ACO Drain

Fiberglass Trench Drain Systems

Site Installation Manual

ACO Drain consists of a full range of modular channels with captive grates. 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 EN 1433—the only standards specifically for trench drain systems.

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Getting Started

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 - 4,000 psi recommended 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.
- Inhalation of dust from grinding, cutting, or drilling.
- Grinding, cutting, etc. may project fragments at speed causing possible impact damage.

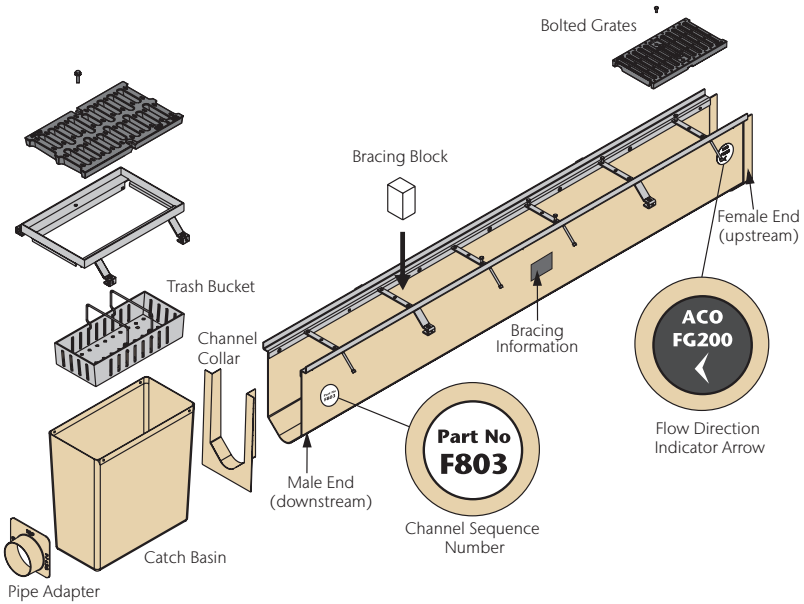
Gloves, eye protection and respirators should be worn to avoid these hazards.

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

Main hazards include:

- Abrasive damage/cuts to hands.
- Inhalation of dust from grinding or cutting.
- Projection of small fragments from grinding, cutting, etc.; flammable items should be removed from area.

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



Make sure arrows molded on sides of channel all point in the intended direction of flow (outlet point).

Installation Sections

These illustrations are a guide for typical ground conditions only. Engineering advice should be taken. Refer to for further information.

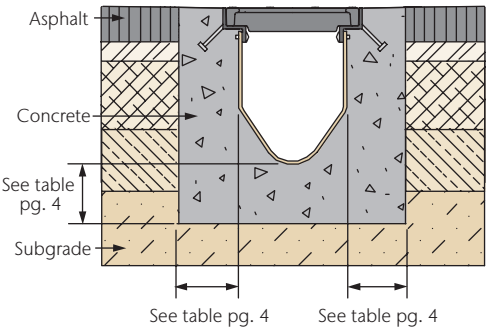
An installed ACO Drain System should incorporate the following:

- Correct grate type.
- Correct channel type and size.
- Recommended 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.

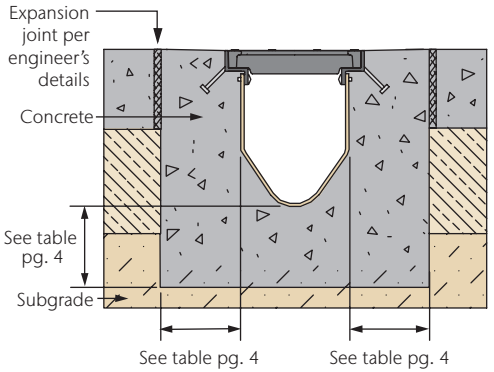
Poor site conditions and low load bearing pavement will require an increase in these dimensions to meet both vertical and lateral loads.

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

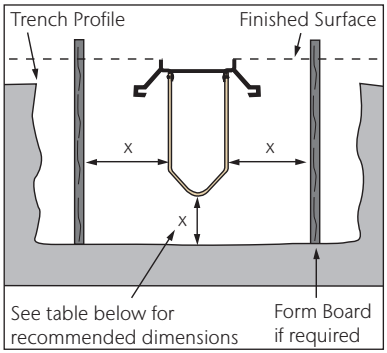


1 Excavation

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

Trench must be big enough to accommodate each of the following:

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



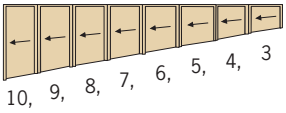
Concrete Surround Dimensions* (x)

Load Class	A	B	C	D	E	F
8" Channel	4"	4"	6"	8"	8"	10"

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

1. For sloped systems, excavate base of trench to roughly follow fall of trench run.

Sloped System



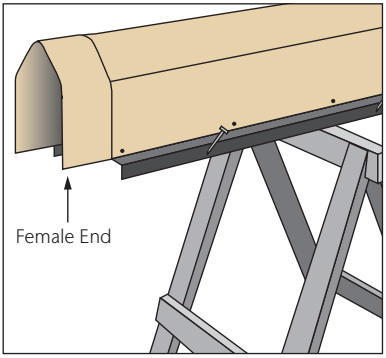
Constant Depth System

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

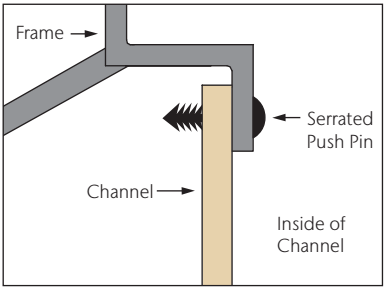
- Ensure loose material is removed from trench and base is well compacted.
- Run string line, or laser, at finished surface level along full length of proposed trench run to ensure trench is installed to grade.
- In concrete pavements ensure an allowance is made for expansion/ isolation joints, if necessary, to allow movement due to thermal expansion/ contraction.

2 Channel/Frame Assembly

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

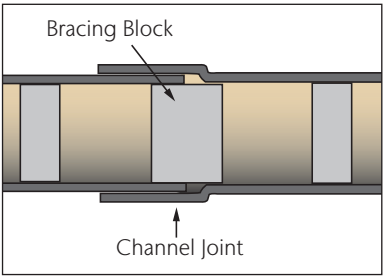


4. Align holes in frame and channel and fasten with push pins (supplied) inserted from inside of channel.



5. Channel Bracing - 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.

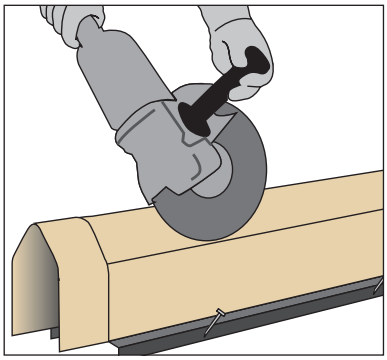
3 On-Site Fabrications

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

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

Cuts can be made with a cut-off tool, reciprocating saw or band saw. 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.

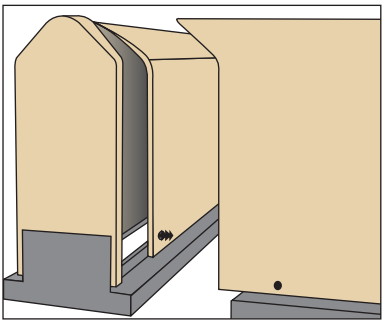
Gratings and frames can be cut with band saw, or similar, with suitable blade.

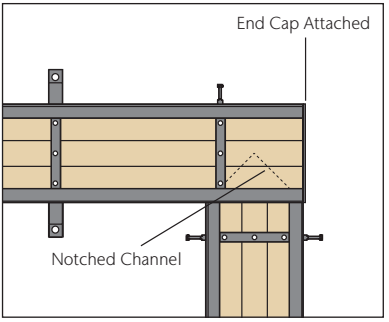


Tee junctions can be complex for FlowDrain channels. ACO recommends these fabrications be produced by the in-house fabrication department.

If they are to be completed on site, both channels need to be fabricated/notched, as shown below, to ensure a complete fit at joint. See ACO Fiberglass Fabrications Tech Bulletin.

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

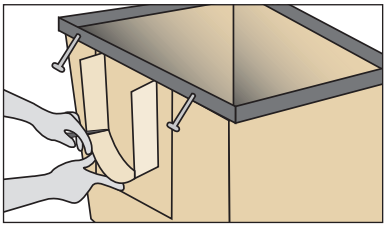




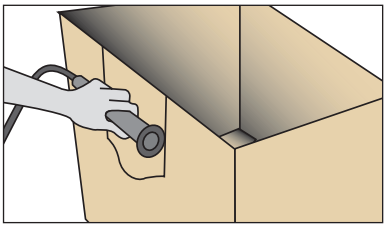
4 Channel Adapters

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

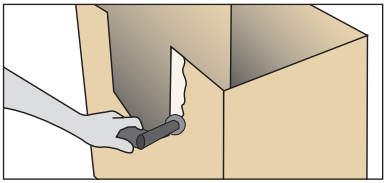
1. Cut collar to match required channel height. Mark inside collar with marker.



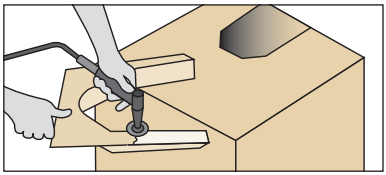
2. Use cut-off tool, reciprocating saw or band saw to remove channel shape.



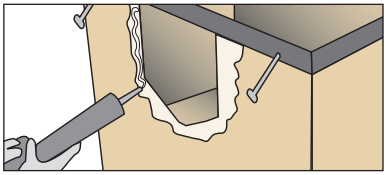
3. Use sandpaper, grinder or similar to roughen surface around opening. Clean with air or dry brush.



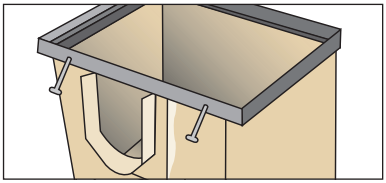
4. Use sandpaper, grinder or similar to roughen adapter flange. Clean with air or dry brush.



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.

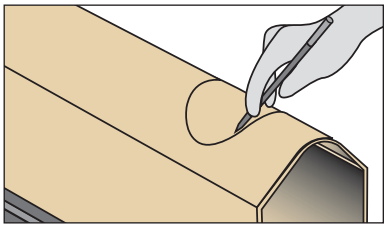


NOTE: For additional stability, prior to pour, apply screws through flange and channel. Cut off screws on inside of basin once concrete pour is complete.

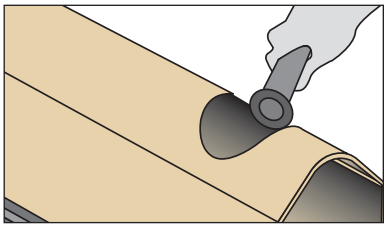
5 Pipe Connections: Vertical Outlet Adapters

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

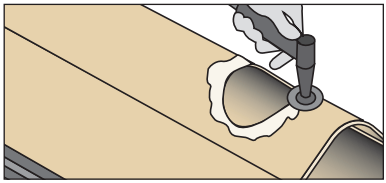
1. Align adapter with appropriate area of channel. Mark inside collar with marker.



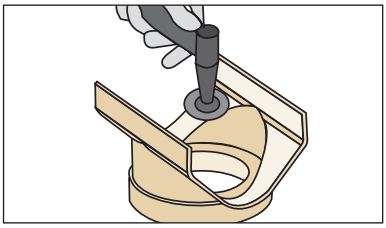
2. Use cut-off tool, reciprocating saw or band saw to remove marked shape.



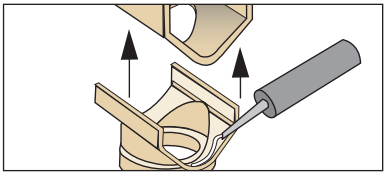
3. Use sandpaper, grinder or similar to roughen surface around opening. Clean with air or dry brush.



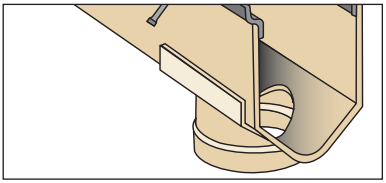
4. Use sandpaper, grinder or similar to roughen adapter flange. Clean with air or dry brush.



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.

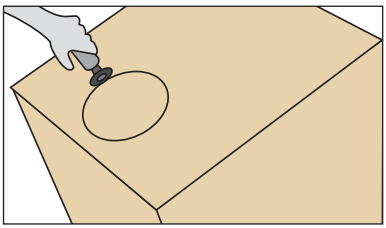


NOTE: For additional stability, prior to pour, apply screws through flange and channel. Cut off screws on inside of basin once concrete pour is complete.

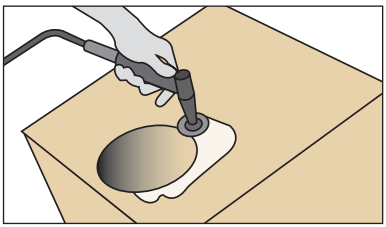
5 Pipe Connections: Pipe Adapters

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

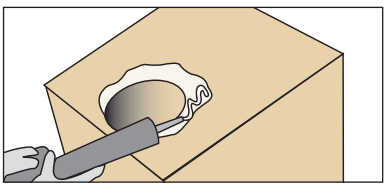
1. Hold pipe adapter in required position, mark basin. Use cut-off tool to remove marked area.



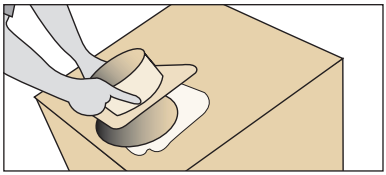
2. Use sandpaper, grinder or similar to roughen surface of basin and pipe adapter on flange. Clean with air or dry brush.



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



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

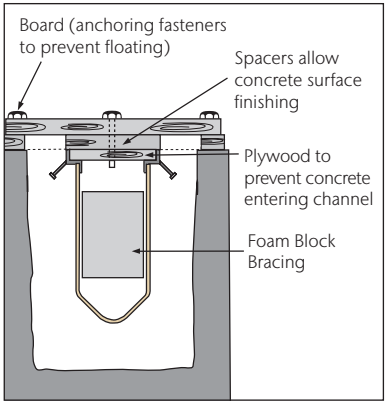


NOTE: For additional stability, prior to pour, apply screws through flange and channel. Cut off screws on inside of basin once concrete pour is complete.

6 Positioning of Channels: Hanging Method

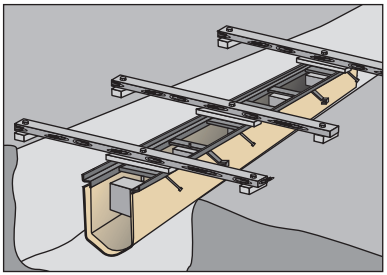
Lay channels in the excavated trench beginning at the outlet point where the catch basin/pipe is located.

1. Cut boards to appropriate width to span excavated trench or form boards
2. Attach boards to channels using 3/8" all-thread rod (attach at central hole in grate locking cross bar).



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 a board to form boards or surrounding slab. This prevents movement or floating of channels during concrete pour.

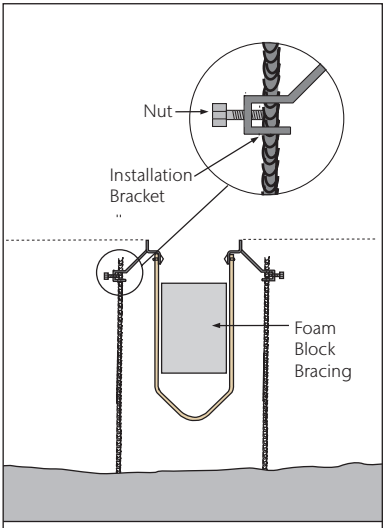


4. If channels are to be sealed, lightly sand, then wipe the next female collar and male end clean. Apply 1/8" bead of polyurethane joint sealant approximately 1" from end of channel.
5. To position next channel, slide male end into female collar of previous channel. Push channels together until frames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

6 Positioning of Channels: Rebar Support Method

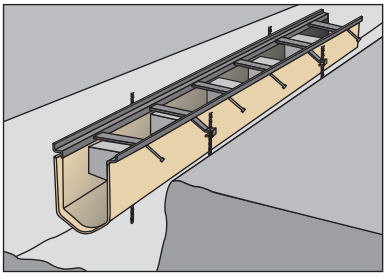
Lay channels in the excavated trench beginning at the outlet point where the catch basin/pipe is located.

1. Place outlet channel (deepest or highest channel number) at required location. Place rebar (#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 prevents the channel from deforming during concrete pour.

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



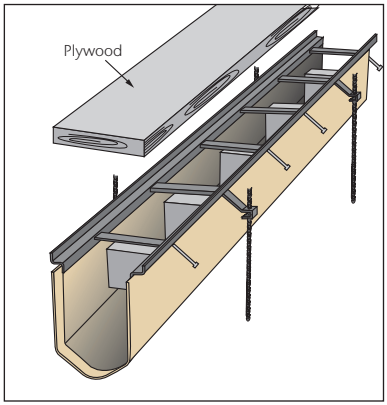
4. To position next channel, slide male end into female collar of previous channel. Push channels together until frames are flush. Smooth joint sealant with a putty knife, if used.
5. Position channel to required level, tighten bolts. Repeat until trench run is assembled.
6. Check security of rebar;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

NOTE: If rebar anchoring strength is questionable due to poor ground conditions, pour a 3" – 4" slump concrete patty around the base of the rebar, keeping base of channel clear from concrete. Allow anchor patties to set prior to pouring concrete surround.

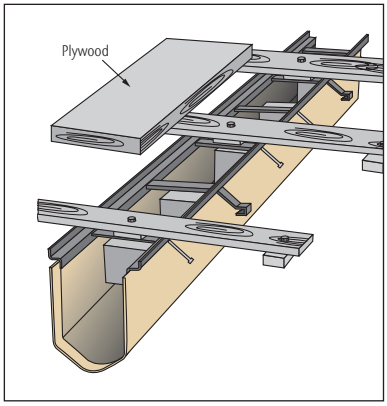
7 Concrete Pour

Concrete is recommended to have compressive strength of 4,000 psi. A wand type concrete vibrator should be used to ensure concrete distributes evenly underneath and around channels.

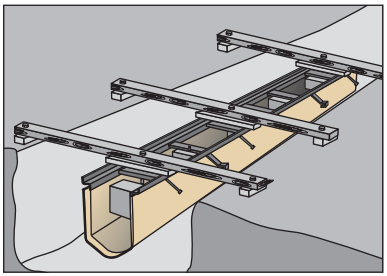
1. Place plywood in grate rebate to prevent concrete entering channels.



For Hanging Method use plywood pieces between boards.



2. Place first lift carefully around bottom of channels taking care not to disturb channel position. Ensure that V-shaped bottom is covered.



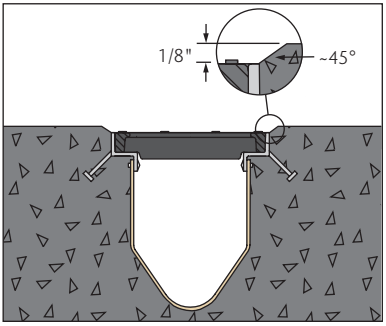
3. Second lift should be to finished grade.

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 cured 24 hours, remove boards (if used), bracing and/or grate protection. Fit grates - see next column.



EXPANSION JOINTS

Transverse joints (perpendicular to the channel) are required to prevent surface cracking in the slab. Such joints should be positioned at channel joints to prevent channels from cracking. If such spacing is not possible, a cut must be made at the appropriate location through the channel and sealed with flexible sealant.

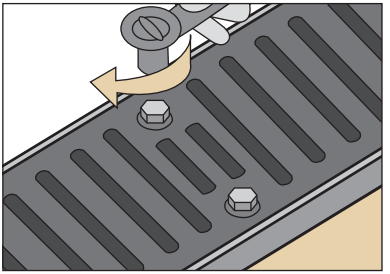
Longitudinal expansion/isolation joints should be continuous and flexible. They must be provided between the concrete surround and surrounding slab and may be varied to suit concrete surround width by up to a meter (39.37") from the channel.

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

9 Fit/Remove Grates

BOLTED GRATES (FG200)

1. *To lock*: Bolted grates are lockable with two ½ - 13 x 1½" bolts fixing directly into the steel frame at 18" (457 mm) intervals.Do not overtighten. (Torque wrench set to no more than 26 lb-ft).



2. *To unlock*: use wrench or socket set to loosen/remove bolts. Use grate removal tool to lift first grate. Subsequent grates can be lifted by hand.

10 Final Inspections & Maintenance

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 13 for full details.

Drainage system is now ready for use.

GRATE OXIDATION

Grates are supplied with a temporary protective coating that will eventually wear off.

Regular traffic will buff iron grate surfaces to a smooth, dark finish.

Grates that are not regularly trafficked will oxidize unless regularly painted. This oxidization is only on the surface and only affect the aesthetics, not the performance, of the grates.

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 page 13 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 high pressure water applied through the grate – debris will be washed to the catch basin for removal (Empty and replace trash bucket).

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