

**ACO SPORT**

*Site Installation Manual*

**ACO Sport range of products**



# GETTING STARTED

Polymer concrete products are made from sand and gravel held together by polymer resin. Polymer concrete products provide a strong and robust solution if correctly installed. This booklet offers basic installation guidance BUT local ground and site conditions may vary and engineering advice may be required.

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Polymer concrete products should be handled with some care as they can be damaged by impact from other products, or machinery, and can break if mishandled.

Typical equipment necessary for installation may include:

- *Excavating equipment*
- *String-line and laser level*
- *Measuring tools*
- *Masonry drill, diamond grinder*
- *Cut-off saw with diamond blade*
- *Rubber mallet*
- *Concrete - 3,000 psi minimum grade*
- *Gloves, respirator and eye protection*



### Working with ACO Sport products on site

Detailed section drawings of typical installations are available for every product in a number of common surfaces. Dimensions and details vary depending upon the location and intended use. Installers should review the most appropriate drawing before starting installation.

Section drawings are available on-line at [www.acousa.com/install\\_drawings\\_sport.htm](http://www.acousa.com/install_drawings_sport.htm) or call (800) 543-4764.

If using multiple systems within a drainage run (e.g. System 2000 in 'D' areas and System 4000 in straights), allow for different elevations if necessary.



### Health & Safety Precautions

When handling polymer concrete products, gloves are recommended to avoid abrasive injury. If cutting, grinding or drilling, suitable eye protection and respirator should be worn.

Metal grates may have sharp edges and should be handled with gloves. Eye protection and a respirator should be worn if cutting or grinding. Flammable items should be removed from the vicinity as sparks may be generated.

MSDS sheets are available on request - call (800) 543-4764 for additional information.



System 1000



System 2000



System 3000



System 4000



System 6000



System 7100



System 7200



System 8100



System 8400



System 9000

# DRAINAGE CHANNELS

## 1-i Site Preparations

Identify the necessary site tolerances required; generally running tracks that comply with IAAF or ASBA guidelines have extremely tight tolerances - often 0.125" (3mm) track flatness maximum.

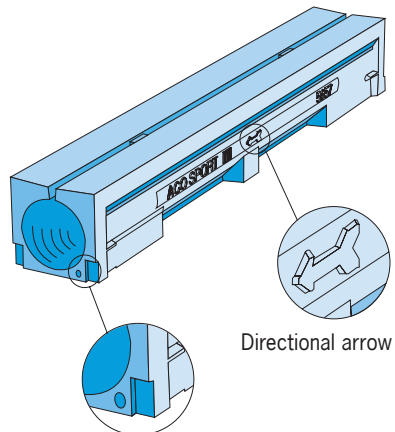
Measure area where products are to be installed. Position stakes/markers and levels to help identify location and height of finished surface. Locate and identify drainage connections.

## 1-ii Channel Identification

Channels have markings on the sides; e.g., part number. Systems 1000, 2000 and 3000) also have an 'S' (straight) or 'R' (radius) to aid site identification. Radius channels also have a small dimple on the end to allow easy identification.

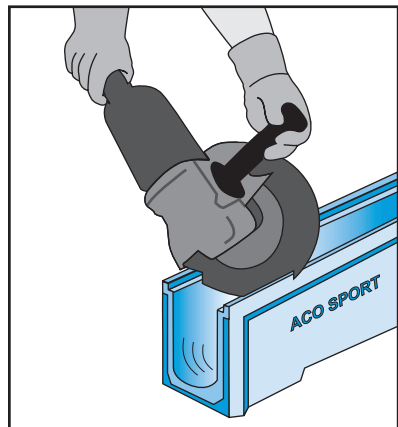
Radius channels only have a subtle visual radius. Arrows on channel help installation direction identification. When standing inside the radius looking outward at the trench system, arrows on the sides of channels should all point **CLOCKWISE** - this confirms the radius channels are correctly positioned.

All channels are supplied in meter lengths (39.37") but can easily be cut to length using a cut-off saw with diamond blade.



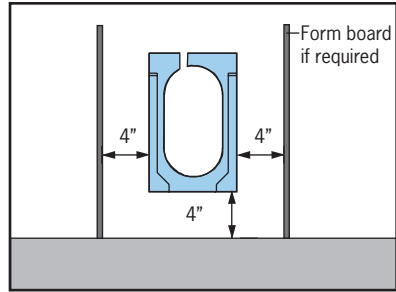
Directional arrow

Dimple on radius channels



# 1-iii Excavation

Once product locations are identified, excavate trench to accommodate a minimum of 4" (100mm) on either side and beneath products. If using sloping System 4000 - allow for the increasing depth due to slope (approx. 1/10" per ft). Catch basins also require 4" (100mm) of concrete support. Less than 4" (100mm) of concrete may result in failed installation.



Reinforcement is not generally required in concrete surround, but consult engineering advice if in doubt.

Areas where emergency vehicles may cross the trench drain may require a larger concrete surround.

# 1-iv Pipe Connections

Identify products that connect to drainage pipes. To remove the 'Drill-out';

1. Mark area to be removed.

2. Remove drill-out.

**Core Drill**

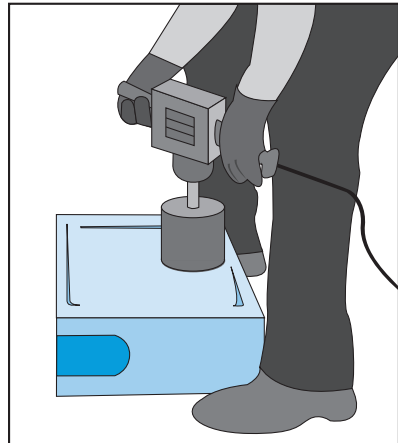
- Using diamond core drill of required size, remove channel/catch basin wall to fit pipe.

**Stitch Drill**

- Using a hammer and nail punch or 1/4" concrete drill bit, pierce every dimple around the drill-out.
- From inside of channel, carefully tap out the inside of the perforated area.

3. Smooth edges with grinder, if necessary.

4. Connect pipe and seal connection.



**Note:** Do **NOT** attempt to remove in-fill area by hammering directly on the polymer concrete as severe cracking can occur and render the piece useless.

# DRAINAGE CHANNELS

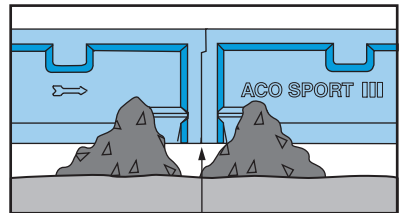
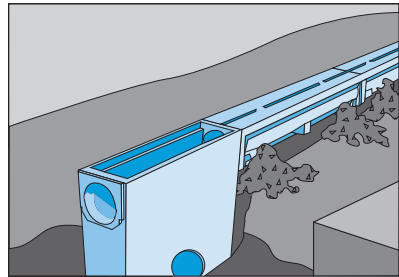
## 1-v Laying of Channels

Start with outlet point. If installing drain around running track, pick one catch basin as the starting point. Ensure string-line and laser are set at required channel height - this may vary from finished surface height depending upon System and type of surface used.

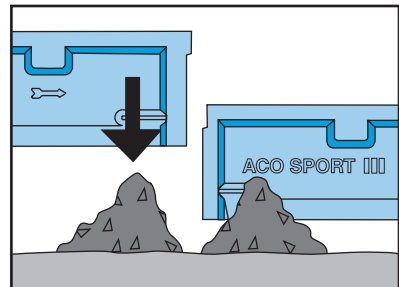
Generally, installation is a two part process; First, position channel at the required height and alignment. Second, pour supporting concrete. Two common methods of positioning channels in place are;

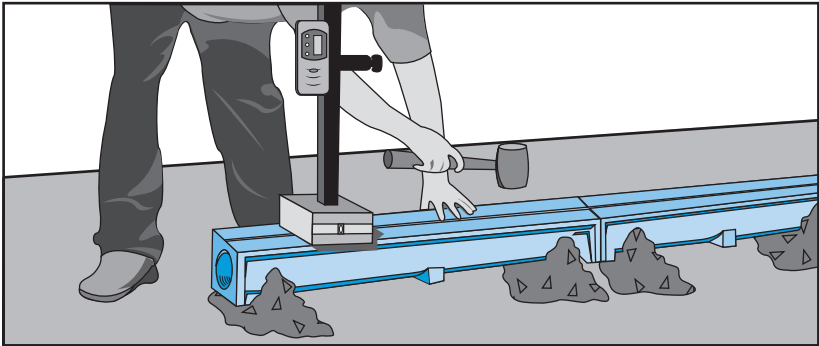
### 1. Patty Method

- a) Set catch basin (or outlet channel) on a minimum 4" (100mm) bed of concrete to required height. Connect outlet pipe and seal around joint.
- b) Using a stiff/dry mix concrete, create 'patties' at intervals to support channels. Allow two patties per channel and space such that no concrete material is directly at the joint. This prevents gaps between channels due to debris.
- c) Lower channel vertically onto 'patties' and position to correct height and alignment ensuring 'tight' connection to previous channel.
- d) 'Patty' should cover the concrete 'keys' on side of channel - this prevents channel movement, or floating, during concrete pour. Add concrete if necessary.
- e) Continue to lay channels until the next catch basin is reached and start again from step 'a'.



Avoid concrete/dirt at joint

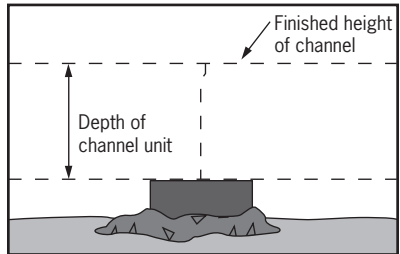
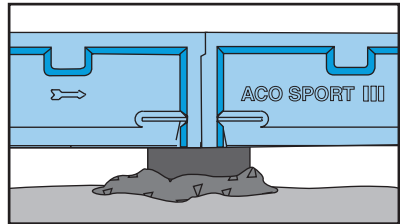




Position channel using laser level or string line.

**2. Brick Method**

- a) Set catch basin (or outlet channel) on a minimum 4" (100mm) bed of concrete to required height. Connect outlet pipe and seal around joint.
- b) Set brick supports, one per meter (39.37"). Channel ends are cast with flat areas on the underside to ensure a consistent surface to maintain the correct level. Brick support is created by placing a concrete brick onto a mound of concrete (generally 1-2 shovels). Height of the brick can be calculated by subtracting the height of the channel from the required finished channel elevation.
- c) Lower channel vertically onto brick - center channel joint on brick. Use shims to adjust to height required.
- d) Add concrete along side of channel, to cover the concrete 'keys' - this prevents channel movement, or floating, during concrete pour.
- e) Continue to lay channels until the next catch basin is reached and start again from step 'a'.



# DRAINAGE CHANNELS

## 1-vi Pouring Concrete

Once concrete 'patties' or brick supports have set (approx. 4-6 hours) the concrete haunch can be poured.

### Channel Bracing - open channels

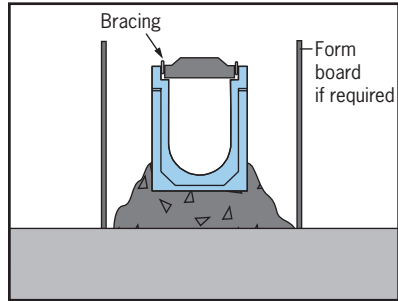
Systems 1000, 4000 and 6000 must be braced to prevent channel walls deflecting inward from concrete pressure.

System 4000 and 6000 can be braced by installing the grates with penny washers, pushed down the side (this allows grates to be easily removed afterward). Grates should overlap channel joints to help prevent movement. Grates can be covered or wrapped to protect from concrete splash.

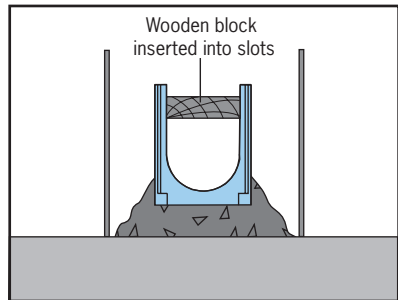
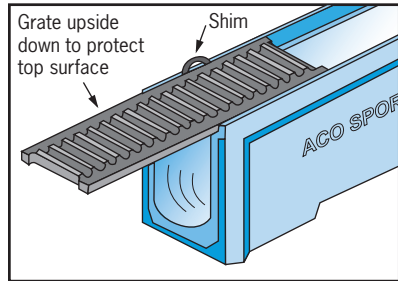
Brace System 1000 using wooden blocks inserted into slots.

### Channel Bracing - slotted channels

System 2000 and 3000 are monolithic and require no bracing. Protective plastic or tape should be used to protect the top surface from concrete splash.



System 4000 Bracing



System 1000 Bracing





### Concrete Pour

Concrete should have compressive strength of minimum 3,000 psi. To minimize cracking of concrete surround, crack control joints can be cut at intervals, frequency to be determined by engineer.

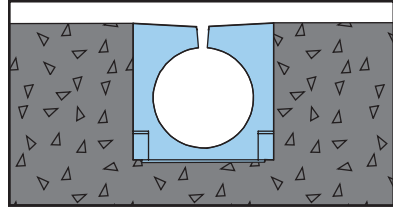
Alternatively, "fiber" reinforcing can be used to minimize surface cracking of the concrete surround. Typically 4,000 psi mix with fiber reinforcement is recommended.

Concrete should be poured evenly and carefully to avoid dislodging channels. If vibration is required, a wand type vibrator can be used.

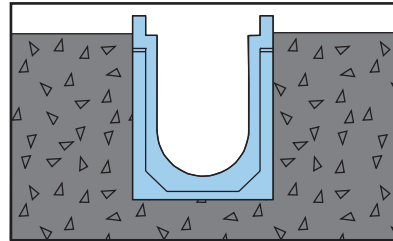
Concrete should be poured to height required. This may vary depending upon product and surface type required. The finished surface should be troweled level and smooth.

Allow concrete to set before removing grates, or bracing, if used.

Protect area from machinery and heavy traffic until finished surface is applied.



Concrete flush with product to allow overlay of track surface



Concrete below product to allow track material to butt up to channel edge - non-porous surfacing.

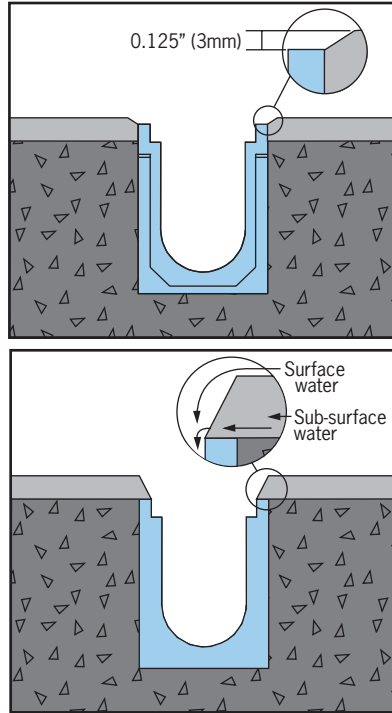
# DRAINAGE CHANNELS

## 1-vii Final Surface

Once concrete surround is sufficiently cured, track surfacing material can be applied. If surface material is 'glued' to the surface of the drain, light grinding may be required to prepare surface and ensure good adhesion.

Finished surface should be level or up to 0.125" (3mm) higher than the top of the channel. This ensures effective drainage and avoids a trip hazard. Porous surfacing must allow entire surface thickness to drain into channel.

Channel systems should be 'flushed', trash buckets/catch basins emptied before use to remove debris. This prevents construction debris from blocking underground pipe work, and ensures the system is ready for use.



Detail to allow drainage from porous surfacing.



## 2-i Connection to Trench Drain

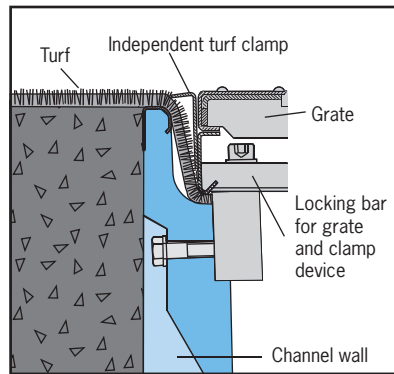
Water based artificial turf can be anchored directly into either System 6100 or 6500 channels.

Install channel exactly as any other ACO Sport open channel (pages 4-10) and allow surround to set.

## 2-ii System 6100

Install channel with clamp detail towards the turf - clamp detail locks turf into place and enables grate removal for maintenance without releasing the turf.

Install turf and pull tight towards the channel (approx. 2" overlap). Clamping bar has the grate locking bars attached. Position locking bars into recesses, pull turf tight and bolt clamping bar down. Fit clamping bars at strategic intervals to ensure turf is flat and consistent. Finish installing clamping bars, fit grates.

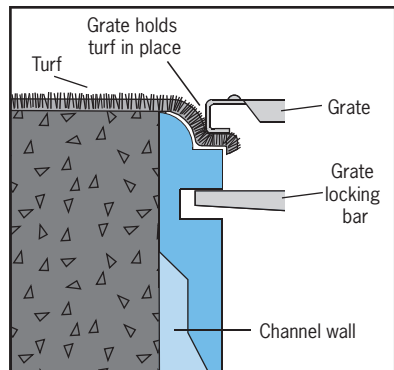


## 2-iii System 6500

Install channel with rounded grate support edge towards the turf - rounded edge allows turf to wrap into the trench drain without being damaged by a sharp corner.

Install turf and pull tight into the channel (a 2" overlap is ideal). Turf is locked into position by grates. Fit grates at strategic intervals to ensure turf is flat and consistent. Fit rest of grates.

**Note:** Do NOT over tighten bolts - this will deform grate and locking bar.



## ARTIFICIAL TURF

### 2-iv Anchoring to a Nailer

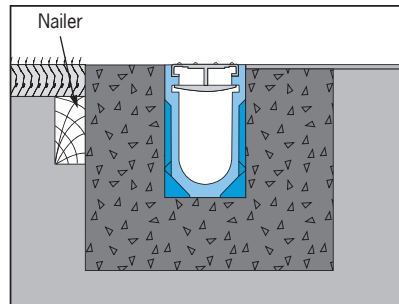
In-fill turf can be installed up to any ACO Sport trench drain or elastic curb and held in place by attaching to a nailer (wooden nailers must be treated to prevent deterioration). Alternatively, turf can be glued or nailed directly to concrete.

### 2-v Product Install

#### i) Trench drains

An open grated system is recommended to enable full access to remove loose in-fill particles if required.

Install drain (details on pages 4-10), incorporate nailer along the length of the trench run, outside the 4" concrete collar as the grate edge requires concrete support. Install turf, pull tight towards the channel and fix to the nailer at strategic intervals. Check turf is tight and straight. Finish nailing at required intervals.

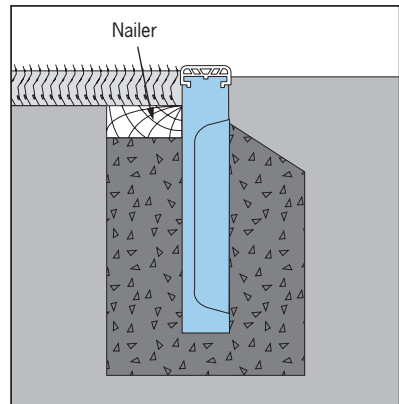


Cover grates when adding in-fill material to the turf to prevent large quantities entering the drain.

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#### i) Elastic curbs

Commonly used at the transition from turf to track material at the 'D' area. Install as detailed in pages 12-13, incorporate nailer directly against the curb, on top of 4" concrete haunch, allowing sufficient depth for turf. Install turf, pull tight towards the curb and fix to the nailer at strategic intervals. Check turf is consistently tight and straight. Finish nailing at required intervals.



### 3-i Excavation

Mark out with stakes, excavate to accommodate a minimum of 4" (100mm) on either side and beneath the curbs.

### 3-ii Laying Curbs

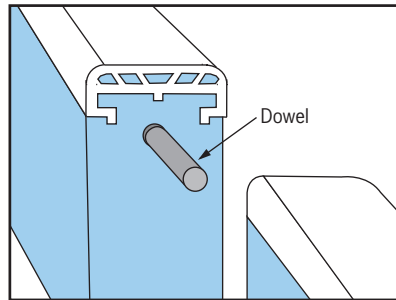
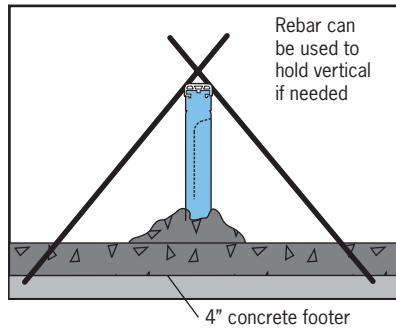
Set string-line or laser level at required height so that curb will be level with, or slightly above, finished surface.

Pour a 4" (100mm) footer where curb is to be positioned. Allow to set.

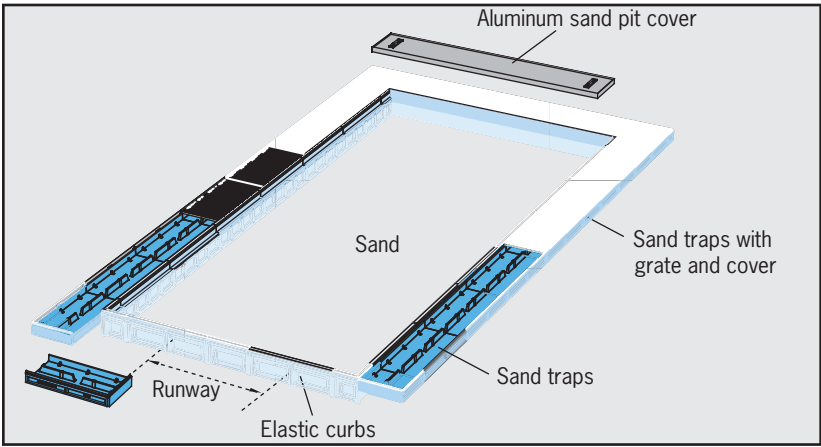
Start with a corner unit. Set curb on 2" (50mm) base of stiff/dry mix concrete. Add concrete haunch around the foot of curb, checking that it is level.

Ensure end is free of concrete and use alignment dowels to connect next curb. Take care not to disturb previous unit. Continue to check curbs are level and add concrete haunch around base.

Curbs can be cut to length if required.



# JUMP PIT SYSTEMS

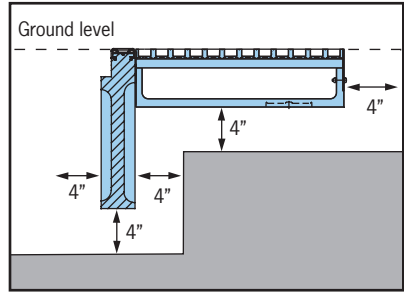


## 4-i Excavation

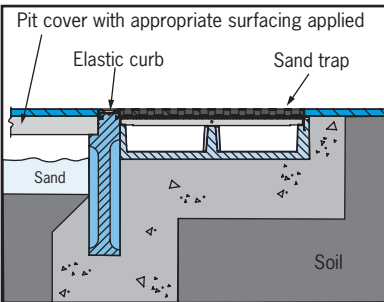
Mark out with stakes, excavate area large enough to accommodate entire jump pit and minimum of 4" (100mm) concrete around the outside edges of the system.

Excavation needs to be deep enough to allow a minimum of 4" (100mm) beneath the curbs and sand trap (if used).

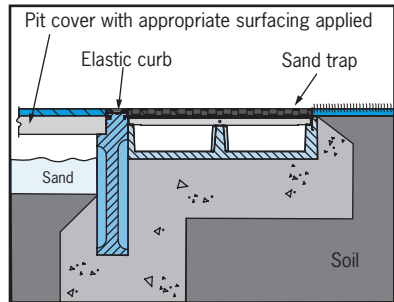
System installation starts with the curb units, then sand traps and finally the covers.



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Installation in synthetic surface



Natural grass installation

# 4-ii Laying Curbs

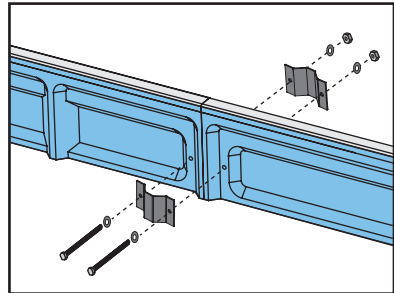
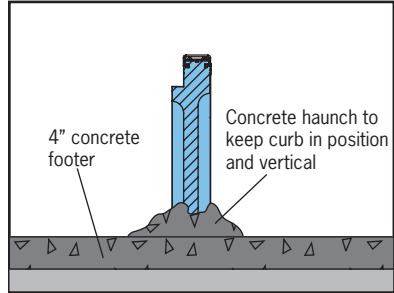
If installing both elastic curbs and sand traps, curbs must be installed first.

Set out pit position at appropriate site location with markers. Check diagonal dimensions to ensure pit is square. Use string-line or laser level at required height so that curb will be level with, or slightly above, finished surface.

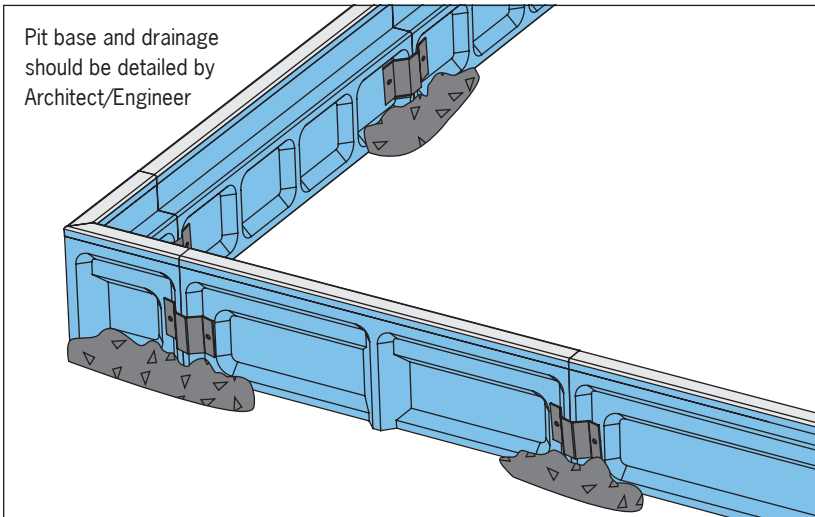
Pour a 4" (100mm) footer where curb is to be positioned. Allow to set.

Start with a corner unit. Set curb on 2" (50mm) base of stiff/dry mix concrete. Add concrete haunch around the foot of curb, checking that it is level. Ensure end is free of concrete and use alignment clamps to connect next curb.

Take care not to disturb previous unit. Continue to check curbs are level and add concrete haunch around base. Work around pit until pit is complete - check diagonally to ensure square.



Alignments clamps help ensure the jump pit remains square and within size tolerance to ensure covers and sand traps (if used) also fit.



# JUMP PIT SYSTEMS - SAND TRAPS

## 4-iii Installing sand traps

### Site preparation

Can be installed as part of the jump pit system or individually to size required.

If installing with elastic curbs, first allow concrete footing around curbs to set approx. 24 - 48 hours.

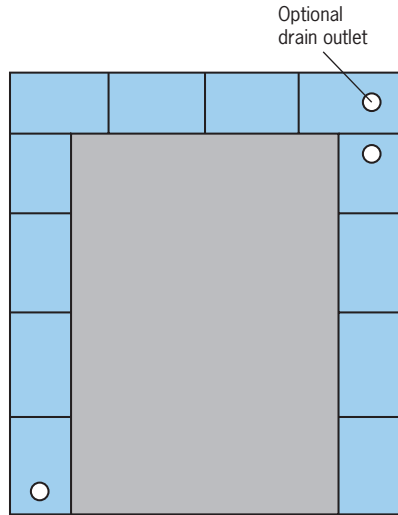
Set string-line, or laser level, at required height.

### Drainage outlet connection (optional)

ACO recommends one per side.  
Each sand trap unit has an optional 4" diameter (100mm) drill-out for pipe connection to enable rainwater to drain away. Select units for pipe connection. Lay necessary pipe work. Filter fabric, or similar, should be used to prevent sand from entering pipe system.

### Laying sand traps

If using "kit" solution, check appropriate length unit and position in vicinity to installation.



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Start at outlet/corner units. Set unit on 4" (100mm) concrete base, add concrete patties along outside edge to hold in place and prevent floating during final concrete pour.

Continue laying sand traps. Take care not to disturb previous unit. Ensure they remain level. Fit end caps at open ends, use concrete patty to hold in place.

Sand traps can be cut to length, if required, with a concrete disc cutter.



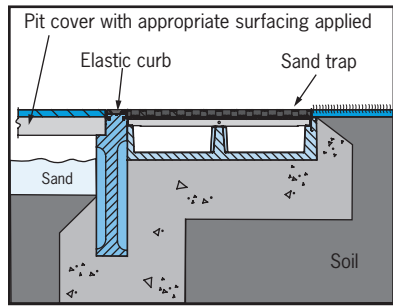
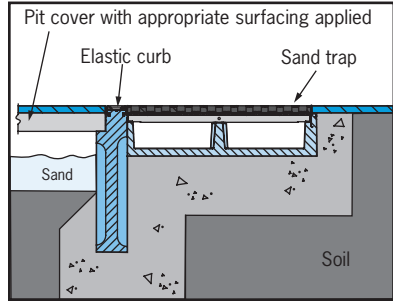
# 4-iv Pouring Concrete

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

Once concrete base has set, approx. 12-24 hours, pour rest of concrete. Level concrete with curb/sand trap and finish per installation drawing.

Use masking tape to protect rubber edge on curbs.

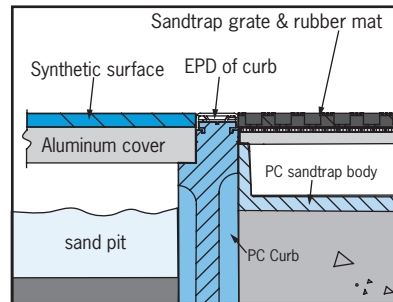
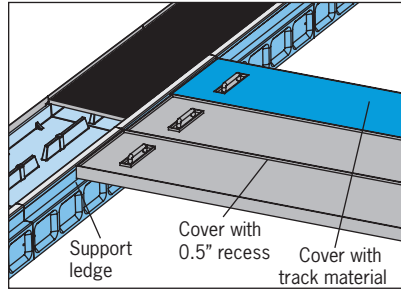
Concrete should be poured carefully to avoid dislodging products. If vibration is required, a wand type vibrator can be used.



# 4-iv Jump pit covers

When the curb and sand trap installation is complete, the aluminum covers can be set on the supporting ledge on the inside edge of the curb units.

Covers have a 0.5" recess to enable surfacing to be applied to match the surround track area.



# WATER JUMP PIT

## 5-i Excavation

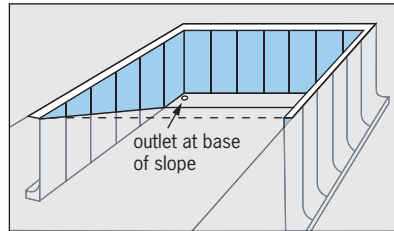
Identify area for water jump, measure and mark out area and levels with stakes/markers. Finished water jump pit will have internal dimension of 12' (3.66m) wide by 11'-9.5" (3.45m) long and be 2'-3.5" (0.70m) deep (at deepest point).

Excavate area large enough for water jump pit. Allow 4-6" extra for concrete surround.

**Note:** Internal sloping base of pit is created on site by contractor after installation of jump pit walls is complete.

## 5-ii Pipe Connections

A drainage outlet enables easy maintenance, otherwise water must be pumped out. The outlet should be created at the deepest point in the concrete base and be fitted with a closing cap or valve. Allow suitable depth for the pipe to pass under the water jump components without affecting the strength of the concrete surround.

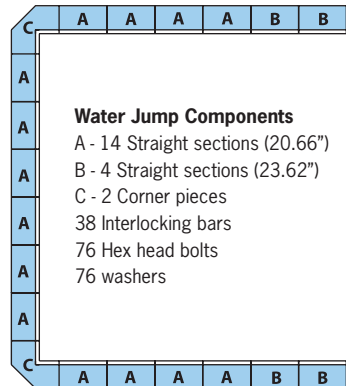


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III

## 5-iii Laying Components

Set components out around excavated area, per the diagram. This ensures parts are close to where they will be required. The outside edges may need to be cut to create the pit size required.

Pour a 6" (150mm) concrete base/footer to fit the entire water jump. Footer should be approximately 32" below grade to allow for 2" (50mm) bedding concrete plus the height of components.



### Water Jump Components

- A - 14 Straight sections (20.66")
- B - 4 Straight sections (23.62")
- C - 2 Corner pieces
- 38 Interlocking bars
- 76 Hex head bolts
- 76 washers

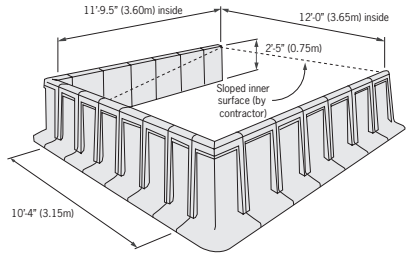
Set string-line and laser level at required grade. Components should be installed flush with top of proposed synthetic surface.

Start with corner, set on a stiff/dry concrete mix, tamp down to required height. Haunch around the foot of the piece to prevent movement during concrete pour.

Lay next straight section; take care not to disturb previous unit. Apply flexible silicone sealant to prevent leaks. Check sections are level and vertical. Bolt together using hardware supplied.

Allow concrete to set, approx. 4-6 hours before continuing.

If using carpet style track surfacing, the rubber edging may need to be trimmed at the shallow end.

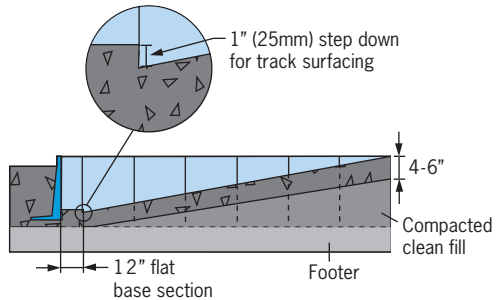


## 5-iv Pouring Concrete

Concrete should have compressive strength of minimum 3,000 psi. Pour 6" concrete onto the outside foot of the wall units, then pour the 12" flat section of the deepest part of the jump pit. Allow to set approx. 4-6 hours.

Pour 1" (25mm) step down to allow track surfacing to transition smoothly into the 12" flat concrete base. Fill and grade inside with clean fill, then pour a 4-6" concrete base slab.

Pour concrete haunch around outside of water jump, level concrete with height of asphalt base. Pour concrete and grade internal surface of jump pit. This also provides bracing to jump pit walls.



## COMMUNICATION BOX

### 6-i Excavation

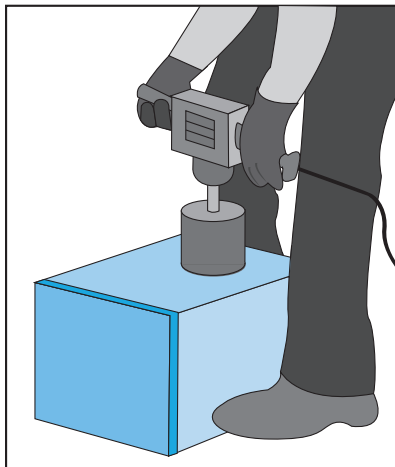
If using communication box in an area trafficked by vehicles, a full concrete encasement will be required. Otherwise well compacted gravel and sand is sufficient.

Excavate area large enough to fit the communication box plus any encasement. Depth should allow for 6-8" gravel base for drainage. If a solid concrete base is required, a drainage outlet must be installed.

### 6-ii Cable Connections

A number of drill-outs for cable conduits are cast into the sides of the unit. (See page 5 pipe connections for details on removal).

These drill-outs are guides only and openings can be positioned where required; allow 4-6" between openings to avoid compromising structural integrity. Conduits may also connect from below through open base.

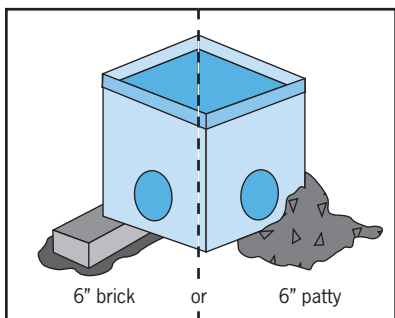


20  
III

### 6-iii Setting Box

Fill base of excavation with 6-8" gravel, compact to avoid settling. Position unit onto gravel and check levels. A small amount of dry mix concrete can be used at corners to hold unit in place.

If installing in trafficked area, set unit to grade on 6" bricks or concrete patties. Allow to set (approx 4-6 hours).



## 6-iv Install Conduit

Once unit is set in place, conduits can be installed through prepared holes in side walls. Seal if necessary.

## 6-v Back-Fill

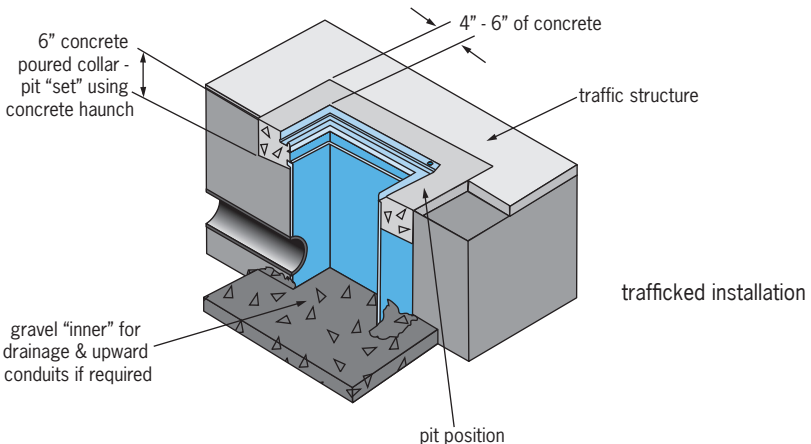
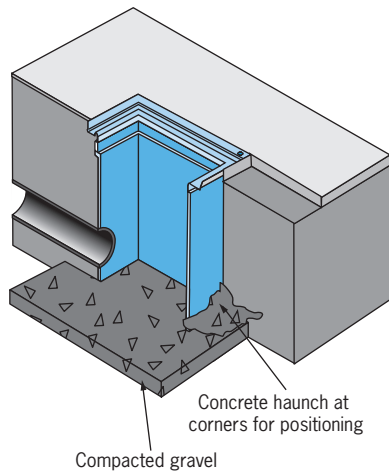
Non-trafficked applications; Back-fill around unit. If compacting, take care not to move or damage unit; internal bracing is recommended.

Trafficked applications; Backfill around unit with concrete of 4,000 psi minimum strength. Finish concrete to required height to allow for surrounding surface finish.

## 6-vi Final Surface

Communication boxes have recessed lids to allow in-fill with matching track or field surfacing material up to 0.5" (13mm) thick. Fill recessed lids at same time as laying surrounding surfacing.

non-trafficked installation



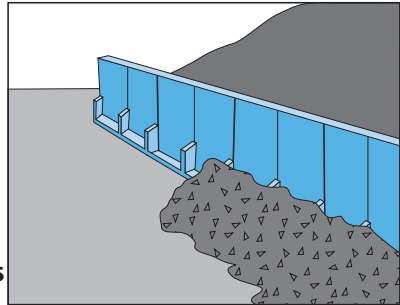
# BLEACHER SEATING

## 7-i Site Preparations

Check ground conditions of area where bleachers are to be installed. Ground must be stable and engineering advice is recommended.

Ground should be prepared with an overall 6% slope. Stepped levels can be prepared.

ACO recommends a **maximum** height of 20 standing elements or 10 seating elements.

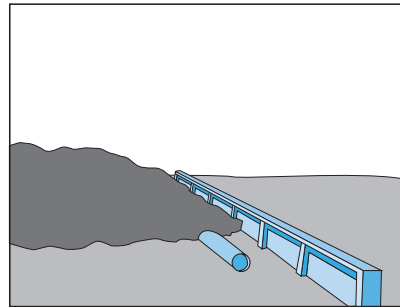


## 7-ii Laying Bleacher System Components

### Front Plates

Position front plates on a 4" (100mm) concrete bed. Ensure sections are level and vertical. Haunch both sides with concrete to hold securely in place.

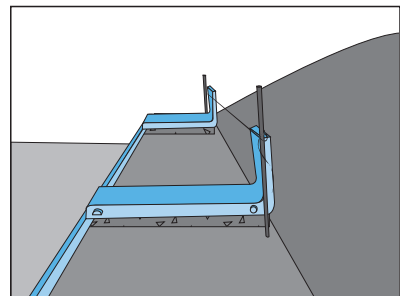
Lay a land drainage (perforated) pipe behind front plates, along entire length, to reduce head pressure from water accumulation. Backfill with clean fill to a level 4" (100mm) below top of front plate and compact.



### Seating/Standing Elements

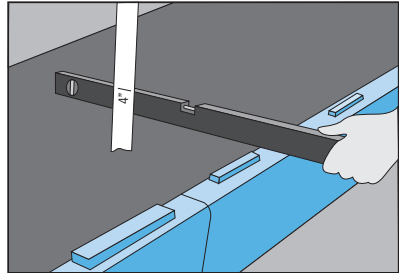
Lay 4" (100mm) stiff mix concrete base, on top of drainage fill, so that it is level with top of front plates.

Position seating/standing elements onto concrete base. Ensure seating units overlap joints of front plates. Check that elements have slight forward slope. This facilitates drainage and prevents ponding water.



Before positioning next seating/standing element, backfill to a height 4" (100mm) below top of the previous element and compact.

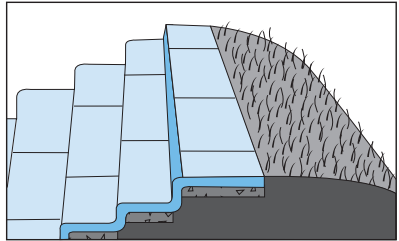
Lay 4" (100mm) concrete base, on top of backfill, so that it is level with top of previous element. Position next seating/standing elements onto concrete base, overlaying joints. Check elements are close to level - a slight (1%) forward slope.



Continue until final seating/standing elements are installed. At back of bleachers either landscape with sloped bank or build retaining wall as required. Add necessary railings, safety elements.

### Top Plates

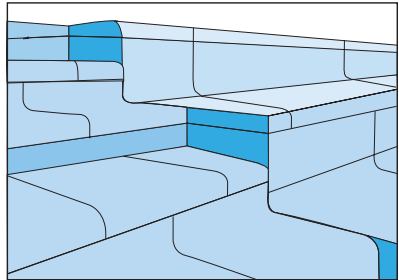
Backfill final seating/standing elements to a height 4" (100mm) below top of the previous element and compact.



Lay 4" (100mm) concrete base, on top of backfill, so that it is level with top of final elements and position top plates.

### Fill-in Plates

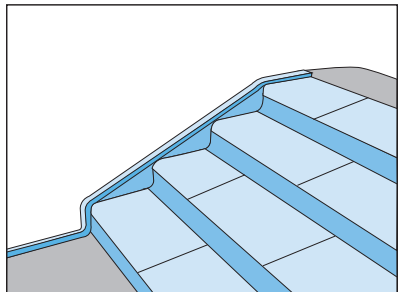
At junctions between seating and standing elements, open faces should be concrete rendered. Side fill-in plates can be attached using ACO Bond - polymer concrete bonding kit.



Outside ends should be rendered with concrete and fill-in plates attached using ACO Bond - polymer concrete bonding kit.

### Expansion Joints

ACO recommends saw cutting expansion joints, approx. every 30 ft. (10m) and filling with flexible sealant. This allows expansion/contraction in large temperature variations.



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