

Action Corrosion Build Smart Guide.



**Anti-Corrosion Product & Design Advice for
Builders, Engineers, Architects & their
Clients, when Building or Renovating by the
sea.**





Introduction

In compiling this guide, Action Corrosion Pty Ltd have drawn upon 5 years of rust and corrosion restoration works on coastal Hotels and Resorts such as Hamilton Island and the Mantra Group. We have also drawn upon the expertise of a corrosion engineer when providing technical advise. Reference material from the Australia Stainless Steel Design Association (ASSDA) is also included in this publication.

Action Corrosion Pty Ltd provides advise and supplies our products for the Sydney Aquarium dugong and shark enclosures. We also provide corrosion restoration work on exclusive beach front homes, and provide an ongoing maintenance service. We have a team of accredited pipeline repairers for refineries, and the gas and oil mining industries across Australasia.

Action Corrosion Pty Ltd manufactures a range of world class commercial rust removers and anti-corrosion coatings. These premium products are available to the public and have been used widely in the air conditioning, pool service, maintenance, plumbing and painting industries.

Any products recommended in this publication, are as a result of the durability we have witnessed in seaside locations, and are what we are confident will provide excellent longevity in a challenging coastal environment.

We hope our guide will assist you in making an informed decision regarding materials and design. After all, your home is your most prized asset.

Josh Burton
Director
Action Corrosion Pty Ltd
Australian owned, Australian made.
www.actioncorrosion.com.au

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Lets Start from the Top - The Roof.

Tip: Consider non metallic roofing alternatives near the coast, if metal is specified, ensure roofing screws are coated with Action Clear Coat at time of installation.

Whilst the trend today is more towards metal roofing, it is our experience that this is not necessarily the best choice near the coast. The issue is not with the bonded roof sheeting itself, but with the fixing screws. Roofing screws are generally galvanised and painted, however, when they are screwed down and have torque applied, cracks occur in these coatings. In coastal locations, corrosion can set in through these breaches. All of the photos in this brochure are of coastal roofs under 5 years old.



This roof is situated at Agnes Water, QLD and was 5 years old at the time of this photo being taken.

When corrosion forms on the screw head, galvanic corrosion occurs on the surrounding sheeting, delaminating the coating and eventually rusting the roof.

When we restore roofs and replace the screws, we apply our Action Clear Coat, which provides an invisible, hard, clear UV resistant corrosion barrier. This coating protects the screw head and surrounding sheeting from corrosion.

Roof Design

After seeing many of these metal roofs with corrosion issues, we hold the view that materials other than metal roofing should seriously be considered near the coast.

If a metal roof is preferred, avoid designing roofs with multi-storey overhangs. We have consistently found these designs have the greatest issues with corrosion as natural rain fall cannot rinse down the screw heads. It is also usually impractical to rinse down these inaccessible areas as part of regular maintenance schedule. The photos below all show corrosion in metal roofing as a result of an overhang design, and are consistent with what we regularly find.



This Pavilion design with roof overhang, prevents natural rain water washing down screw heads, allowing salt to settle and rust to take hold. Remember rain water runs down the valleys of the roofing, leaving the screws untouched. This roof is 5 years old and the screws are too rusted to be removed. You can see rust appearing in the sheet surrounding the screw head. Whilst the metal roofing has a warranty, it does not extend to damage as a result of screw heads.



Another example of roof damage as a result of an overhanging roof design, note the dirt build up in this sheltered area which natural rainfall does not reach and which cannot be routinely rinsed down due to it's inaccessible location.



This photo was taken (4) years after this Kingscliff home was built. It won a design award for best home under \$1M. As you can see, the problem associated with rusted screws is quite common along the coast for homes 4-5 years old. The roofing screws would fare much better with the simple application of Action Clear Coat, which along with providing excellent corrosion protection, is totally clear and will not change the roof colour.

Gutter Support Brackets

At the very least, gutter support brackets need to be galvanised. It is also advisable to apply an anti-corrosion coating such as Action Clear Coat Xtreme, which has UV resistant properties. The brackets depicted are from two different properties which are 5 years and 3 years old respectively.

The lower picture of a metal fascia, shows the damage which can be caused when gutter brackets are allowed to rust. The metal fascia is rusting proximate to where the rusted brackets are attached. Brackets should be coated with an anti-corrosion coating at the time of installation.



Down-Pipe and Down-Pipe Saddle Selection.

Tip: Where possible, opt for plastic or stainless steel saddles, avoid the standard metal ones. If stainless saddles are specified, apply an anti-corrosion coating prior to installation.



If architecturally, a satin/grain finish is required, the down-pipe should be coated with Action Clear Coat Xtreme prior to installation. This down-pipe at Tweed City Shopping Centre has a satin (grained) finish. It was easily restored with Action Rust Removal Gel and protected with Action Clear Coat Xtreme. The restoration would not have been required if they were treated prior to installation.



Standard metal down-pipe saddles quickly rust in a coastal location and bleed rust down the walls as shown. We always recommend using plastic or stainless steel saddles wherever possible, as shown right. Poly saddles can be painted to specification.

Stainless Steel Grade, Finish and Design.

Tip: Choose a highly polished finish where possible. If satin finish is preferred, coat stainless with an anti-corrosion coating such as Action Clear Coat and rinse down regularly.

Grade Selection

Stainless steel is a very popular choice for both inside and outside fittings and fixtures. If Stainless steel is selected for a project close to the coast, it will require routine maintenance to prevent tea-staining corrosion. Regardless of the grade or finish we recommend our Action Clear Coat for all coastal stainless steel.

The most popular grades of Stainless Steel are 304 and 316 (marine grade) the differences between stainless steel grades are chromium content and the addition of nickel and molybdenum to 316 grade. 316 generally has greater corrosion resistance than 304, however there is added expense for this grade.

Finish Selection

“In aggressive environments, the smoother the surface, the better the corrosion resistance. A smoother surface is less susceptible to an accumulation of deposits, which may become focal points for localised corrosion.”(ASSDA)

It has been our experience that this statement by the Australian Stainless Steel Development Association is very true when building near the coast. We have found that the finish is as important as the grade of stainless steel used.

Electropolishing is the process of highly polishing stainless steel, bringing chromium to the surface and smoothing the finish by 30%. This makes it more difficult for salt and impurities to attach. The photo's below demonstrate the importance of finish.



This new home is about 500 metres from the beach. The handrail, uprights and clamps are the same 304 grade, however, only the handrail and clamps were electropolished. The uprights are satin finish. After only 4 weeks the uprights have corrosion whilst the handrail and clamps remain in good order. Action Corrosion used Rust Removal Cream to restore the upright and Action Clear Coat Xtreme to protect it from future corrosion.



*Highly polished handrail and satin finish supports.
The handrail is unaffected, the satin finish supports have corrosion.*

We recommend having a highly polished finish on all external stainless steel where practical. We also recommend using Action Clear Coat to protect from corrosion on all stainless steel regardless of the grade and finish.

Stainless Steel Design: Crevices and Corrosion.

“Many metals and alloys are susceptible to crevice corrosion, but in stainless steel, crevices are the first and most common place for corrosive attack to begin. With a little understanding, crevice corrosion can either be avoided or minimised.”

(ASSDA)



The spigot design left, has a number of crevices and sharp edges. Corrosion will be an ongoing issue for this design as these areas invite corrosion. Another concern is that the required dry film thickness (DFT) cannot be achieved for any anti-corrosion coating on these sharp edges.

Many of our beachfront clients have opted for the rounded cylindrical design (right) which provides an easy to maintain alternative without the same corrosion issues.

Stainless Steel Location

We recommend regular rinsing down of all external stainless steel at least every 4-6 weeks, however, stainless steel fittings and fixtures under roof (i.e not rinsed down by natural rain water) are particularly susceptible to corrosion from salt and grime build up. It is for this reason that alternatives other than stainless steel products be considered for these areas if a regimented cleaning schedule is not adopted.

Likewise, materials other than stainless steel for spigots and railings close to a pool, should be considered as the chlorine, salt and other chemicals in the pool water can cause the early onset of corrosion unless pre-coated. A powder coated surface in these areas may provide a more durable and maintenance free alternative.



Pools contain salt, chlorine and acids which can cause corrosion to stainless steel nearby. Powder coating maybe better suited to these environments when it comes to maintenance requirements.

Structural Issues

Tip: Paint your Arch Bars before they are installed, especially the ends where it will be checked into the wall. This area will rust first, due to contact with moisture in the wall. This area cannot be painted once installed.

Archbars (Lintels)

These are galvanised flat bars which are recessed into the wall above doorways, garages and windows to support the weight of a masonry wall. The galvanised coating does a very good job in preventing rust, however the porous masonry walls hold moisture, meaning that the sections of flat bar which are recessed into the wall, almost always rust first. In this series of photos, you can see that rust has started in the corners, which is consistent with what we find in the field along the east coast of Australia.





We recommend painting the arch bars with a quality exterior paint, prior to installation, and, as added precaution, apply a heavy coat of Action Clear Coat Xtreme to the bar ends, which will create a moisture barrier for the steel. By taking these simple steps at the time of construction, you will save yourself ongoing rectification work at a later stage.

Your local Inspirations Paint and Colour Store stock a full range of quality exterior paints for this application. Selected stores also stock the Action Corrosion range of rust removers and anti-corrosion coatings.



Steel Support Posts and Beams.

The photo below is a prime example of what happens when a post has a hot dipped galvanised finish and the fixing plate is welded on site and coated with an inferior cold gal type product. Rust will set in on the plate and the weld, while the hot dipped galvanised post itself remains sound.



Wherever possible, insist that any steel support posts or beams are hot dip galvanised with the fixing plates already attached. Whilst this will be more labour intensive for the builder and expensive for the client, it will provide excellent long term protection of your structural steel. The welding of these plates on site, in our experience, creates rust issues in a very short period of time. We are unaware of a coating which provides the same long term protection of steel in a coastal location as hot dipped galvanising, so these plates will always rust before the beams themselves do.

Correct Screws and Fixings.

Tip: Any screws or hardware which accompany external walls lights, spot-lights, handles, street numbering or any other items purchased to attach to a wall, throw in the bin. Generally, the screws provided are of poor quality, they will rust and stain your walls. Take the time to purchase and use quality stainless steel screws, preferably 316 grade.



This is the usual outcome when poor quality hardware is used to affix lights and other fittings to a masonry wall. In this case, the rust staining was easily dissolved with Action Rust Removal Gel. The problem will continue however, until the hardware is removed and replaced with quality stainless steel screws.

Fan Selection

Tip: Opt for timber bladed fans with an alloy motor/hub.

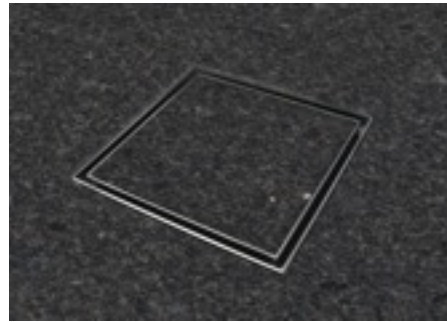


We do not endorse the use of metal bladed fans anywhere near a coastal location. Salt and dust tends to settle on top of metal blades and accelerates the corrosion process. We have had many instances where fans have not been used over the winter months and when turned on in summer, all the surrounding walls are sprayed with rust, requiring a full removal, undercoat and repaint of all walls.

Bathroom

Tip: Reduce the amount of metal in this high humidity area.

Floor Grate Selection



Bathrooms in particular are a high humidity area, combine this with a coastal location and corrosion will become an issue. The key is to limit the amount of metal within the bathroom. Consider the use of a tile insert style of floor grating and not the standard metal type pictured. Reduce the number of metal handles in vanities by having them recessed in the draws. Consider using non metal materials for hand towel/towel holders and other accessories. If metal is used ensure it is coated with a product such as Action Clear Coat.



Even the highest quality 316 grade stainless fittings suffer from corrosion in bathrooms near the coast, due to continual high humidity.

Dissimilar Metal Issues

Tip: Wherever possible, especially in a corrosive environment, do not mix metals.

When two different metals are in contact and subjected to a corrosive environment, there is a current flow between them. This flow causes corrosion of the least corrosion resistant metal (active) to increase, and corrosion of the more corrosion resistant (inactive) metal to decrease. The corrosion rate is related to the distance between the two metals in the ranking on the Galvanic Corrosion Table (see next page).

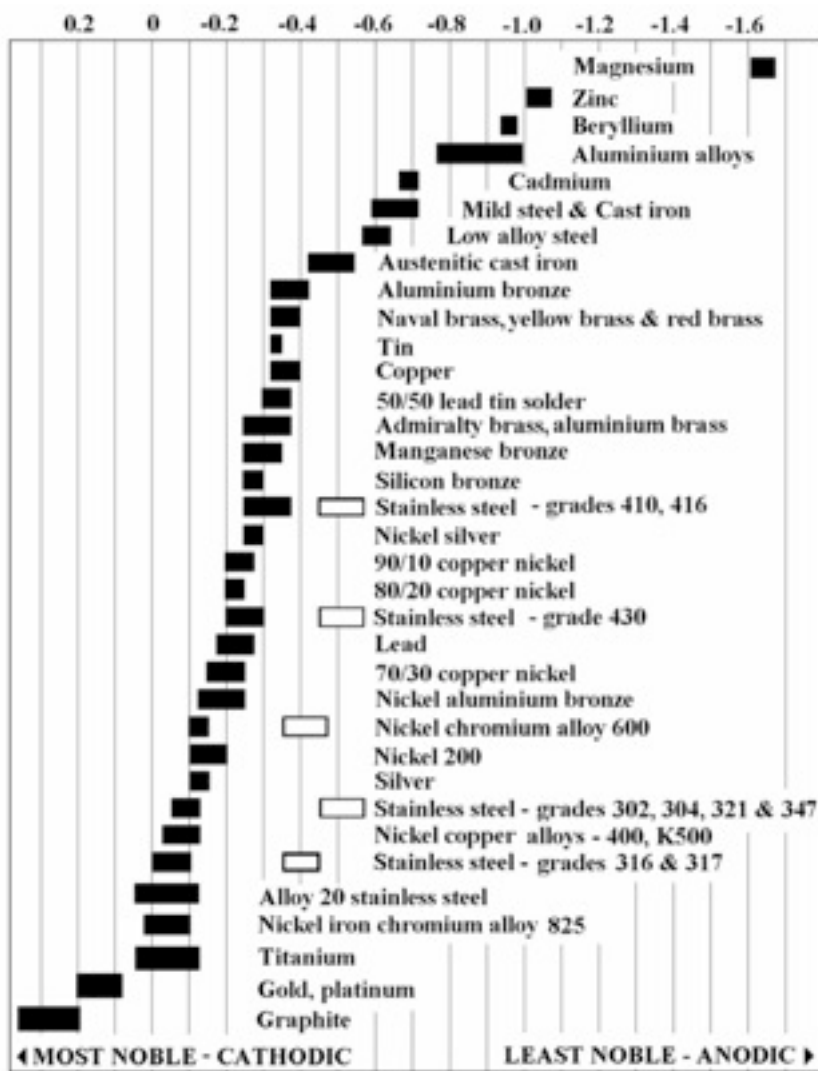
As you can see from the table, the marriage of Aluminium with Stainless Steel is not recommended and will generally lead to corrosion of the Aluminium (Anode) with the Stainless Steel (Cathode) remaining sound.



Keep metals which are in contact the same wherever possible. If not, ensure that are well suited in the Galvanic Corrosion Table (i.e proximate to each other in the table)

Galvanic Corrosion Table

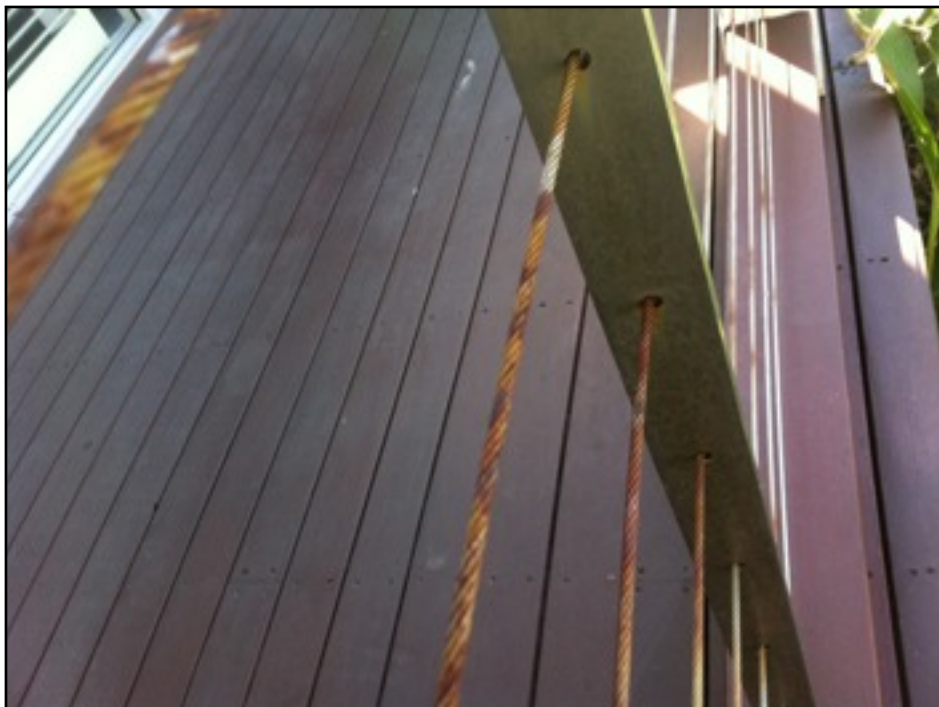
This table ranks metals and alloys. The 'Anodic' or 'Less noble' metals are at the negative end of the table, such as Magnesium, Zinc and Aluminium. They are more likely to be attacked than those at the 'Cathodic' or 'Noble' end of the series, such as gold or graphite.



Cables

Tip: Avoid the use of Stainless Steel cable externally, it is a very high maintenance product, which looks very untidy when corrosion sets in.

External Stainless Steel Cable (Balustrade etc)



Due to the fine intertwined wires on external balustrade cable, many of the cable surfaces are unable to be cleaned and protected. This makes it very difficult to prevent corrosion. The best way to treat the cable is with the application of lanolin oil, every 3 months, which is the best chance of penetrating and coating the fibres. If you are not prepared to commit to this regime, we recommend against its use externally in a coastal environment. A better option would be stainless steel horizontal bars.

Garage Door Cable

Coastal garage door cable, when not regularly maintained, tend to snap due to weakness in the cable. In most cases this weakness is due to corrosion damage. We recommend the use of stainless cable, and the regular application of lanolin oil every 6-12 months to prolong their life.



A simple application of commercial grade lanolin oil, will ensure the cable and chain are kept in good order.

Coat the underside of the garage door brackets with Action Clear Coat Xtreme before installation. As you can see from this photo, moisture travels through the masonry wall, and will rust the metal surface it contacts. This bracket is galvanised, but is still severely rust affected.



Electrical Corrosion Protection

Tip: Keep your TV, Home Theatre Equipment, Stereo etc away from windows and sliding doors near the coast. They will suffer from corrosion internally, and there is no warranty for corrosion on these appliances.



The terminals of this flat panel television have corrosion due to it's proximity to a sliding door. Internally it will also have the same issues. The heat generated by the new large screen TV's mean more small ventilation holes are required in the rear and top to disperse the heat. This is also where salt and dust enters to damage the unit.

Along with appliances, there are other areas of the home which require corrosion protection. The wiring within the meter box, down-light and wall light connections, internal alarm system, intercom systems and automatic garage door motors. These are items which should be treated at the installation stage, and every year to eighteen months thereafter.

The electronics including chlorinators, ionisers, pumps and power points within the pool pump enclosure, are particularly susceptible to corrosion damage. This is because most people store chemicals including chlorine, salt and acid in the same area. Wherever possible store your chemicals in a different location.



A simple spray of Action Vapour-Guard will protect all your electrical appliances and circuitry throughout the home. It is non-conductive and designed to clean and protect sensitive electrical circuitry. A light spray on circuit boards inside air-conditioning units will provide 12-18 months protection.

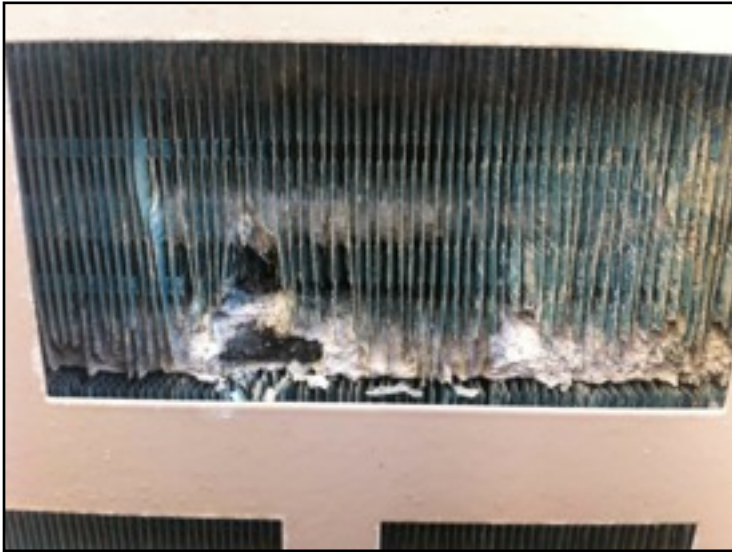
Air-Conditioner Corrosion Protection

Tip: Make sure your air-conditioner installer protects internal circuit boards with an electrical corrosion inhibitor, such as Action Vapour Guard. Ensure the external compressor unit is mounted off the ground, on nylon spacers to stop rust on feet and cabinet.



(Left) Coil Guards, Fan Guards, Feet, Cabinet and internal Circuit Boards all need protection from corrosion from the time of installation, however if it's already corroded it's not too late to remove rust and protect. Where possible, opt for an external unit with a plastic fan guard.

(Right) A combination of high humidity, moisture and a coastal location combine to corrode circuit boards within compressor units. When damaged, these boards require replacement, with repair costs often in excess of \$1000 so it is good to be proactive.



Coil fins corrode and fall away if not treated. Clogged or damaged fins are unable to exchange heat effectively. This creates a very inefficient unit, which will require more power to cool.



The Action Corrosion Aircon Install Kit (left) will protect your circuit boards, cabinet, coil, coil guards and fan guards against corrosion. Easy to use and easy on the hip pocket. Action Corrosion have also designed a patented nylon spacer (right) to lift the compressor unit up from the wet concrete/tile and protect from the early onset of rust on the feet and underside of the cabinet which is always a problem with external units.

Importance of rinsing down with fresh water.

Tip: If you are building a multi storey home or unit block, ensure each balcony is plumbed with a tap, so everything can be rinsed down with fresh water regularly.



This is one of the most important pieces of advise, hose down the external fittings and fixtures of your home regularly with fresh water or they will grow barnacles, like this.



We thank you for taking the time to read through this brochure. We hope it will assist you in making better informed choices for your building or renovation project, which will result in greater longevity and a significant reduction in maintenance.

For product information or to purchase from our range please go to,

Web: www.actioncorrosion.com.au

Email: sales@actioncorrosion.com.au

Address: 3/18 Industry Drive, Tweed Heads South, NSW. 2486.

Ph 1300-731311



Our products are also stocked in selected inspirations stores on the Gold Coast QLD and Northern NSW.