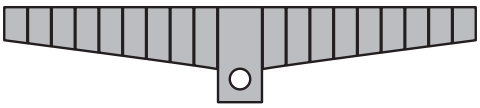


** Refer to the tables for dimensions of 'X'*

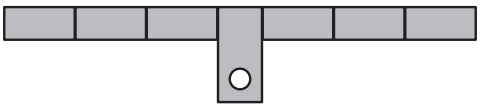
c) The compacted gravel base

d) For sloped systems, stepped slope or combined slope, excavate the base of the trench by roughly following the fall of the trench drain run

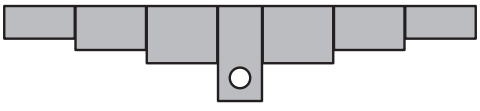
Sloped system



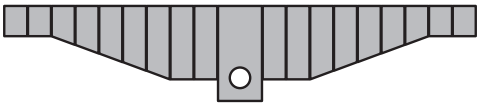
Neutral system



Stepped slope



Combined slope



Ensure any loose material is removed from the trench and the base is well compacted.

Run a string line or laser at finished surface along full length of the proposed trench run to ensure the trench is installed to grade.

In concrete pavements ensure an allowance is made for expansion/ control joints, if necessary, to allow movement due to thermal expansion/contraction.

Engineered and site specific gravel base requirements should always be met. Local codes should always be checked.

As a general reference, BG-FILCOTEN offers the following surrounding concrete dimensions for various load class requirements and its rail types.

Value of X (surrounding concrete) for galvanized and stainless steel rails trench drains

Channel Nominal Width		Load Class A 15	B 125	C 250	D 400	E 600
NW 100	4"	100 mm 4"	100 mm 4"	150 mm 6"	150 mm 6"	200 mm 8"
NW 150	6"	150 mm 6"	150 mm 6"	200 mm 8"	200 mm 8"	250 mm 10"
NW 200	8"	150 mm 6"	150 mm 6"	200 mm 8"	200 mm 8"	250 mm 10"
NW 300	12"	200 mm 8"	250 mm 10"	250 mm 10"	300 mm 12"	300 mm 12"

Value of X (surrounding concrete) for cast iron rails trench drains

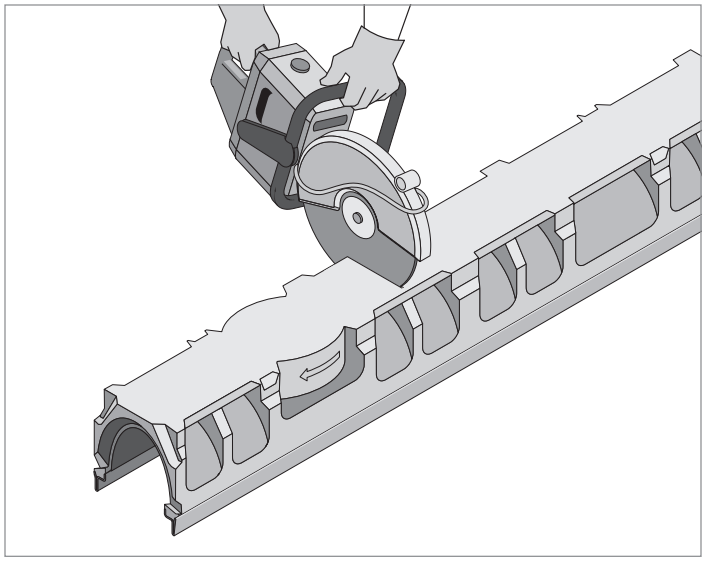
Channel Nominal Width		Load Class A 15	B 125	C 250	D 400	E 600	F 900*
NW 100	4"	100 mm 4"	100 mm 4"	150 mm 6"	150 mm 6"	200 mm 8"	200 mm 8"
NW 150	6"	150 mm 6"	150 mm 6"	200 mm 8"	200 mm 8"	250 mm 10"	250 mm 10"
NW 200	8"	150 mm 6"	150 mm 6"	200 mm 8"	200 mm 8"	250 mm 10"	250 mm 10"
NW 300	12"	200 mm 8"	250 mm 10"	250 mm 10"	300 mm 12"	300 mm 12"	300 mm 12"

2 On-Site Fabrications

When cutting channels and/or grates, gloves, protective eye wear and respirator or mask should be worn.

Cutting channels is required to form miters, T-junctions and non-standard lengths. Most fabrications can be completed on site.

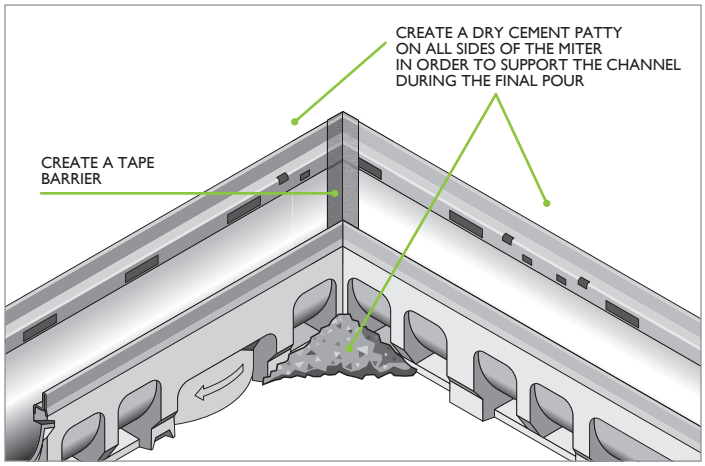
Channels can be cut with a masonry or diamond disc saw. Gratings should be cut with a band saw, or similar, with suitable metal cutting blade.



A standard construction glue can be used to bond cut surfaces together. Simply apply adhesive to both cut ends and push fit together, then allow to dry. Remove any extra adhesive from inside the channel surface before it hardens.

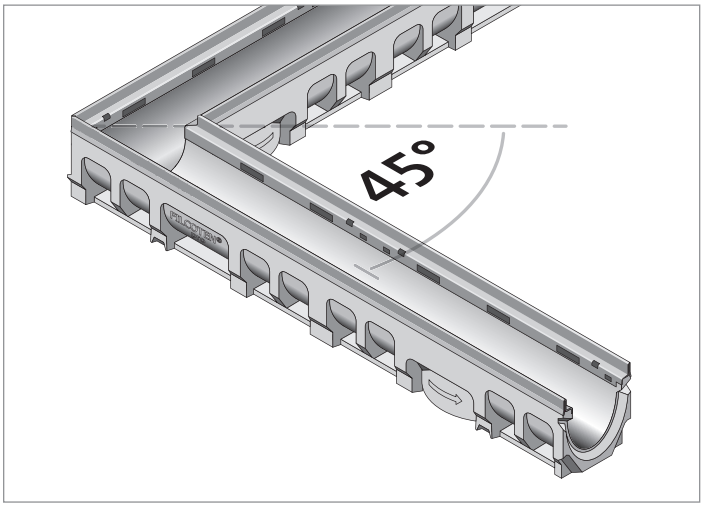
If corrosive liquids are transported in the trench, the joints should be properly sealed.

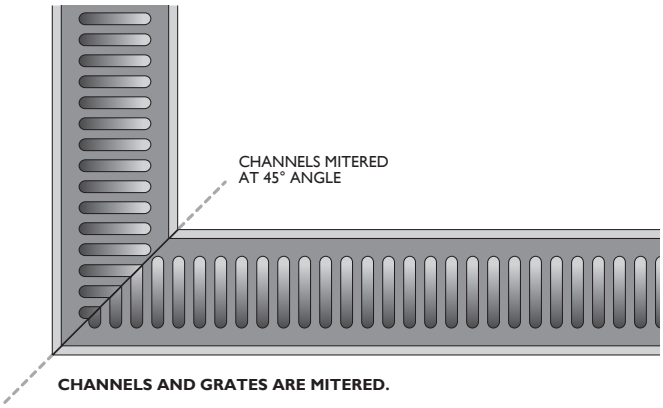
Ensure the sealant/adhesive used is chemically resistant.



Miters

Mitered joints are formed by cutting channels to the required angle and butting together. For 90° angle, miter cuts of 45° are required.





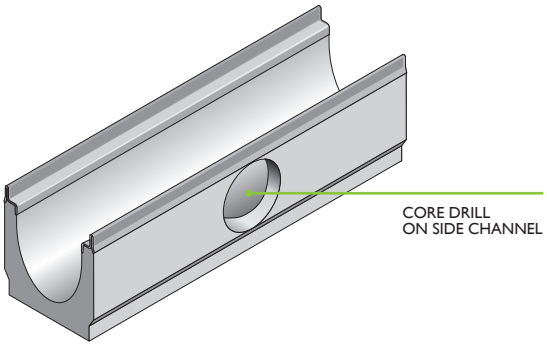
CHANNELS AND GRATES ARE MITERED.

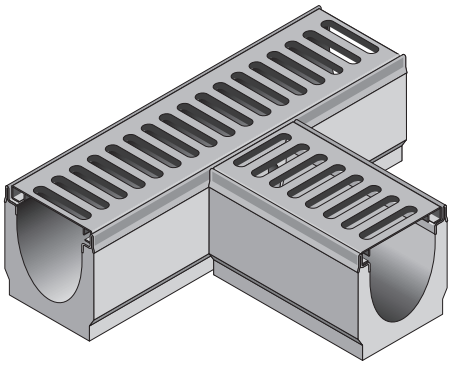
T-junctions

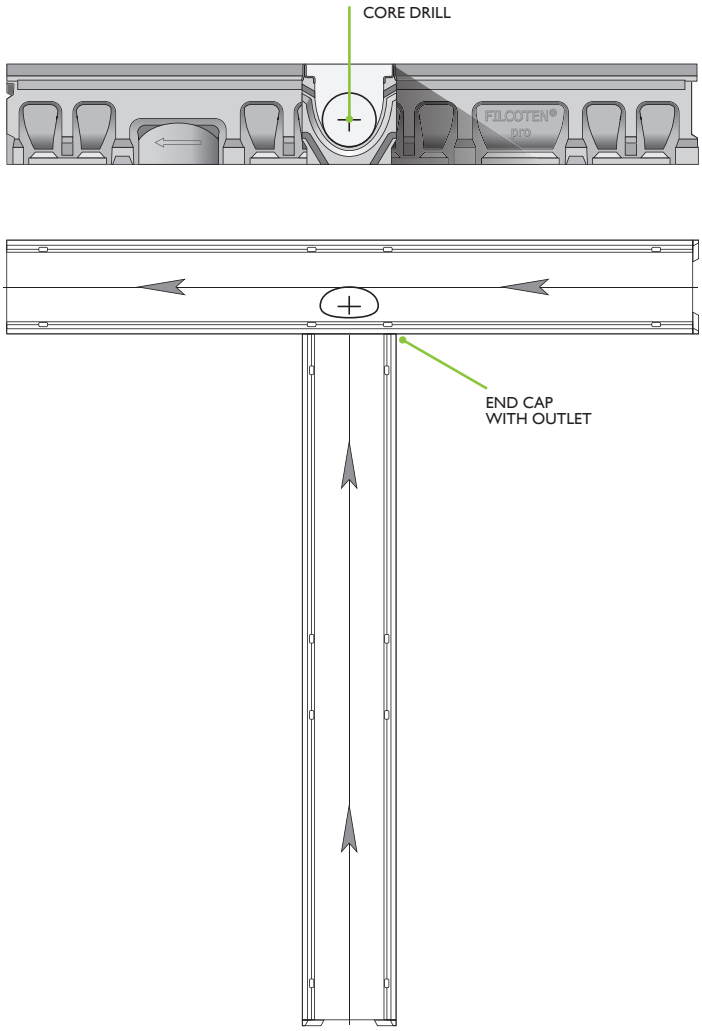
T-junctions are formed when an opening is cut into the side of one channel and another channel is butted up to this opening.

On full meter channel, mark the area in the channel wall to be removed by butting the channels together and by marking the interior's profile of the channel.

The edge rail should be left intact to provide additional strength and seating for grate.

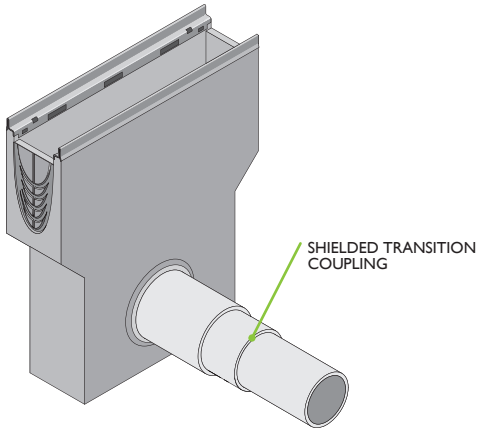


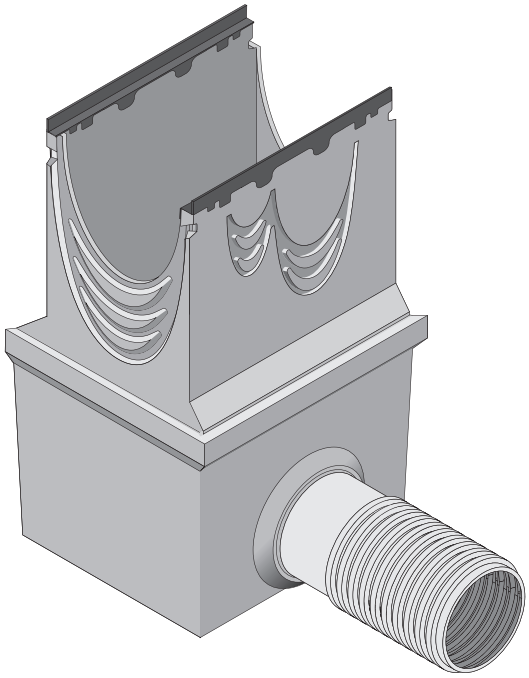




3 Catch Basin Connections

NOTE: THE 12" AND 8" CATCH BASIN REQUIRE A PIPE ADAPTER 8" IF CAST IRON SOIL PIPE OR PVC IS USED.

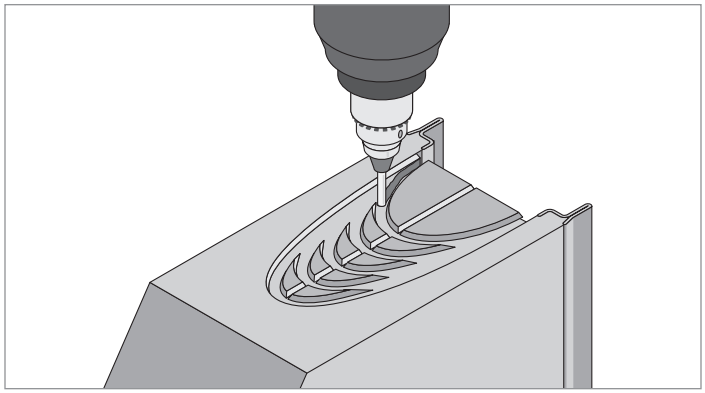




1. Insert the pipe adapter as shown
2. Connect the discharge piping to the catch basin adapter using a no-hub coupling or corrugated pipe

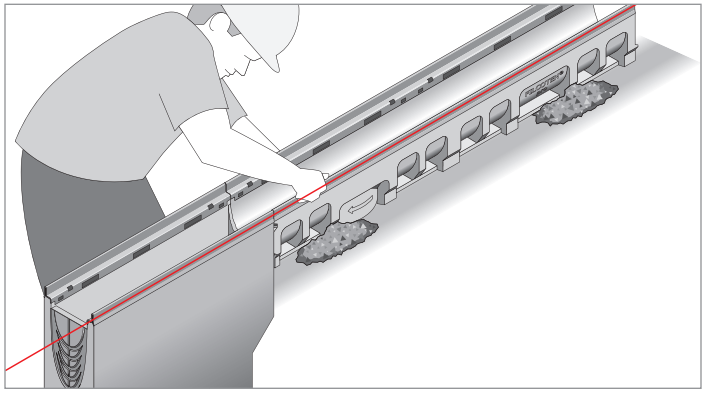
Catch Basin Cut-out

- Identify and mark the area to be removed
- Cut-out the removal
- Use a cut-off tool, a reciprocating saw or a band saw to cut the opening for the required height channel connection. (Bracing may be necessary).



Use a grinder to dress or enlarge corners for proper fitting.

3. Insert the channel into the socket and seal using an appropriate sealant/adhesive.



** Please ensure installation as per direction of the arrows.*

If corrosive liquids are transported in the trench, ensure the sealant or adhesive is chemically resistant.

4 Pipe Connections

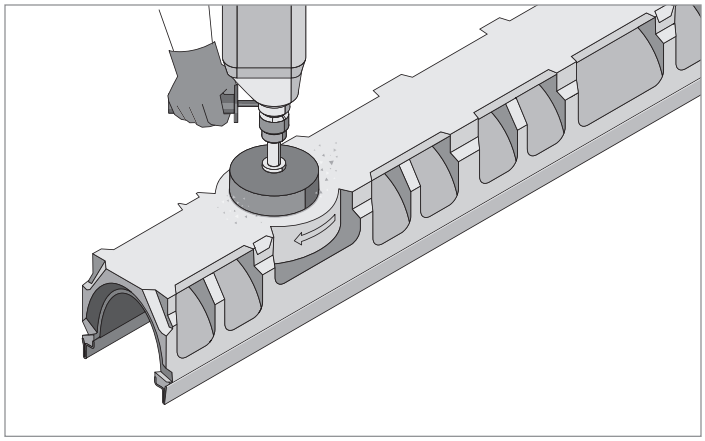
ATTENTION: USE PROTECTIVE GLASSES AND RESPIRATORY PROTECTION WHEN CUTTING AND DRILLING BG-FILCOTEN CHANNELS

Removal of cut-out, or cut hole:

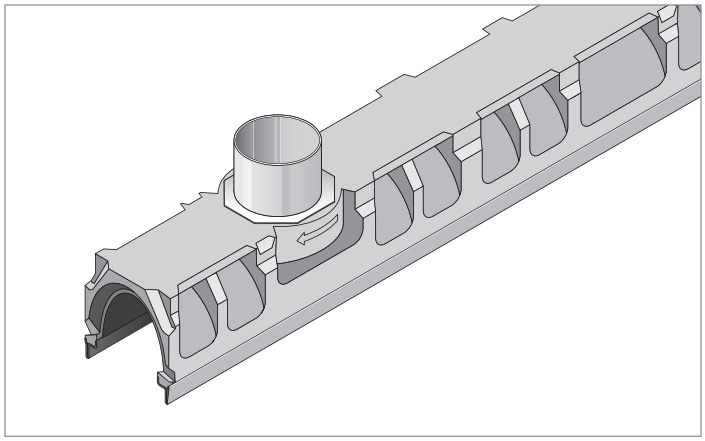
1. Identify and mark the area to be removed.
2. Remove the drill-out. Use a cut-off tool, a reciprocating saw or a band saw to cut the opening for the required height channel connection. (Bracing may be necessary).

Core Drill

Using the correct diamond core drill size, remove the channel/catch basin wall/base to fit the pipe.



- Turn the channel upside down.
- Make the required penetration by either core drilling or switch drilling the needed opening.
- A grinder may be used to dress or enlarge the hole for proper pipe or channel insertion.
- The no-hub bottom outlet is then attached directly to the channel bottom using the appropriate sealant or adhesive.



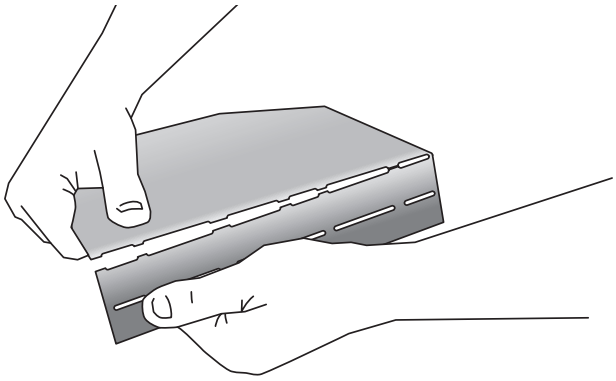
If no end outlet is provided, a pipe may be fitted into the hole by using an appropriate sealant/adhesive.

CAUTION: DO NOT HAMMER DIRECTLY ON MATERIAL TO MAKE PENETRATION. THIS MAY CAUSE SEVERE CRACKING OF THE MATERIAL SURROUNDING THE HOLE. **ALWAYS PREDRILL WITH CORE DRILL.**

5 Connection with Underground Piping

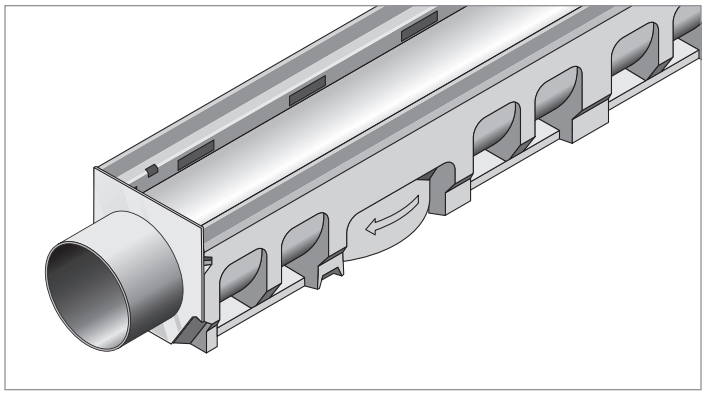
End Caps, End Outlets and Bottom Outlets

The end caps, end outlets, and bottom outlets are field fabricated by first fitting the end cap, end outlet or bottom outlet to the channel and then removing the unwanted piece. Each end cap or outlet is perforated along predetermined measurements.

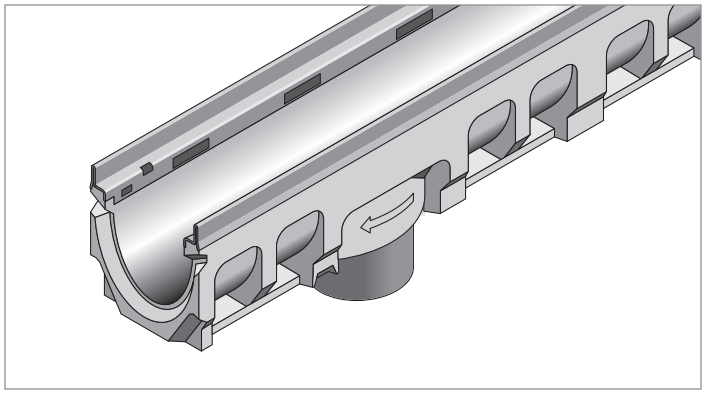


Channels may be connected directly to underground piping via:

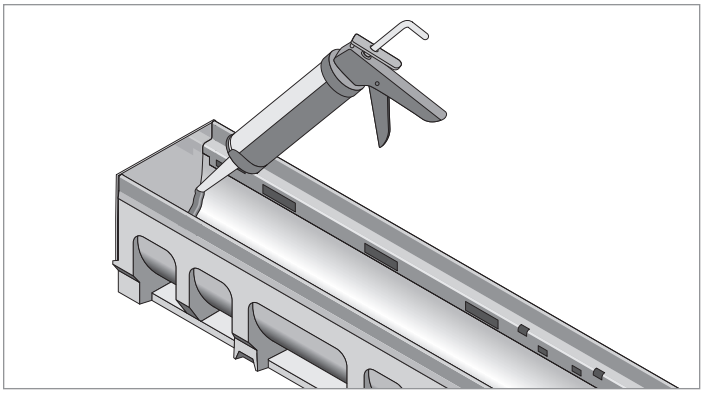
1) End cap outlets (horizontal outlet).



2) Bottom Outlets (vertical outlet).



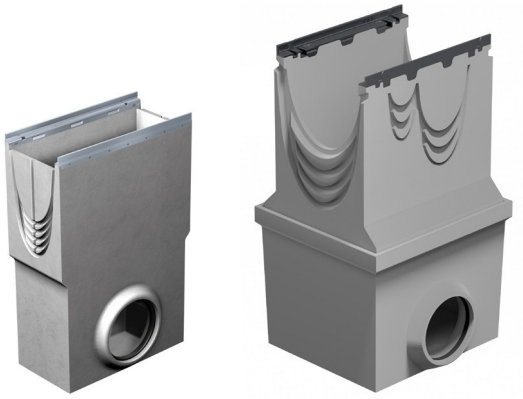
3) End caps.



If corrosive liquids are transported in trench, ensure the sealant or the adhesive is chemically resistant.

On some projects VOC's, and any outgassing from adhesives and sealants is limited or not allowed. In these cases, the outlets, the end caps, and the other accessories may be held in place during the pour by the application of a suitable tape. In these cases, duct tape is used.

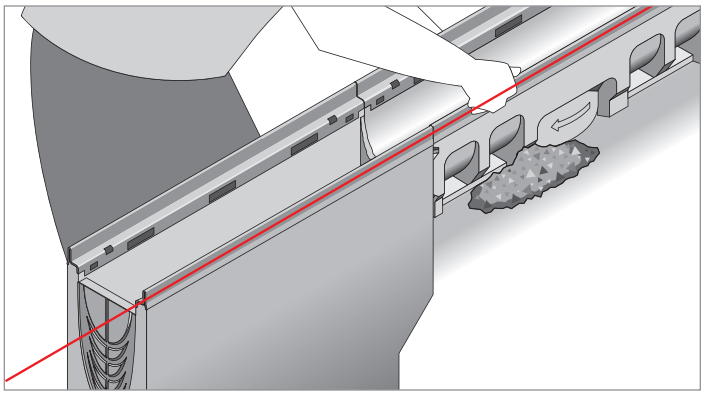
4) In-line catch basin.



Connecting Channels to Catch Basins

The catch basins have guides for the channel connection at corresponding depths of the level of designated channel units (0, 5-0, 10-0, and 20-0).

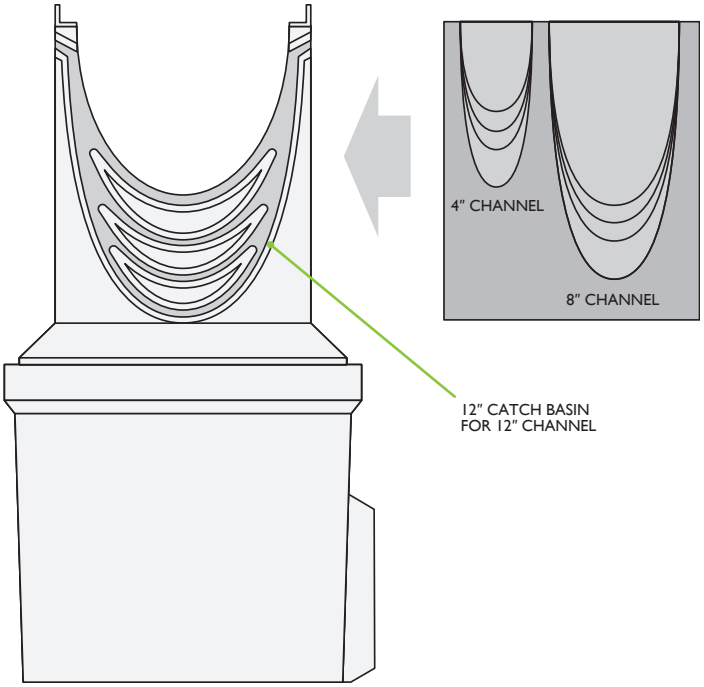
In-line catch basins - cut out the end material at the required channel height. Seal the joint with flexible sealant.

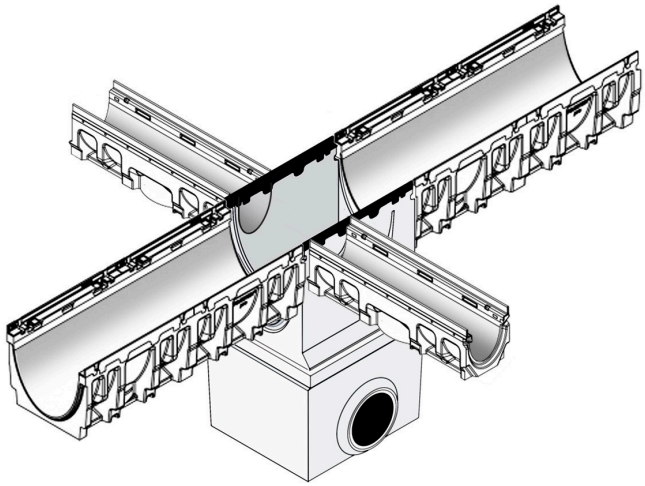


If corrosive liquids are transported in the trench, ensure any sealant or adhesive is chemically resistant.

Combining multiple size channels into a single catch basin.

The adapter plate is needed when a 12" (300mm) channel is combined with a 4" (100mm), 6" (150mm), or 8" (200mm) channel into one large 12" (300mm) catch basin. This provides the designer the ability to run several different channel sizes all discharging into a single common catch basin.



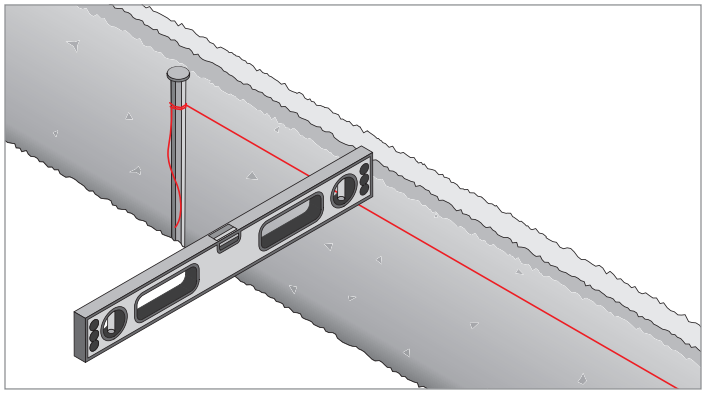


6 Positioning of Channels

Start at the outlet point or at the end of the run, which will be the discharge point.

Ensure the string line, or laser is set at the top edge of the required channel height.

Lay the channel out according to the engineer's diagram by following the directional arrows and by installing the slopes in sequence of number.

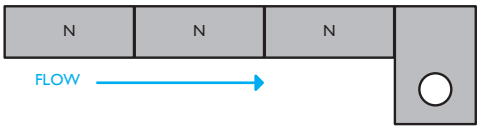


The channels should be installed in accordance with the engineered drawing, the manufacturer's supplied drawing or in accordance with the industry standards and the area codes.

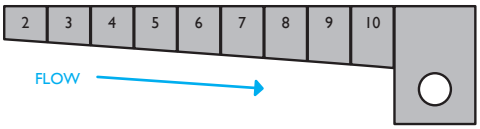
BG-FILCOTEN channels are push fitted together. Simply align the male and female ends and push together.

BG-FILCOTEN channels can be laid out using only neutral channels or with a predetermined slope. Refer to engineered drawings or manufacturers drawings for layout design.

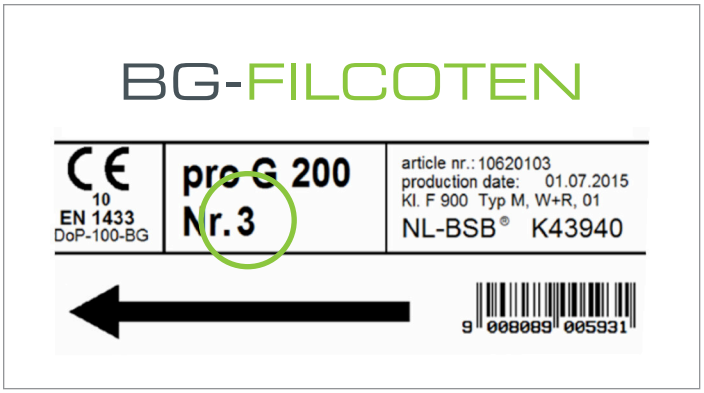
Neutral Channel Layout



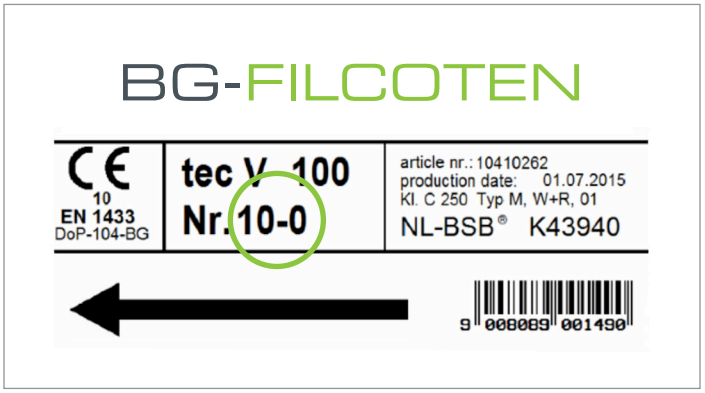
Sloped Channel Layout



Each channel is labeled as seen below. Note the directional arrow which is found on all sloped channels. This indicates the intended direction of discharge. The channels should always be arranged so the flow path moves in the direction of the directional arrow.



Each channel is marked with a number to indicate its place in a sloped design. For neutral channels, a "-0" extension is indicated next to the number. Always refer to the engineer's or manufacturer's drawing to determine the correct channel placement and design.



Common methods of positioning channels in the excavation include:

A. Patty Method
B. Mechanical Support Method
C. Suspension Method

A. Patty Method

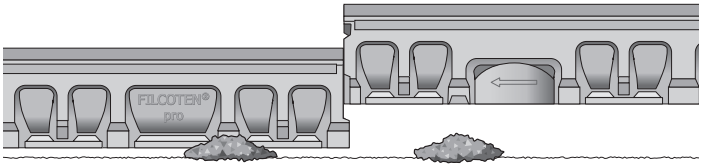
a) Set the catch basin (or the outlet channels) on the bed of concrete to the required height (see page 11 for concrete dimensions).

b) Connect and seal the outlets, the pipe, and the end caps. **All connections for water discharge should be made.**

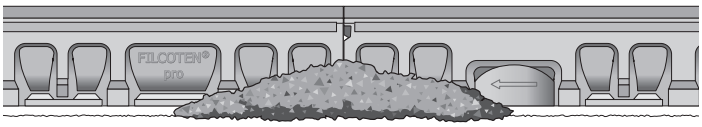
c) Using low slump concrete or dry concrete, create "patties" around the support risers. Allow "patties" to set.

NOTE: PATTIES SHOULD BE SIZED TO PROVIDE A COMPLETE SUPPORT STRUCTURE OF CONCRETE FOR THE RISER AND THE CHANNEL (SEE PAGE 11). COVER THE RISERS COMPLETELY, AND AT LEAST, TWO INCHES UP THE CHANNEL SURFACE.

d) If channels are to be sealed, roughen ends and use a flexible sealant – check chemical compatibility, as required.

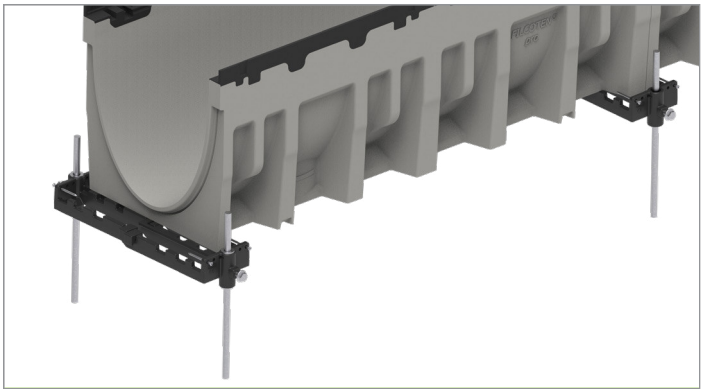


e) Lower the channel vertically onto "patties" and position it to the correct height and alignment ensuring a "tight" connection to the previous channel. Note: channels are formed with interlocking male / female ends. Keep the inside channel joint free from concrete, dirt or debris.



f) Ensure the concrete "patties" extend and cover the anchor grooves on side of the channel (as shown in the image above) - this helps prevent movement, or floating, during the concrete pour. Once the dry concrete is set, the final pour can be made.

g) Continue to lay the channels until the end of the run or the next catch basin is reached.



Designed for use with BG-FILCOTEN light, tec, pro, pro mini, city mini, parkline, one and one urban channels.

The installation chair kit makes the channel drain height adjustment and positioning easy. It is a clamping system that fits around the profiled channel details.

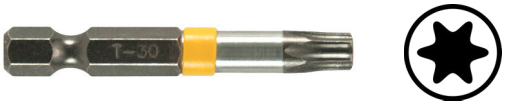
The rebar is used to achieve the correct height.

One device per joint is required. It is a universal device which is adjustable to accommodate channel sizes of 4" (100mm), 6" (150mm), 8" (200mm) and 12 " (300mm).

To complete an installation using the installation chair kits, the installer will need one more kit than the channel drain quantity. If the project calls for 10 channels, then 11 installation chair kits will be needed.

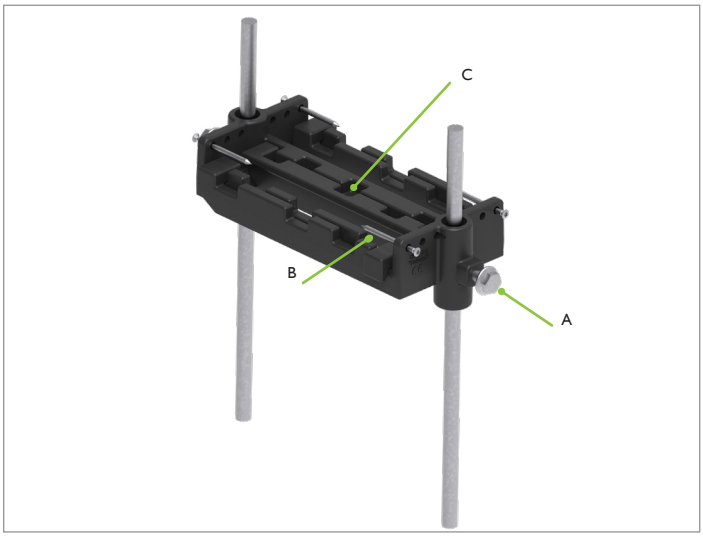
Note: Assemble the installation chair as per the instructions. (link)

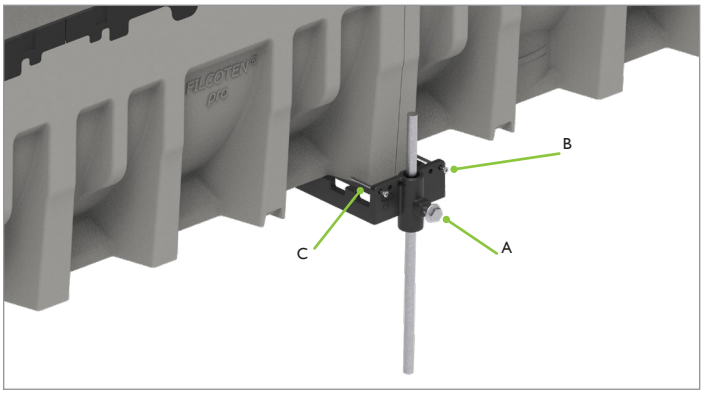
1. Drive the #4 or #5 rebar (deformed rebar supplied by others) into the ground to hold the installation chair. Screw the installation device to the deformed rebar at the required height. Use bolt A.
2. Set the channels in position over the installation chair body C (2-pieces assembly).
3. Using a #30 TORX screwdriver bit (refer to the images on following page), tighten the screws carefully onto the channel (component B).



4. Adjust all the wing nuts and fasteners so that the channels are held securely at the correct installation height (bolts A and B).
5. Repeat for any additional channels.
6. Each installation chair secures 2 adjoining channels which sit on top of the installation chair and in-between the clip clamping teeth. The installation chair is positioned at the channel seam.

Check that the channels are at the required level. The wing nuts and fasteners must be fully adjusted and tightened on the installation chair as required to support the load.





*Deformed bars provided by others.

C. Suspension Method

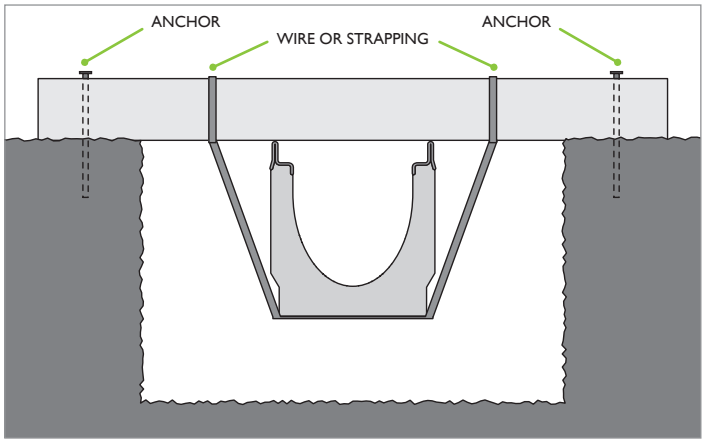
a) Cut 2 x 4's to length to span the excavated trench or form boards (minimum 2 per channel - NW200 & NW300 will require 3 - 4 per channel). Cut "spacers" to "lift" the supports above the finished level.

b) Using simple wire or straps, suspend the channels from the overhanging support board.

c) Adjust the channels to the required position and height. Packing material may be required beneath 2 x 4's to achieve the required height and to ensure the channels are level.

d) If channels are to be sealed, roughen the ends and use a flexible sealant – check chemical compatibility, if required.

e) Nail (anchor) or bolt the cross member supports securely to the slab/form boards. This ensures the channels are held securely during the concrete pour. **There is a possibility that the channel run could float or shift if the supporting cross members are not properly anchored.**

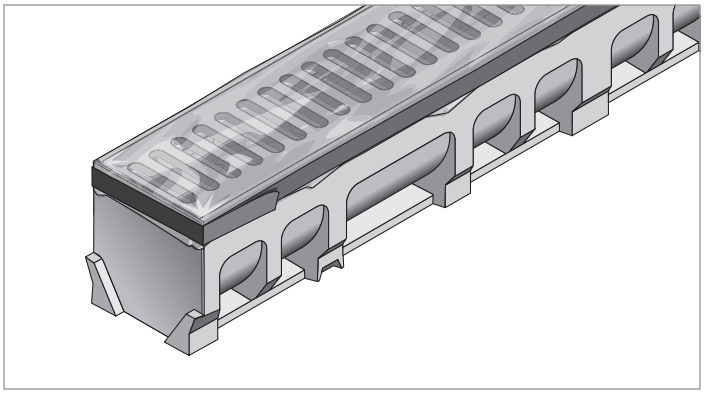


7 Pouring Concrete

Channel Bracing

To prevent the channel wall and joints from distorting due to the weight of concrete, gratings or 3/4" plywood sections (cut to create a snug fit) should be placed in the grate recess of the channel.

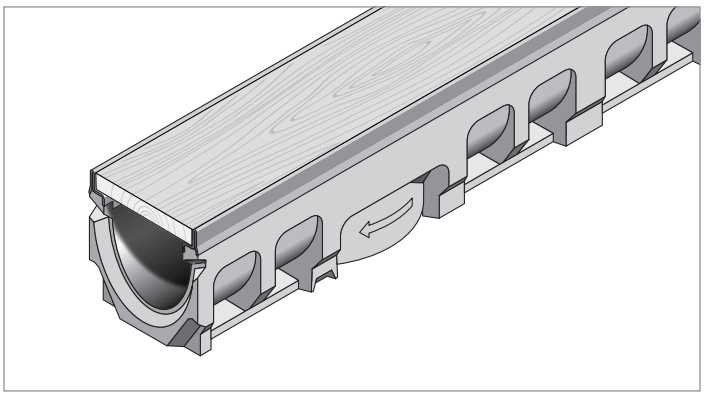
If gratings are used, they should be suitably protected from concrete contamination during concreting (wrapped in plastic or masking tape) and should be laid to bridge the channel joints to aid alignment. Shims (or washers) should be placed along one side to maintain a clearance gap.



Concrete Pour

To prevent concrete from filling the channel body, cover the exposed areas with plywood or similar (bracing should suffice).

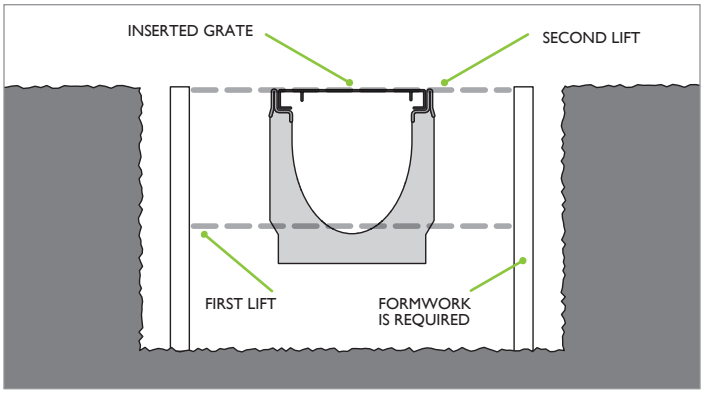
If any open outlet exist, they should be covered to prevent fresh concrete from entering the channel. Ensure all the system connections are made and secured.



The concrete should have a compressive strength of minimum 4,000 psi.

If using the hanging method, once the channels are secured in position, the first concrete lift should come approx. 2 inches (50mm) up the sides of the channels.

Once the concrete "patties" or first fill has been poured and set, the remaining concrete surrounding can be poured.



The concrete should be poured evenly on (both sides of the channel) and carefully to avoid dislodging or moving the channels.

A wand type concrete vibrator should be used to ensure concrete distributes evenly underneath and around the channels.

If 'cold joints' are a concern, **engineering advice should be sought** to determine alternative details.

8 Pavement Finishing

A. Concrete

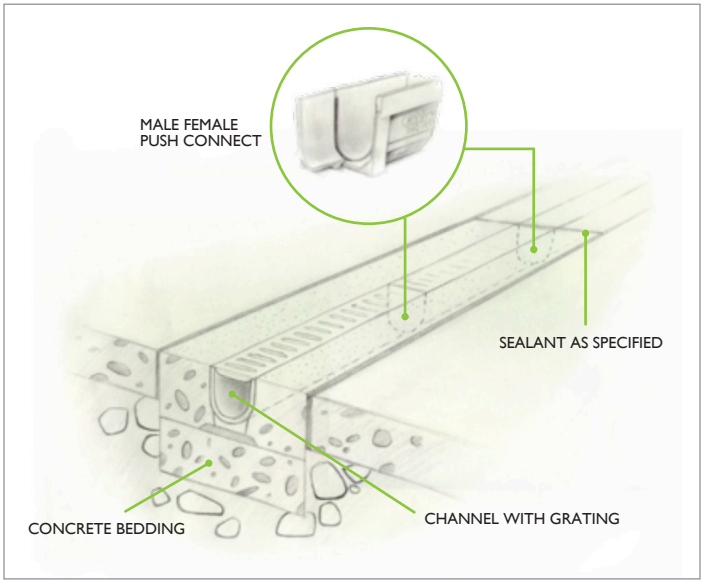
To finish the installation, trowel the concrete flat and taper down to the channel edge. The top of the adjacent pavement must be above the grating level (approximately 1/8" or 5 mm). This ensures all liquids drain into the channel.

Finished concrete should have a slight slope down to the channel.

Once concrete has cured for 24 hours, remove the bracing and/or grate protection.

Expansion joints and transverse joints (perpendicular to the channel) are required to prevent surface cracking in the slab.

These joints should be positioned at the channel joints to prevent the channels from cracking. If such spacing is not possible, a cut must be made at the appropriate location through the channel and be sealed with flexible sealant.



Longitudinal Expansion / Control Joints should be continuous and flexible. They must be provided between the concrete and surrounding slab and may be varied to suit the concrete surrounding width by up to a meter (3.28 feet) from the channel.

BG-GRASPOINTNER STRONGLY ENCOURAGES THE INSTALLATION OF EXPANSION JOINTS IN ACCORDANCE WITH THE ENGINEER SPECIFICATION, LOCAL CODES AND REGULATIONS.

B. Asphalt

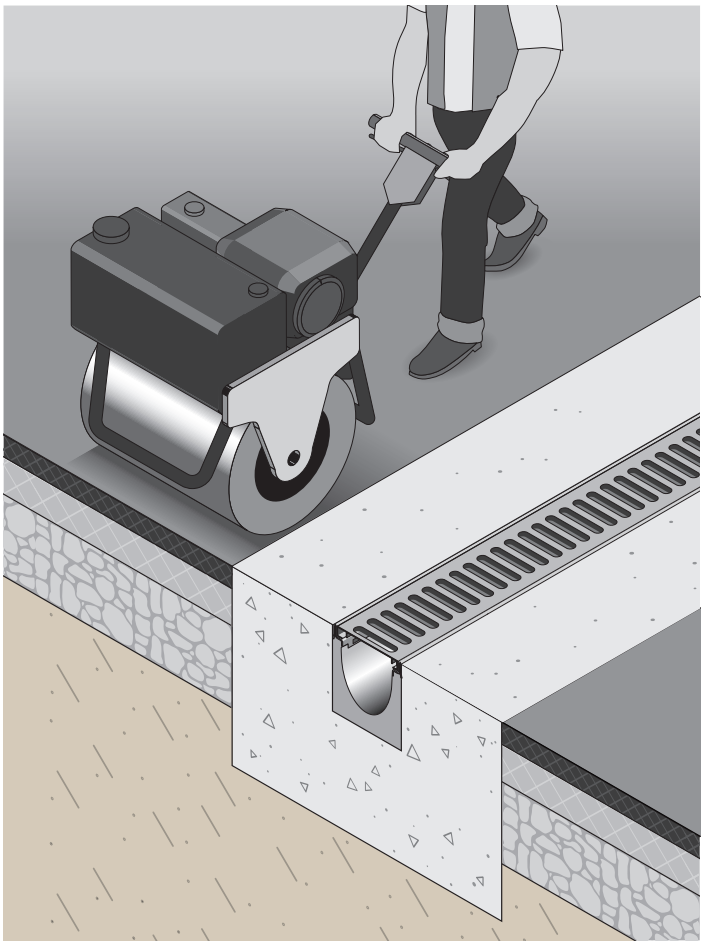
For applications up to Load Class C, asphalt can be applied directly up to the channel edge.

Finished asphalt should have a slight slope down to channel.

For applications over Class C, a full concrete surrounding should be used.

See page 15 for concrete haunch details.

CAUTION: TO PREVENT DAMAGE TO THE CHANNELS AND THE GRATES, PROTECT THE CHANNEL BETWEEN THE CONCRETE POUR AND THE APPLICATION OF ASPHALT AND WHEN ROLLING THE ASPHALT.



A small manual rolling machine should be used to compact the asphalt at the outer edge of the channel concrete surrounding to avoid damaging the concrete edge.

Compaction machinery should not be allowed to pass over the channel and channel concrete surrounding. Machines should be directed along each side of the channel concrete surrounding, running parallel to the concrete edge.

Asphalt must be above the grating level by approximately 1/8" or 5 mm. This ensures all liquids drain into the channel.

Once the installation is finished, remove the bracing and/or grate protection.

C. Brick Pavers

For applications up to Load Class C, brick pavers can be installed up to the channel edge.

For applications over Class C a full concrete surrounding should be used. See page 15 for concrete haunch details.

The adjacent brick pavers to the channel **MUST** be fully bonded (glued) to the concrete haunch. The number of pavers to be glued would depend on paver dimensions. This prevents the movement of bricks and possible damage to the channel. Subsequent pavers can be bedded on compacted sand.

The bricks must be above the grating level by approximately 1/8" or 5 mm, this ensures all liquids drain into the channel.

Once the surface is finished, remove the bracing and/or grate protection.

9 Fit Grates

Gratings installation

The BG-FILCOTEN gratings are equipped with a four point fix self-locking (Snap-on) system and/or four point bolting system.

To install the grating, align it directly over the channel rails. Push down/ stand on the grating until it clicks into position.

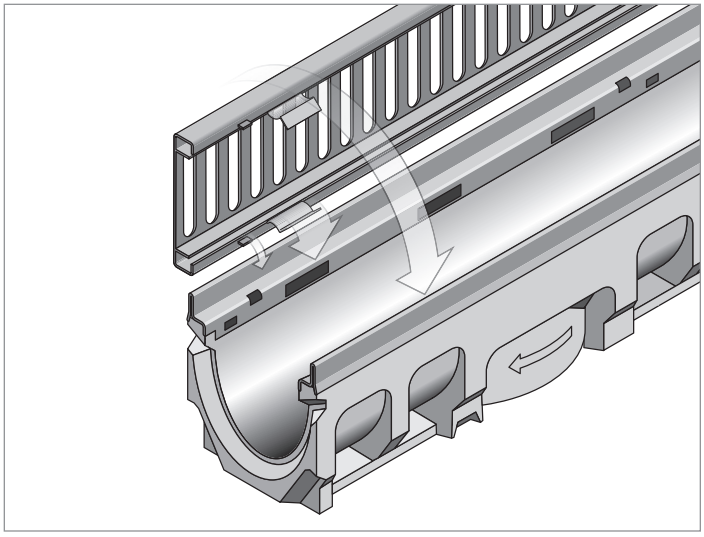
If the gratings are equipped with a bolting system, use the key driver to lock them in place.

To remove the first grate, insert a flat head screwdriver under the grating bar, then pull up sharply.

The subsequent grates can be removed by hand.

- Grip the end of grate and lift sharply.

If the gratings are equipped with a bolting system, use the key driver to release them.



Anti-vandalism locking device

Step 1

Push the system to protect against vandalism into the fitting springs provided for this purpose until it snaps into place.

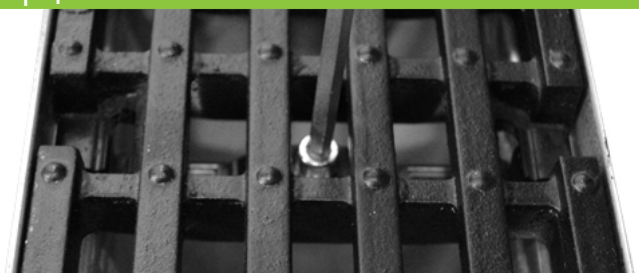
Step 2

Attach the grating as described for the fix-connection above into the BG-FILCOTEN tec/pro channel.

Step 3

Push the grating firmly into the channel until it snaps into place.

Step 4



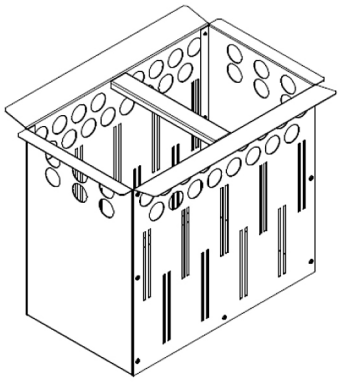
Lock the system to protect against vandalism by twisting the bolt.

NOTE: ANTI-VANDALISM LOCKING DEVICE VIDEO INSTALLATION ON: **http://www.bg-graspointner.com/**

10 Final Inspections & Maintenance

Final Inspections

1. Remove any debris in the system and grate recess. Ensure the outlet pipes are clear.
2. Install the sediment buckets in the catch basins, if required.
3. Flush the trench run to check for pipe flow blockages, unblock if necessary.
4. Empty the sediment buckets and clean out the pipe connections, if necessary. Replace the sediment buckets.



5. Install the gratings in proper position ensuring they are securely locked down if required (page 18).

Maintenance

Regular inspections of the trench drain system is recommended. The frequency will depend on local conditions and environment, but should be done at least annually. Inspections should cover:

- Grates and locking devices
- Catch basins and sediment buckets
- Surrounding concrete and adjacent paving

All items should be inspected for damage, blockage or movement. Compare with the site drawings if necessary.

1. Remove the grates - see page 18.
2. Remove the debris from the channel.
3. Flush the channels with water or high pressure washer.
4. Repair the damaged surfaces.
5. Renew the joint seals as required.
6. Empty the sediment buckets and clean out the pipe connections.
7. Reinstall the sediment buckets.
8. Reinstall the grates, ensuring they are locked in place.

The systems with grates which may have wide slots may be cleaned with the use of pressured water applied through the grate - debris will be washed to the catch basin for removal.

(Empty and replace the sediment bucket).

Drainage system is now ready for use

Thank you for choosing BG-Graspointner

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