



## **ACO DRAIN**

### *Site Installation Manual*

#### **Fiberglass Drain Systems**



# Getting Started

ACO Drain consists of a full range of modular channels with lockable gratings. Systems include catch basins, end caps, and other accessories.

When installed correctly, ACO Drain products are designed to withstand a variety of loadings as classified by DIN 19580/EN 1433 (The only standards specifically for trench drain systems).

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Fiberglass products should be handled with care as they can be damaged by impact from other products, or machinery.

Typical equipment necessary for installation may include:

- *Excavating equipment*
- *String-line and laser level*
- *Measuring tools*
- *Drill, grinder and/or saw*
- *Concrete - 3,000 psi minimum compressive strength*
- *Gloves, respirator and eye protection*

## Health and Safety

Fiberglass is produced from glass mattings bonded together using a resin binder.

Main hazards include:

- Abrasive damage to hands.
- Respirable dust from grinding, cutting or drilling.
- Grinding, cutting, etc. may project fragments at speed causing possible impact damage.

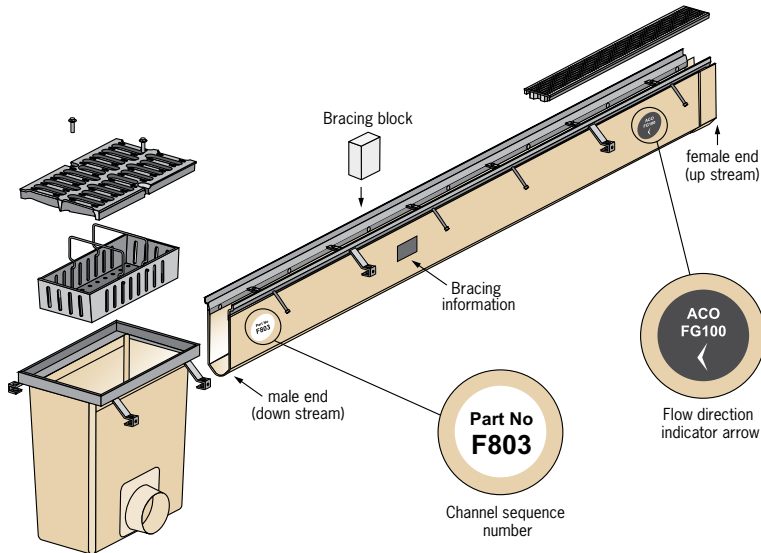
Gloves, eye protection and a respirator should be worn to avoid these hazards.

Grates and frames made from metals are either castings or fabricated.

Main hazards include:

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

Gloves, eye protection, and respirator should be worn to avoid these hazards. Operations should be conducted away from areas of fire or explosion hazard.



**Make sure arrow stickers on sides of channel all point in the intended direction of flow (outlet point).**



## Installation Sections

These illustrations are a guide for average ground conditions only. Engineering advice should be taken.

Refer to [www.acousa.com/install\\_drawings\\_drain.htm](http://www.acousa.com/install_drawings_drain.htm) for further information.

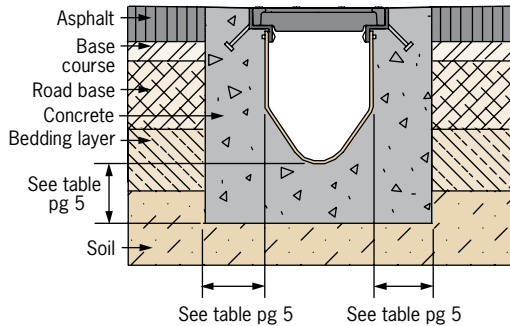
An installed ACO Drain System should incorporate the following:

- Correct grate type.
- Correct channel type and size.
- Minimum grade 4,000 psi compressive strength cement concrete surround.
- Concrete surround dimensions are **minimum** dimensions and engineering advice should be taken to confirm appropriate for the specific project.
- Concrete surround should typically be the same thickness as the concrete slab.

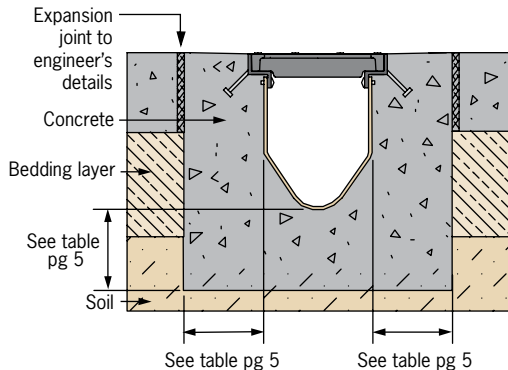
Poor site conditions and low load bearing pavement will require an increase in these dimensions to meet both vertical and lateral loads.

Reinforcing steel may be required within the slab and around the trench drain - engineering advice should be sought to determine bar size and configuration.

### Asphalt - EN 1433 Class A - E



### Concrete - EN 1433 Class A - E



# Commercial Trench Drains

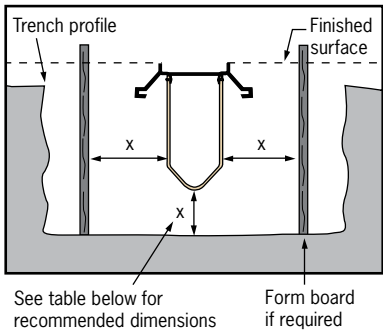
## 1 Excavation

Excavate trench to accommodate drain system. Excavations must be made about the center line of proposed drainage run and catch basin.

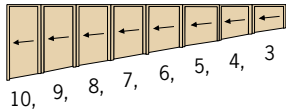
The trench must be big enough to accommodate each of the following:

- A. Channel/catch basin width and depth dimensions.
- B. Concrete surround dimensions\*.

- C. For sloped system, excavate base of trench to roughly follow fall of the trench run.



### Sloped system



### Neutral system



**NOTE:** Check product literature for overall product depth. Add additional measurement for concrete surround from table at left.

### Concrete Surround Dimensions\* (x)

Load CI	A	B	C	D	E	F
4" channel	6"	6"	8"	8"	10"	10"
8" channel	6"	6"	8"	8"	10"	10"
12" channel	12"	12"	12"	12"	12"	12"

\* These dimensions are recommended minimums only, based on 4,000psi concrete. Ground conditions will affect actual dimension required; engineering advice should be sought. Concrete surround should be same thickness as surrounding slab depth.

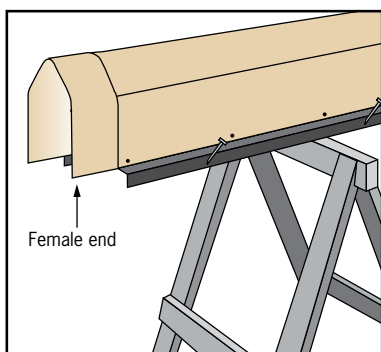
Ensure loose material is removed from trench and base is well compacted.

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

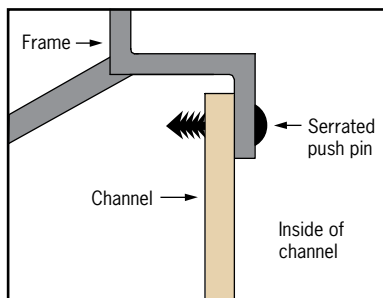
In concrete pavements, ensure an allowance is made for expansion/isolation joints, if necessary, to allow movement due to expansion/contraction.

## 2 Channel / Frame Assembly

1. Set frame upside down.
2. Push fiberglass body onto frame - must sit outside frame.
3. The female end of channel should extend past the end of grate frame approx. 2 inches. The male end is flush with grate frame.



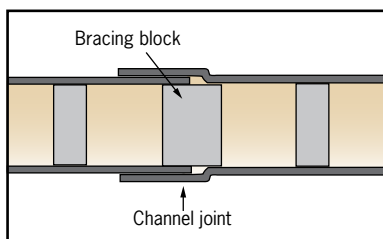
4. Align holes in frame and channel and fasten with push pins (supplied) from inside of channel.



### Channel Bracing

5. Refer to red sticker on side of channels for specified number of polystyrene blocks for each channel. Bracing deeper channels during concrete pour prevents bowing due to hydrostatic pressure from concrete.

**NOTE:** Ensure blocks remain vertically centered between channel walls.



Once channels are positioned, add blocks at joints to maintain correct horizontal alignment.

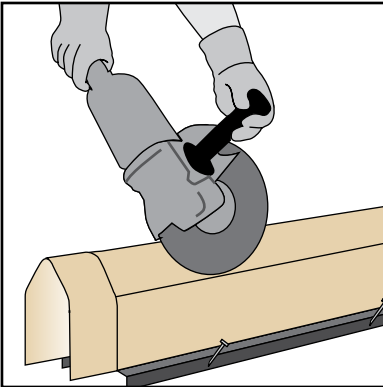
### 3 On-Site Fabrications

When cutting channels and/or grates, gloves, protective eye wear and respirator or mask are recommended.

Cutting channels is required to form miters, tee junctions and produce non-standard lengths. Contact ACO Technical Department for further information.

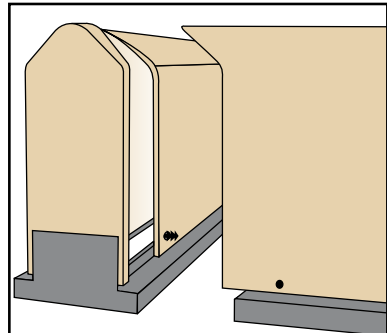
Cuts can be made with a cut-off tool, jigsaw or hacksaw. They should be smooth and made perpendicular to the base of the channel. The saw should be of sufficient size to cut completely through one side wall of the channel at a time.

Gratings and frames can be cut with band saw, or similar, with suitable blade.



Tee junctions/miters are a little more complex for FlowDrain channels. ACO recommends these fabrications be produced by the in-house fabrication department. If they are to be completed on site, channel needs to be notched to ensure a complete fit at joint.

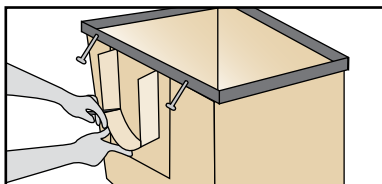
Joints should be sealed using ACO's fiberglass repair kit to give the joint maximum strength and durability.



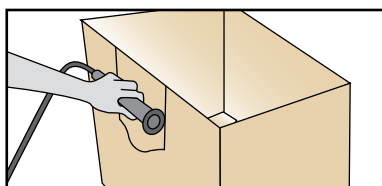
## 4 Channel Adapters

Channel adapters are designed to create a female flange to help support channels or pipes when connecting into F660, F880, or F900 basins.

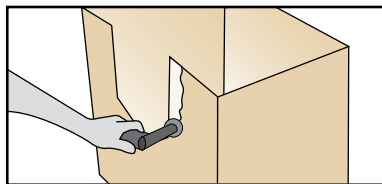
1. Cut collar to match required channel height. Mark inside collar with marker.



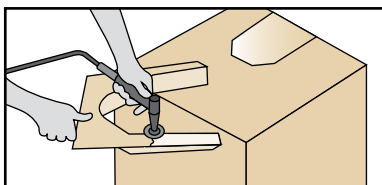
2. Use cut-off tool, jigsaw or hacksaw to remove marked channel shape.



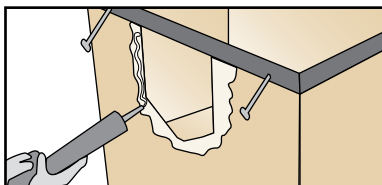
3. Use sandpaper, grinder or similar to roughen surface around opening. Clean with air or dry brush.



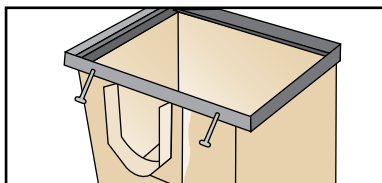
4. Use sandpaper, grinder or similar to roughen adapter flange. Clean with air or dry brush.



5. Apply flexible sealant (polyurethane or urethane) to roughened surface of basin.



6. Apply collar to basin. Ensure joint is properly sealed, remove excess sealant. Place channel into collar.



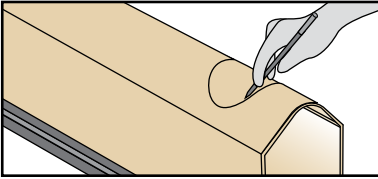
**NOTE:** For additional stability, apply screws through flange and channel. Cut off screws on inside of basin once concrete pour is complete.



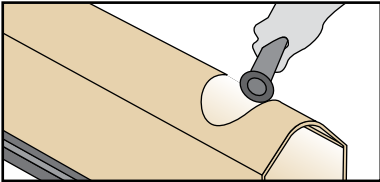
## 5 Pipe Connections - Vertical Outlet Adapters

Vertical outlets provide vertical bell end for easy attachment to drainage pipe.

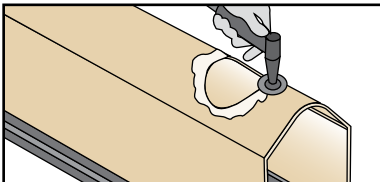
1. Align adapter with appropriate area of channel. Mark inside collar with marker.



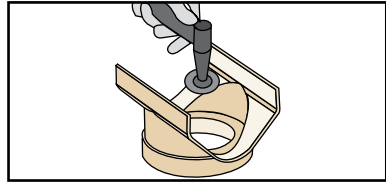
2. Use cut-off tool, jigsaw or hacksaw to remove marked shape.



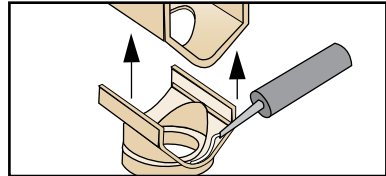
3. Use sandpaper, grinder or similar to roughen surface around opening. Clean with air or dry brush.



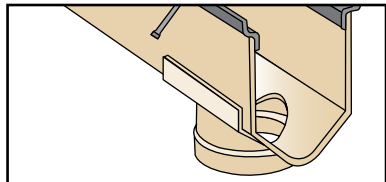
4. Use sandpaper, grinder or similar to roughen adapter flange. Clean with air or dry brush.



5. Apply flexible sealant (polyurethane or urethane) to roughened surface of adapter.



6. Secure adapter to bottom of channel. Ensure joint is properly sealed, remove excess sealant. Place pipe into adapter.

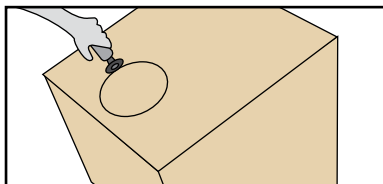


**NOTE:** For additional stability, apply screws through flange and channel. Cut off screws on inside of channel once concrete pour is complete.

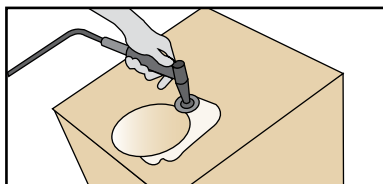
## 5 Pipe Connections - Pipe Adapters

Pipe adapters are designed to provide a transition for 4", 6" or 8" Schedule 40 pipe.

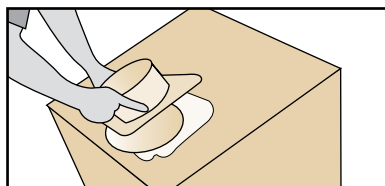
1. Hold pipe adapter in required position, mark basin. Use cut-off tool to remove marked area.



2. Use sandpaper, grinder or similar to roughen surface of basin and pipe adapter on flange. Clean with air or dry brush.



4. Place pipe adapter on basin. Ensure joint is properly sealed, remove excess sealant. Drainage pipe fits over the pipe adapter.

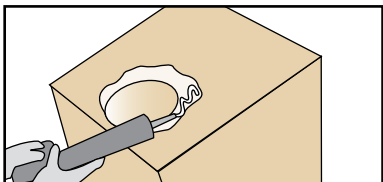


**NOTE:** For additional stability, apply screws through flange and channel. Cut off screws on inside of basin once concrete pour is complete.

10



3. Apply flexible sealant (polyurethane or urethane) to roughened surface of basin.

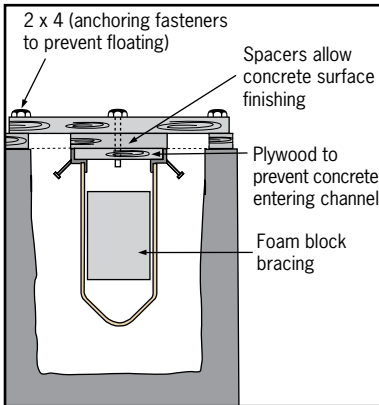


## 6

### Positioning Channels - Hanging Method

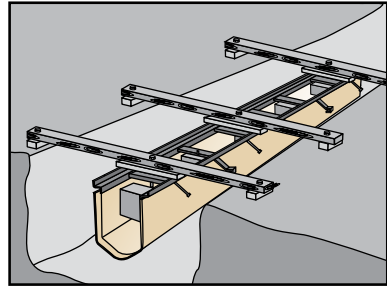
Lay channels in the excavated trench beginning at the outlet point; where catch basin/pipe is located.

1. Cut 2 x 4's to appropriate width to span excavated trench or form boards
2. Attach 2 x 4's to channels using **J-Bolts for FG100** or **3/8" all-thread rod for FG200** (attach at frame cross members).



**CAUTION:** Do not over tighten, cross members may deform, causing problems fitting grates.

3. Place outlet channel (deepest or highest channel number) and ensure it is aligned properly. Fasten 2 x 4 to form boards or surrounding slab. This prevents movement or floating of channels during concrete pour.



4. If channels are to be sealed, lightly sand, then wipe clean next female collar and male end. Apply 1/8" bead of polyurethane joint sealant approximately 1" from end of channel.
5. To position next channel, slide male end into coupler end of previous channel. Push channels together until frames are flush. Smooth joint sealant with a putty knife, if used.
6. Fasten 2 x 4 to form board or slab. Check level and straighten. Repeat until trench run is assembled.
7. Check security of 2 x 4's; system will float in wet concrete. Reattach if necessary.

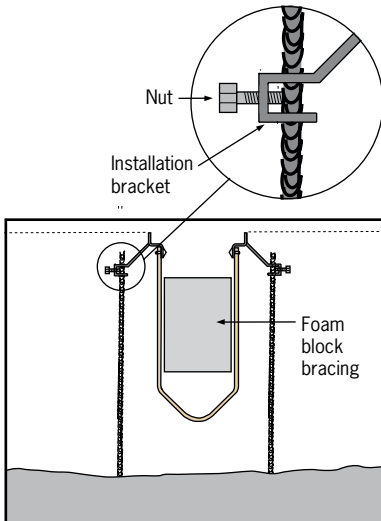


# 6

## Positioning Channels - Rebar Support Method

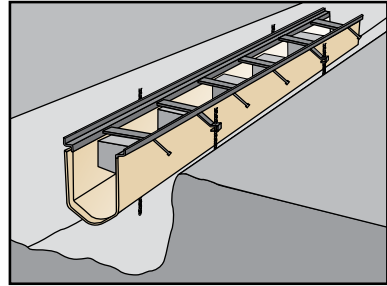
Lay channels in the excavated trench beginning at the outlet point; where catch basin/pipe is located.

1. Place outlet channel (deepest or highest channel number) at required location. Place rebar (no. 4 or 5) through installation brackets (4 per channel) and drive into ground until secure.
2. Adjust channel assembly vertically to align with string line or laser. Once channel assembly is set to the height desired tighten the 5/16" bolts onto rebar. Do not over tighten.



Note: foam block bracing to prevent channel crushing during concrete pour.

3. If channels are to be sealed, lightly sand, then wipe clean next female collar and male end. Apply 1/8" bead of polyurethane joint sealant approximately 1" from end of channel.



4. To position next channel, slide male end into coupler end of previous channel. Push channels together until frames are flush. Smooth joint sealant with a putty knife, if used.
5. Place rebar through installation brackets, pound into ground until secure. Position channel to required level, tighten bolts. Repeat until trench run is assembled.
6. Check security of rebar; system will float in wet concrete if not sufficiently anchored.

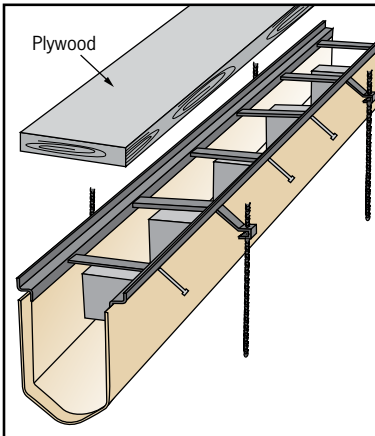
**NOTE:** If rebar holding strength is questionable due to poor ground conditions, pour a 3" - 4" slump concrete around the base of the rebar, keeping base of channel clear from concrete.

## 7 Concrete Pour

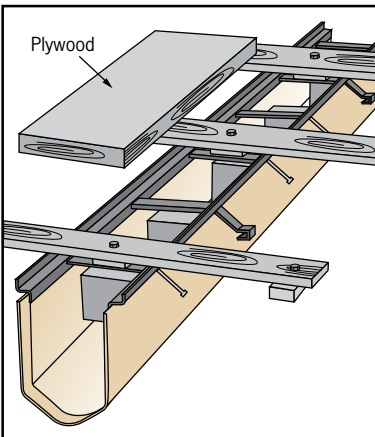
Concrete should have compressive strength of minimum 3,000 psi.

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

1. Place plywood in grate rebate to prevent concrete entering channels.

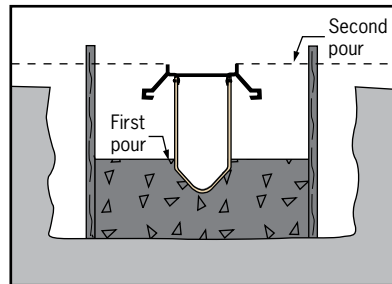


For Hanging Method use plywood pieces between 2 x 4's.



2. Place 3" to 4" slump concrete carefully around bottom of channels taking care not to disturb channel position. Ensure that "V" bottom is covered.

3. Second pour should be to finished level.



**NOTE:** Care should be taken to place concrete equally on both sides of trench system to avoid moving channels. Too much concrete on one side of the channel may cause the channels to twist.

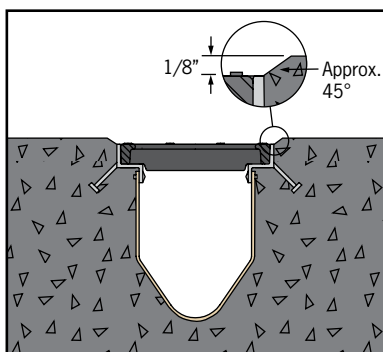
If 'cold joints' are a concern, **engineering advice should be sought** to determine alternative details.

# 8

## Concrete Finishing

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

Once concrete has set, remove 2 x 4's (if used), bracing and/or grate protection. Fit grates - see page 15.



### Expansion joints

Transverse joints (cutting across channel surround) to prevent surface cracking in the slab may be required. Such joints should be positioned at male and female overlap and channels sealed with a flexible sealant.

Longitudinal expansion/isolation joints must be continuous and flexible. They must be provided between the concrete surround and surrounding slab and may be varied to suit concrete surround width by up to a meter (3 feet) from the channel.

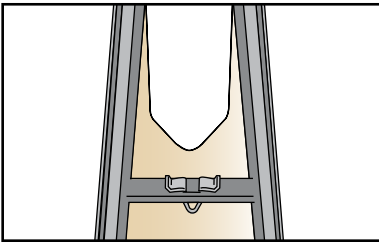
If the joint is dowelled, debonding should be provided. **ACO recommends seeking engineering advice.**

## 9 Fit Grates

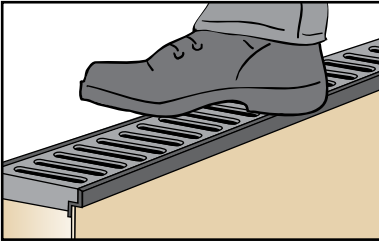
### QuickLok Gratings (FG100)

QuickLok provides highly secure boltless locking, which is quick to remove/replace for maintenance and cleaning.

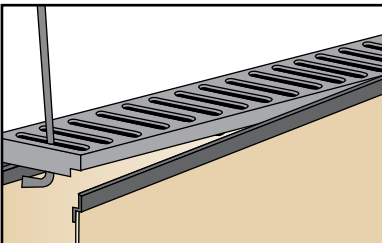
1. QuickLok locking mechanism is part of the cross bar on the frame.



2. To install QuickLok grating, align stud directly over QuickLok mechanism. Push down or stand on grating until it clicks into position.



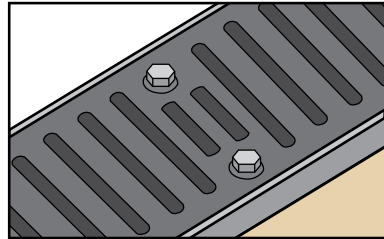
3. To remove, insert grate removal tool under grating bar and pull grating up sharply.



### Bolted Grates (FG200)

Used on FG200 gratings, bolted grates are lockable with two ½ - 13 x 1½" bolts fixing directly into the steel frame at 18" (457mm) intervals.

Do not overtighten. (Torque wrench set to no more than 26 lb - ft).



# 10

## Final Inspections

1. Remove any debris in the system and grate rebate. Ensure outlet pipes are clear.
2. Install trash baskets in catch basins, if required.
3. Flush trench run to check for pipe work blockages, unblock if necessary.
4. Empty trash buckets and clean out pipe connections, if necessary. Replace trash buckets.
5. Install gratings in proper position ensuring they are securely locked down. See page 15 for full details.

**Drainage system is now ready for use.**





# 11

## Maintenance

Regular inspections of the trench drain are recommended. Frequency will depend on local conditions and environment, but should be at least annually.

Inspections should cover:

- Grates and lockings
- Catch basins and trash buckets
- Concrete surround and adjacent paving

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

1. Remove grates - see pg 15 for details
2. Remove debris from channel
3. Flush channels with water or high pressure washer
4. Repair damaged surfaces, if necessary, with an appropriate ACO repair kit
5. Empty trash buckets and clean out pipe connections
6. Re-install trash buckets
7. Re-install grates, ensuring they are locked in place.

Systems with grates that 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 trash bucket).