OPERATION & MAINTENANCE MANUAL

Introduction

To aid in ensuring the maximum life can be realised with the product, along with minimising the costs for major refurbishment, this manual is to advise in the ongoing maintenance requirements along with identifying important points that should be followed at all times. Our commitment to providing a service of quality that takes into consideration the effects of the environment during its manufacture and life plus the health and safety of the public and customers has been considered.

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Cleaning, Maintenance & Repair

This section gives a generic overview of the inspection and cleaning regimes, solutions, methods and techniques which will preserve the aesthetic finish of the products.

Inspection & Cleaning

To maximise life expectancy, the products should be visually inspected on a regular basis for any signs of damage, vandalism, breakdown of surface finish, build-up of salt, dirt or atmospheric residue, and loose fixings.

During these inspections, should any concerns be noted, then the Customer's attention is brought to the following pages whereby suitable maintenance and repair methods are described for the various materials used.

In the event of serious damage to any main component then Ryco Industries should be contacted immediately for detailed technical advice.

In addition to the visual inspection, a regular cleaning regime is also required. The required frequency of visual inspection and cleaning will be dependent on the environment in which the product is situated:

• In rural and urban environments, the products should be visually inspected monthly, and cleaned every 3 months.

• In harsh industrial or coastal environments where the products may come into contact with concentrated atmospheric pollutants (chemical, marine), the visual inspection frequency should be increased to weekly, and the cleaning frequency increased to monthly (or as required).

Note – this document is not designed to be exhaustive and extensive in the exacting requirements of every case. If you consider your cleaning or repair circumstances to be outside of the scope of this document, then please contact Ryco Industries and we will be happy to help you.

All cleaning and maintenance should be recorded, detailing the method of cleaning, what products have been used, and what repair work has been undertaken. In the case of a warranty claim against Ryco Industries, this information will be requested.

Galvanized Coating

Prepared items are galvanized by immersion in molten zinc. On immersion in the galvanizing bath the steel surface is completely covered by the molten zinc, which reacts with the steel to form a series of zinc-iron alloy layers, producing a uniform coating. The thickness of these layers is determined principally by the mass of the steel being galvanized. This is an important advantage of the galvanizing process – a standard minimum coating thickness is applied automatically regardless of the operator.

To allow formation of the coating the work remains in the bath until its temperature reaches that of the molten zinc, in the range of 445°C to 465°C. The work is then withdrawn at a controlled rate and carries with it an outer layer of molten zinc which solidifies to form the relatively pure outer zinc coating.

The molten zinc in the galvanizing bath covers corners, seals edges, seams and rivets, and penetrates recesses to give complete protection to areas which are potential corrosion spots with other coating systems. The galvanized coating is slightly thicker at corners and narrow edges, giving greatly increased protection compared to organic coatings which thin out in these critical areas. Complex shapes and open vessels may be galvanized inside and out in one operation.

The period of immersion in the galvanizing bath varies from a few minutes for relatively light articles, or longer for massive structural members.

Upon extraction from the galvanizing bath the item is then quenched to cool.

New galvanized products should be handled, transported and stored with the normal care given to any other surface finished building material. New galvanized steel surfaces which have not yet developed the patina of protective insoluble basic zinc carbonates, which normally contributes to the long life of aged coatings, are highly reactive and susceptible to premature corrosion under poor conditions of exposure.

Transport should be under dry, well ventilated conditions. When stored on site, material should be covered where possible and raised clear of the ground on dunnage or spacers. When shelter is not possible material should be stacked to allow drainage of rainwater. Storage in contact with cinders, clinkers, unseasoned timber, mud or clay will lead to surface staining and in severe cases, premature corrosion.

Clearance for ventilation between stacked galvanized products is necessary under damp or humid conditions to avoid the possibility of wet storage stain and the development of bulky white corrosion product. Attack on the galvanized coating producing white corrosion is caused by the retention of condensation or run-off water between the contacting surfaces under conditions of restricted air circulation. The attack is frequently superficial despite the relative bulkiness of the corrosion product but may be objectionable because of appearance. In severe cases corrosion product should be removed to allow the natural formation of protective basic zinc carbonate film.

Where galvanized products are likely to be stored or transported under poor conditions the galvanizer can, on request, apply a simple chromate treatment which will minimise wet storage stain. Under severe conditions chromating should not be relied on and new galvanized products

Galvanized Coating Continues

should be packed carefully and protected for shipment and storage.
Continuously galvanized sheet steel products designed for outdoor exposure are normally given a carefully controlled chromate treatment during manufacture. This treatment provides excellent resistance to wet storage staining and against early dulling during initial outdoor exposure. Care should nevertheless be taken to see that sheet and coil is kept dry while awaiting fabrication or erection.

Powder Coating

Powder coating is a type of dry coating, which is applied as a free-flowing, dry powder.

The main difference between a conventional liquid paint and a powder coating is that the powder coating does not require a solvent to keep the binder and filler parts in a liquid suspension form.

The coating is applied electrostatically and is then cured under heat to allow it to flow and form a "skin." The powder may be a thermoplastic or a thermoset polymer. It is used to create a hard finish that is tougher than conventional paint.

Powder coating is mainly used for coating of metals, such as galvanized steel, "white goods", aluminium extrusions. Newer technologies allow other materials, such as MDF (medium-density fibreboard), to be powder coated using different methods.

The application of powder is very simple. Filtered, compressed air, usually at 20-30psi pushes the powder out of the gun past the electrode which gives the powder a positive charge. The part being coated is grounded so the positive powder particles are attracted to it. When the part is completely covered, the part is put into the curing oven.

Your powder coated products can continue to look great for a long time – with a few easy tips on caring and maintaining them.

Many powder coated products are exposed to the elements, and over time it may begin to show, for example with loss of gloss, chalking and sometimes a slight colour change. However, a simple regular clean will minimize the effects of weathering and will remove dirt, grime and other build-up, which is detrimental to all powder coatings.

Products that are outdoors such as architectural coatings or outdoor furniture will need cleaning from time to time. How often you clean them depends on a few factors, such as

- The geographical location of your building.
- The environment surrounding the products e.g. marine, industrial, alkaline or acidic, etc.
- The levels of atmospheric pollution including salts.
- Prevailing winds and the possibility of air borne debris causing erosive wear of the coating, for example. sand causing abrasion.

Long term, a change in the environmental circumstances during the lifetime of the building e.g. if rural became industrial, can also affect the atmosphere and thus the wear on the coating.
Clearly the environment the product or building is in is a key factor in the frequency of cleaning required.
In many environments high corrosively levels, such as industrial or marine, normal cleaning frequency should be at a minimum of six-monthly intervals.

Powder Coating continues

You might not think it at first, but sheltered areas can be more at risk of coating degradation than exposed areas. This is because wind-blown salt and other pollutants may adhere to the surface and will not be cleaned away with rainfall. These areas should be inspected and cleaned if necessary, on a more regular basis. Where the atmosphere is deemed to be non-hazardous, e.g. rural or 'normal' urban environments, then the period between cleaning can be extended up to a maximum of 24 months depending Therefore, to really protect your product, start early.

You can start cleaning at the time the products are installed, ensuring that construction materials such as concrete, plaster and paint splashes are removed before they have a chance to dry.
If these materials aren't removed at this early stage, it is almost guaranteed that aggressive cleaning materials and techniques will be used to remove them, and that can cause potential damage to the powder coated surface.
The best method of cleaning is simple: regular washing of the coating using a solution of warm water and non-abrasive, pH neutral detergent solution.
Make sure you thoroughly rinse the surfaces after cleaning to remove all residues. You can use a soft cloth, sponge or a soft natural bristle brush.
In fact, cleaning of powder coated sections can be conveniently carried out at the same time as window cleaning.

Wet Painting

Wet painting concerns the application of one or more coating layers, the so-called ‘wet painting systems. The first layer is often a rust-proof primer coat, followed by one or several layers of coating, depending on the required level of protection. An offshore installation, for example, needs four layers due to the extreme circumstances, while only one layer is sufficient for an indoor construction. For the coating of floors, special products are used that can withstand heavy loads. In addition to the number of layers, the type of coating and the application method are important considerations. Logic will gladly help you make a well-informed choice.
The recommended cleaning frequency is detailed at the start of this section.

The cleaning of wet painted surfaces should be undertaken using either:
1. Warm mild soapy water and soft brush, sponge or natural bristle brush. Rinsed with clean water.

2. A proprietary car wash and wax system. Rinsed with clean water.

3. A low-pressure water wash e.g. hosepipe.

At no time during the cleaning process is it advisable for any abrasive cleaners, solvents, or other chemicals, to be used. Where small repairs to the painted surface are required, then the following should be adhered to as a minimum:

For light scratches / chips where the base material is exposed then a suitable should be carefully applied to the defect, followed by a topcoat finish of a matching acrylic based paint or touch up.

If required, the damaged area can be filled to bring it back up to the same level as the remaining painted surface. A proprietary car filler system would be suitable for this operation and can easily be sanded back to the finish and level needed.

For larger areas of damage or vandalism, the areas should be sanded by the minimum amount to feather in the broken edges. As per the above, the area can be filled if required and a primer and then topcoat either brushed or sprayed onto the area. Information relating to the original paint system can be obtained by contacting.

Anodize Coating

Anodic film is substantially transparent

Unlike painting, parent metal surface remains visible through the coating. So the surface of the extruded aluminium surface should be of the best possible quality before anodizing.

Anodizing does not remove all defects

Because of this factor, if you want us to anodize material from your own supply, we may not always be able to guarantee good appearance. However, we will make recommendations and do everything we can to achieve the best possible finish for you.

Film thickness affects appearance

As anodic film becomes thicker, the film also becomes duller and less transparent. For a good match in appearance, particularly with coloured material, it's best to avoid mixed film thickness.

Heat joining methods affect colour

Weld filler metal and the heat affected zones of weldments anodize to a different colour than the parent metal. This fact must be taken into account when anodizing welded structures.

Temper (hardness) and metal types affect colour

T4 and T5 tempers anodize to a different shade, as do sheet metal and extruded metal. The sheet alloys 5005 and especially 5205 provide the best match with 6060 T5 (the preferred extruded aluminium alloy for anodizing).

Cast material is almost impossible to match with wrought metal (sheet or extrusion).

Bending may cause crazing and reduced corrosion resistance

Anodic films cannot be permanently deformed (bent out of shape) without crazing, which also reduces the film's corrosion resistance. We recommend you avoid bending or forming anodized extruded sections, except for sections with very low thickness film.

Films with a thickness of less than 6 microns may be formed for articles such as windscreen trim (FORD specification). But above this figure, flexibility reduces very quickly. You must always use rounded tools and good lubrication.

Cleaning products and environmental factors may cause corrosion

The anodic film on aluminium is one of the most corrosion resistant coatings available, but it is not indestructible.

Reasonably resistant to abrasion

Anodized film is about 4-5 times harder than the aluminium alloy substrate. The greatest hardness is found at the surface of the film, which is capable of marking glass and steel. The aluminium alloy's substrate is not altered by anodic treatment.

Anodic film is therefore quite resistant to abrasion. In fact, specific abrasion tests have found that anodized aluminium is more abrasion resistant than hardened glass. Rubbing type abrasion, particularly with hard scouring material, is more damaging than blast type abrasion – for example, water blasting.

Anodize Coating Continues

The cleaning and etching process does not remove defects such as deep die lines, surface abrasions and corrosion. In fact, these defects are often exaggerated. So it's important to control damage risks during production, storage, handling and transport of extruded aluminium.

Strong acid or alkaline material will seriously corrode the coating. In service, it’s essential to avoid:

- Contact with brick or glass cleaners (acid) or alkaline cleaners
- Contact with wet building materials such as plaster or cement and unprotected concrete (alkaline)
- Paint splashes – as attempts to remove them using paint stripper will cause corrosion
- Aggressive scouring type cleaners

Run off from dissimilar metal building components such as copper guttering or downpipes can also cause serious corrosion.

Dissimilar metal fixings should be properly insulated from anodized aluminium, particularly in a severe environment. Use only good quality, proven sealants.

The cleaning of anodized surfaces should be undertaken using either:

1. Warm mild soapy water and soft brush, sponge or natural bristle brush. Rinsed with clean water.

2. A low-pressure water wash e.g. hosepipe.

We recommend you treat all commercial cleaning products with suspicion and do patch tests before using them extensively on anodized aluminium.

Stainless Steel

Stainless is a term coined early in the development of these steels for cutlery applications. It was adopted as a generic name for these steels and now covers a wide range of steel types and grades for corrosion or oxidation resistant applications.

Stainless steels are iron alloys with a minimum of 10.5% chromium. Other alloying elements are added to enhance their structure and properties such as formability, strength and cryogenic toughness. These include metals such as:

- Nickel
- Molybdenum
- Titanium
- Copper

Non-metal additions are also made, the main ones being:

- Carbon
- Nitrogen

The main requirement for stainless steels is that they should be corrosion resistant for a specified application or environment. The selection of a particular "type" and "grade" of stainless steel must initially meet the corrosion resistance requirements. Additional mechanical or physical properties may also need to be considered to achieve the overall service performance requirements.

Although stainless steel is much more resistant to corrosion than ordinary carbon or alloy steels, in some circumstances it can corrode. It is 'stain-less' not 'stain-impossible'. In normal atmospheric or water-based environments, stainless steel will not corrode as demonstrated by domestic sink units, cutlery, saucepans and work-surfaces.

In more aggressive conditions, the basic types of stainless steel may corrode, and a more highly alloyed stainless steel can be used. See Corrosion Mechanisms in Stainless Steel

Stainless steels are selected in applications where their inherent corrosion resistance, strength and aesthetic appeal are required. Surface contamination and the formation of deposits must be prevented. These deposits may be minute particles of iron or rust from other sources and not removed until after the stainless steel items have been installed.

Industrial and even naturally occurring atmospheric conditions can cause deposits that can be equally as corrosive. A working environment which offers more aggressive conditions, e.g. hot and humid, such as swimming pools, increases the speed of discolouration and therefore requires maintenance on a more frequent basis.

All grades and finishes of stainless steel may in fact stain, discolour or attain an adhering layer of grime in normal service. To achieve maximum corrosion resistance, the surface of the stainless steel must be kept clean. Providing the correct grade is specified, any contamination from handling, manufacturing and installation is removed, and cleaning schedules are carried out regularly, good performance and long life will be achieved. The two grades of stainless steel used in Logic products are grade 316 & grade 304.

Stainless Steel Grade 304

304 stainless steel has a high resistance to rust. It withstands corrosion from most oxidizing acids and is often used for kitchen and food applications. However, it is susceptible to corrosion from chloride solutions (notably saline environments with high amounts of sodium chloride).

Chloride ions can create localized areas of corrosion, called "pitting," which can spread beneath protective chromium barriers to compromise internal structures. Solutions with as little as 25 ppm of sodium chloride can begin to have a corrosive effect.

304 grade is the most common form of stainless steel used around the world. It contains between 16 and 24 percent chromium and up to 35 percent nickel—as well as small amounts of carbon and manganese. The most common form of 304 stainless steel is 18-8, or 18/8, stainless steel, which contains 18 percent chromium and 8 percent nickel.

Stainless Steel Grade 316

316 grade is the second-most common form of stainless steel. It has almost the same physical and mechanical properties as 304 stainless steel and contains a similar material make-up. The difference is that 316 stainless steel incorporates about 2 to 3 percent molybdenum, which increases corrosion resistance—particularly against chlorides and other industrial solvents. Alternative 300-series grades can contain up to 7 percent molybdenum.

316 stainless steel is commonly used in many industrial applications involving processing chemicals, as well as high-saline environments such as coastal regions and outdoor areas where de-icing salts are common. Due to its non-reactive qualities, 316 stainless steel is also used in the manufacture of medical surgical instruments.

Location Grade 304, Grade 316 - Maintenance

Stainless steel is easy to clean. Washing with soap or a mild detergent and water, followed by a clear water rinse, is usually quite adequate for domestic and architectural products. An enhanced aesthetic appearance will be achieved if the cleaned surface is wiped dry. On brushed (satin) finishes, nylon abrasive blocks may be used to remove minor surface imperfections, ground in dirt and scratches. These blocks are flexible and are impregnated with grit. Note – they must always be used in the same direction as the original polishing marks. Where stainless steel has become extremely dirty, with signs of surface discolouration, (perhaps following a period of neglect or misuse) alternative methods of cleaning will be required. These are detailed in the table below:

Problem Cleaning Agent Comments

Routine cleaning can be accomplished by using warm water and a cloth. This is the least risky option for cleaning stainless steel, plain water works to clean in most situations. To clean the external surface of your stainless steel appliance, use a clean microfiber towel with a mix of warm water and Flash Multi-Surface Concentrated Cleaner, for a powerful clean that's so good at getting rid of greasy stains, that you won't need any from your elbow.

If you don't have a microfiber towel, use a sponge, but steer clear of steel wool or any scrubbers that aren't specifically labelled 'non-scratch'. You don't want to end up ruining your stainless steel in an attempt to clean it!