

Installation Guidelines

GULLY AND CHANNEL INSTALLATION

Basic Instructions

– details may vary depending upon application

Step 1 Base Preparation



Prepare base with 100mm compacted Type 1 fill.

Step 2 Gully Positioning



Position gully bodies and measure for shuttering and oversite concrete level.

Step 3 Construct Shutters



Construct shutters, position and mark concrete level. Leaving the shutters long allows easy removal after concrete pour.

Step 4 Pour Concrete



Pour concrete slab and leave for 24 hours before removing shuttering.

Step 4 (Continued)



Keep pipework clear of loose materials.

Step 5 Re-Position Gully



Position gully(s) and check levels. Keep loose materials clear of gully.

Installation Guidelines

GULLY AND CHANNEL INSTALLATION

Step 6 Backfill Gullies



Backfill gullies with concrete and float to flange level.

Step 7 DPM



Fit DPM and clamp in flange as appropriate.

Step 8 Channel Assembly



Loose assemble gullies, channel sections and joint gaskets.

Leave spacer bars intact until channel has been completely installed. Loose assemble gullies, channel section and joint gaskets in drainage run ensuring compatibility of adjacent channels, position and level before final tightening of all joints. For Load Class C250 applications, allow 200mm either side and under the channel for concrete backfill support, where this is not possible, seek engineering advice. For Load Class A15 and B125 applications, allow for a minimum of 30mm of bedding material and approximately 50 – 100mm either side of the channel to allow access to

levelling feet, fixing ties and flange plates. Prior to bedding and haunching, check joints and traps for water tightness.

Step 8 Form Levelling Screed Shuttering



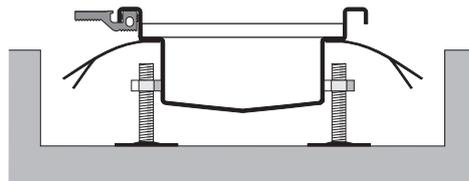
Taking into account finished floor materials and thickness (sharp sand, paviers, tiles, vinyl etc) construct shuttering for the levelling screed. Pour screed and remove shuttering.

Weigh the channels down when back filling the trench to prevent the channels from lifting or floating. Fully extend and twist channel fixing ties to provide a good anchorage. Pour suitable cement or resin mortar around the channel. The mortar should be of a type and consistency to ensure there can be a good compaction of this material both under the channel base and particularly under the channel edge.

The bed and surround must have sufficient strength to support the channel in service. For light and medium duty applications up to Load Class C250, a suitable mortar of Strength Class C20/25 to BS EN 206-1 with a maximum aggregate size of 10mm should be used.

Where it is not possible to provide the depth of surround as prescribed in Step 2, a suitable mortar of Strength Class at least C30/37 to BS EN 206-1 with a maximum aggregate size of 10mm may be used to support the channel following engineering advice.

Step 8 (continued)



Remove immediately from the inside surfaces of the channel (or gully) any mortar or concrete spillage.

For channels with vinyl edge detail, refer to pages 37-38.

Installation Guidelines

CHANNEL INSTALLATION PROCEDURE

Step 9a – Block Pavior Finish



Prepare screed base working mix under channel and gully top flange and lay block paviors on 300mm wide epoxy surround to prevent movement. Set paviors 3mm maximum above channel edge. Complete paviors on compacted sharp sand bed.

Step 9b – Tile Finish



Prepare haunching on screed base working mix under channel and gully top flange. Lay levelling screed and lay tiles in cement bedding.

Step 9c – Flexible Sheet Finish



Fit the ACO Vinyl Seal® rigid extrusion and flexible seal system to channel and gully edge as described on pages 37-38. Prepare haunching

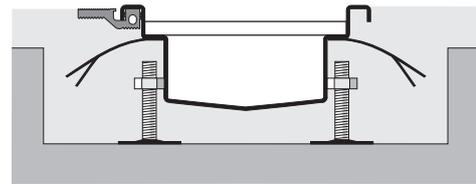
Step 10 – Sealing

A mastic sealant should be provided between the edge of the channel and floor typically 8 – 10mm wide and 10 – 15mm deep.

In some cases it may be necessary to apply a suitable primer to the stainless steel before applying the sealant. The sealant manufacturers' advice should be sought for each individual application.

Step 11 – Grating Installation

Spacing bars with the channel are provided to give stiffness and rigidity during manufacture, site handling and installation. They also prevent closure of the grating aperture during the concreting phase of installation.



These bars should be left in position until immediately before the gratings are inserted in place. The spacer bars may be removed by striking them with a sharp horizontal blow with a mallet.

Step 12 – Cleaning

Remove all protective tape from the channel edge and clean the surface with a solvent if necessary to remove any adhesive residue.

Wash and clean the channel, empty the silt basket and refit the gratings.

Cutting and Welding On-site

It is not easy to work with stainless steel on site, as the material is particularly hard and special cutting equipment is needed. Similarly if stainless steel is welded on site then care should be taken to ensure that all welded surfaces are properly finished either by hand, or with an acid finishing.

It may not be possible to achieve a uniform surface appearance or guarantee full passivation of the weld in these circumstances. Hence finishing under factory conditions will be far superior in this respect.

Installation Guidelines

ACO BUILDING DRAINAGE VINYL SEAL®

Sealing Vinyl Sheet Flooring to Drainage Channels and Gullies

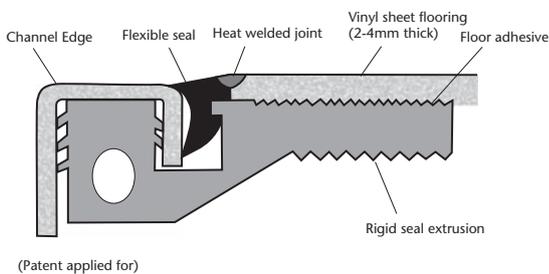
Vinyl sheet is a common flooring finish in many of the areas where stainless steel drainage channels and gullies are required. Previously the standard method of jointing the two was by a mechanical clamping system.

Although functional, this mechanical clamping mechanism can be cumbersome to fit and increase the potential areas for bacterial growth.

In order to overcome the frequently encountered problems of achieving watertight and bacteria free seals, ACO have developed the ACO Building Drainage Vinyl Seal® a unique solution that will enable quick, easy and economical installation. ACO Building Drainage Vinyl Seal® provides a completely watertight and bacteria free seal.

This method of sealing requires no additional tools or skills other than those required for the professional fitting of vinyl sheet flooring, making the installation quick, easy and economical.

The seal is significantly more cost effective than the traditional mechanical type and is designed to fit ACO Building Drainage stainless steel drainage channels.



Step 1

Remove channel protective tape prior to fixing extrusion.



Step 2

Cut grey rigid extrusion to suit ensuring any mitres are cut accurately otherwise pressure points may appear in the finished floor in use.

Step 3

Using Sheet Plier Grip Wrench supplied, clip the vinyl seal rigid extrusion to underside of channel



Step 4

Where there are joint plates in the channel run cut a notch out of the rigid extrusion as shown to enable the extrusion to be clipped to the underside of the channel.



Step 5

Here you can see the rigid extrusion cut to suit and fitted prior to the fitting of the black flexible seal.



Step 6

Insert the black flexible seal as shown, making sure that the curved concave section of the seal faces TOWARDS the channel edge and that the groove in the flexible seal engages with the notch on the rigid extrusion. (It may help to lubricate the flexible seal when inserting using a water soluble soapy solution).



Installation Guidelines

ACO BUILDING DRAINAGE VINYL SEAL®

Step 7

Using the Sheet Plier Grip Wrench, proceed along the channel inserting the flexible seal.



Step 8

As can be seen when fitting around a corner, the flexible seal may be kept in one piece to minimise joints.



Step 9

Here you can see the rigid extrusion and flexible seal fitted prior to screeding / back filling.



Step 10

Install the channel into the ground ensuring the flooring screed is flush to the top edge of the rigid extrusion. Protect the channel & seal assembly from splashes of concrete or screed.

Step 11

Depending on the installation, additional suitable fixings may be required to secure the rigid extrusion to the floor substrate. If this should be required, separately drill and countersink the rigid extrusion making sure all the fixings are finished flush with the top of the extrusion.

Step 12

Grout any voids at connecting PVC joints and mitred corners straight joints or fixings to ensure a continuous fully supported finish.

Step 13

Prior to laying the vinyl sheet flooring, peel the protective film from the rigid extrusion (a knife may be required to cut the film adjacent to the flexible seal) and ensure all surfaces are clean and dry.

Step 14

When preparing the vinyl sheet material and floor surface, apply a compatible adhesive also to the top surface of the rigid extrusion e.g. Altrofix 19 two part water resistant urethane adhesive. taking care not to apply adhesive to the flexible seal. This is to ensure the vinyl sheet floor is reliably anchored over its full area.

Step 15

Lay the sheet flooring against the flexible seal edge and prepare the welded joint between the flexible seal and vinyl sheet flooring as normal by scoring the sheet/seal joint to approximately half the depth of the sheet flooring thickness .

Either in-colour or black welding filler rod may be used to weld the joint. Remove surplus weld material from the joint using a spatula when the welded joint has cooled.

Installation

CARE AND MAINTENANCE

Although robust, all grades of stainless steel will stain and discolour due to surface deposits and, as such, can never be accepted as completely maintenance free. In order to achieve maximum corrosion resistance, the surface of the stainless steel must be kept clean. Provided the grade of stainless steel and the surface finish are correctly selected, and cleaning schedules carried out on a regular basis, excellent performance and long service life are assured.

Factors Affecting Maintenance

Surface contamination and the formation of deposits must be prevented in order to maintain a durable and hygienic surface.

These deposits may be minute particles of iron or rust from other sources used on the building of new premises and not removed until after the stainless steel drainage products have been installed. Wire brushes and wire wool must not be used to remove marks and cement spillages as this will only serve to introduce iron impurities to the material surface. Care must also be taken when storing, erecting or cutting carbon steel near to stainless steel.

Industrial and even naturally occurring atmospheric conditions can produce deposits which can be equally corrosive, e.g. salt deposits from marine conditions.

The working environment can offer more aggressive conditions, for example the high humidity found in swimming pools increases the speed of discolouration and therefore requires maintenance on a more frequent basis.

Modern processes use many cleaners, sterilisers and bleaches for hygienic purposes. All these proprietary solutions, when used in accordance with makers instructions are safe, but if used incorrectly (e.g. warm or concentrated) can cause discolouration and corrosion on the surface of any quality of stainless steel.

Strong acid solutions are sometimes used to clean masonry and tiling of buildings but they should never be permitted to come into contact with metals, including stainless steel. If this should happen the acid solution must be removed immediately by copious application of water.

Maintenance Programme

With care taken during fabrication and installation, cleaning before handing over to the client should present no special problems, although more attention may be required if the installation period has been prolonged.

Where surface contamination is suspected, immediate attention to cleaning after site fixing will encourage a trouble free product.

Food and beverage handling, pharmaceutical and chemical industry applications require extremely high levels of cleanliness applicable to each industry.

Advice is often sought concerning the frequency of cleaning stainless steel and the answer is quite simple: clean the metal when it is dirty in order to restore its original appearance. This may vary from once to four times a year for external applications or it may be once a day for an item in hygienic or aggressive situations.

Frequency and cost of cleaning is lower with stainless steel than with many other materials, and will often outweigh the initial higher cost of this superior product.

Installation

CARE AND MAINTENANCE

Cleaning Methods

The Modular system components are easy to clean. Washing with soap or a mild detergent and warm water followed by a clear water rinse is usually quite adequate for most applications. An enhanced aesthetic appearance will be achieved if the cleaned surface is finally wiped dry.



Precautions

Acid cleaners should be used for cleaning, only when other methods have proved unsatisfactory. Manufacturers directions should be followed.

Problem	Cleaning Agent	Comment
Routine cleaning, all finishes and materials	Soap or mild detergent and water (such as washing up liquid).	Sponge, rinse with clean water, wipe dry if necessary.
Fingerprints, all finishes.	Soap or warm water or organic solvent (e.g. acetone, alcohol).	Rinse with clean water, wipe dry if necessary.
Stubborn stains and discolouration.	Mild cleaning solutions (e.g. Jif, Goddard Stainless Steel Care).	Rinse well with clean water and wipe dry.
Oil and grease marks, all finishes.	Organic solvents (e.g. acetone, alcohol).	Clean after with soap and water, rinse with clean water and dry.
Rust and other corrosion products.	Most mild corrosion and staining effects can be removed by application of commercially available metal polishes. Check manufacturer's details before use	Rinse well with copious amounts of clean water (precautions for acid cleaners should be observed).
Scratches on brushed finishes.	Household synthetic fibre scouring pads (e.g. Scotch Brite fibre pad). Apply in direction of brushed finish. Clean with soap or detergent as per routine cleaning.	Never use ordinary steel wool as iron particles can become embedded in the surface being cleaned and cause corrosion problems.

Always read instructions on proprietary cleaning agents.

Stainless Steel

FAMILIES

Stainless steel is the name given to a wide range of steels which have the characteristics of greatly enhanced corrosion resistance over conventional mild and low alloy steels.

The enhanced corrosion resistance of stainless steel essentially comes from the addition of at least 11% chromium, however most stainless steels commonly used contain around 18% chromium. Other significant alloying elements include nickel and for superior corrosion resistant properties, molybdenum.

For ACO Building Drainage applications, the principal properties of stainless steel may be summarised as follows:

- ▶ **Durable and corrosion resistant in highly aggressive environments.**
- ▶ **Hygienic, easily cleaned surfaces.**
- ▶ **Aesthetically attractive surface finish.**
- ▶ **Good forming and fabrication characteristics.**
- ▶ **Excellent strength and resistance to oxidation at high temperatures.**

All of which make stainless steel an obvious first choice material for demanding applications.

Stainless Steel Families

Stainless steel is used across a wide spectrum of engineering applications and this has led to the development of the vast range of different types of stainless steels that are now available. There are four main grades of stainless steel:

Austenitic Stainless Steels

This group of stainless steels is the most widely used and encompasses the generic 304 and 316 grades of material. These materials are used in the ACO Building Drainage manufacturing process and are ideal for applications including **food processing, leisure, dairy, brewing, pharmaceutical, chemical and petrochemical industries.**

304 grade stainless steels contain around 18% chromium and 10% nickel and provides excellent corrosion resistance. For applications where superior corrosion resistance properties are required under extreme conditions particularly where chlorides are involved, 316 grade stainless steels are used and contain around 17% chromium, 12% nickel and 2.2% molybdenum.

Unlike all other grades of stainless steels, austenitic grades are non-magnetic and as a consequence magnetic particles are not attracted to the system surfaces which otherwise would encourage both contamination and corrosion.

Ferritic Stainless Steels

Ferritic stainless steels have inferior corrosion resistance properties compared to austenitic 304 and 316 grades and are used in less demanding applications such as domestic appliance and motor car trim. This grade of stainless steel is slightly more brittle when compared to austenitic grades.

Ferritic steels contain between 11.5% and 16.5% chromium and less than 0.5% nickel. This group of steels are magnetic and will attract particulates which can cause contamination problems. Ferritic steels are **not suitable for drainage products.**

Stainless Steel

FAMILIES AND CORROSION RESISTANCE

Martensitic Stainless Steels

Martensitic steels are magnetic and have the highest strength of the groups of stainless steels, however they also have the poorest corrosion resistance. They can be hardened by heat treatment and generally find their main application in cutlery manufacture.

Martensitic steels contain around 12.5% chromium and contain a relatively high carbon content of 0.3% (austenitic and ferritic steels contain around 0.02% and 0.04% carbon respectively).

Martensitic steels' poor corrosion resistance make them **unsuitable for drainage applications**.

Duplex Stainless Steels

Duplex stainless steels have an effective austenitic/ferritic structure and are characterised by good corrosion resistance, high strength and in particular, good resistance to stress corrosion cracking.

Duplex steels contain around 22% chromium, 5.5% nickel, 3% molybdenum and 0.02% carbon. This group of steels are magnetic and will attract particulates which can cause contamination problems and therefore are **unsuitable for drainage applications**.

Stainless Steel Corrosion Resistance

The single most important property of stainless steels and the reason for their existence and widespread use, is their natural corrosion resistance. In spite of their name, stainless steels can both 'stain' and corrode if used incorrectly.

The reason for the good corrosion properties is due to the formation of a very thin, invisible oxide film that forms on the surface of the material in oxidising environments such as the atmosphere and water.

This film is a chromium-rich oxide which protects the steel from attack in aggressive environments. As chromium is added to a steel, a rapid reduction in the corrosion rate is observed because of this protective film. In order to obtain a compact and continuous passive film, a chromium content of at least 11% is required. Passivity increases fairly rapidly with increasing chromium content up to about 17% chromium.

The most important alloying element is therefore chromium, but a number of other elements including nickel, molybdenum and nitrogen also contribute to the corrosion resistance properties of stainless steels. Other alloying elements may also be added to enhance the corrosion resistance in particular environments.

Stainless steels must oxidise in order to form the passive, chromium-rich oxide film. Stainless steels have a very strong tendency to passivate and only a small amount of oxidising agents are needed for passivation - air and water are sufficient to passivate stainless steels and indeed, this oxide film is spontaneously regenerated when exposed to oxygen. An important factor to note is that the passive film is self-healing, so when the material is cut or machined or, should chemical or mechanical damage occur, the passive film will 'heal' or re-passivate in oxidising environments - unlike a painted finish on mild steel.

Selection of the correct grade of material for each application is an important factor in the design process. It is important to note that even 316 grades of stainless steel are not immune to all kinds of chemical attack; use with reducing solutions such as hydrochloric and sulphuric acids particularly when in concentrated and/or hot form, requires careful consideration. See corrosion resistance chart on pages 45 and 46.