TATA STEEL

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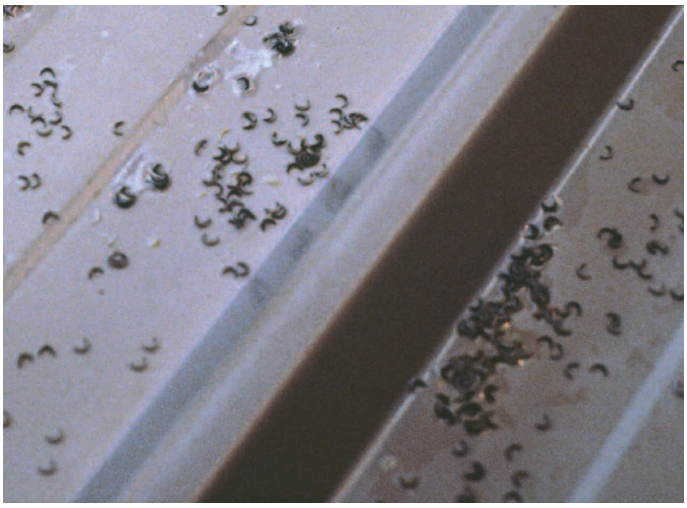
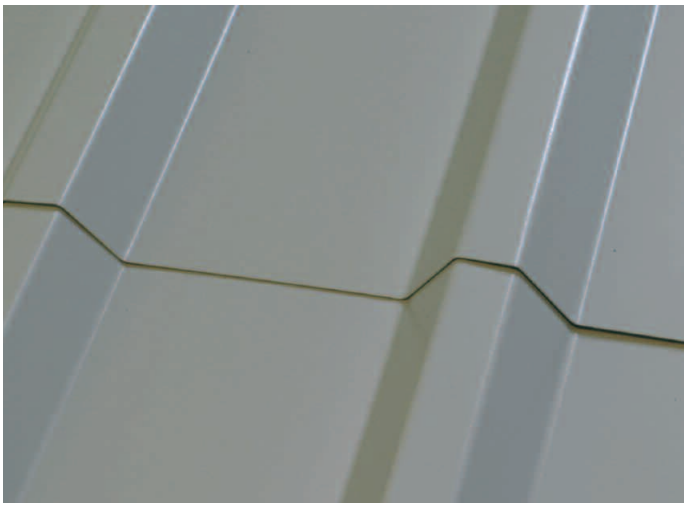
Inspection and maintenance guidance

For pre-finished steel building envelopes

Inspection and maintenance

To secure the best possible performance and life-time from pre-finished steel cladding, a structured maintenance regime is recommended. This document details the main areas that need to be checked and actioned as part of an ongoing inspection and maintenance programme. This then provides the basis for an easy-to-use 'inspection survey template' that can be included with any handover documents once a building is operational. The templates can be copied and used on site to note the location of any issues or areas of concern, record any recommended remedial action and confirm the completion of these.





The inspection regime

Tata Steel has developed and manufactured pre-finished steel for use within roof and wall cladding systems since 1965 so has vast experience in this area. This supports the provision of best practice advice for the inspection and maintenance of pre-finished steel building envelopes. Good inspection and maintenance practice will repay the careful building owner with the best possible performance in terms of appearance, durability and lifespan.

This Inspection and Maintenance guide should be included in the Building Operation and Maintenance manual for future reference. Copies can be downloaded from www.colorcoat-online.com

How often should inspections take place? They should be carried out periodically through the building's lifetime. It is difficult to quantify how often as different building locations and designs will demand different levels of maintenance. It is suggested that the building be inspected after the first year of occupation to assess future maintenance requirements and the duration required between inspections.

In line with Health & Safety Executive (HSE) latest Work at Height Regulations, every effort must be made to avoid having to go on to the roof to facilitate inspections. It may be possible to inspect the roof from a cherry picker, an access hatch or with binoculars from ground level or adjacent buildings.

For more information about safe working at heights visit www.colorcoat-online.com/site_safety

Colorcoat HPS200 Ultra®, with its outstanding performance and exceptional durability, and Colorcoat Prisma®, with the ultimate combination of durability and aesthetic appeal, have been developed for optimum performance in normal weathering conditions. This means that these products, when used as part of a roof or wall cladding system, will not require any annual inspections to maintain the validity of the Confidex® Guarantee for the entire guarantee period. This supports HSE guidance about minimising roof visits and reduces building service costs. Should a claim need to be made in this guarantee period there is no requirement to provide maintenance and inspection reports to Tata Steel.

Photovoltaic panel installations

When photovoltaic (PV) panels are installed on pre-finished steel roofs, the sheeting is no longer exposed to normal weathering conditions and washdown by rainfall. This can result in an accumulation of debris, dirt and airborne salts underneath the PV array and additional maintenance and inspection will be required.

When Colorcoat HPS200 Ultra® or Colorcoat Prisma® is used, the Confidex® Guarantee will remain valid underneath any mechanically attached PV system.

provided the additional requirements of the PV addendum are followed.

These include:

- The area of cladding under the PV cannot be considered maintenance and inspection free.
- The area must be regularly cleaned, and accurate records of cleaning retained for future reference.
- The frequency of cleaning/maintenance should be commensurate with local environmental conditions.

Dealing with potential maintenance issues

Build up of dirt in a gutter.

Build up of dirt and debris

A build up of dirt and debris can occur on all surfaces, on all elevations and on roof cladding. Such build up will be particularly profound at any irregularity, such as at corners, penetrations and gutters. In some environments such as industrial estates and areas close to busy roads, dirt will build up more quickly than elsewhere. Rainfall will have a degree of washing effect. However, any area of the building sheltered from rain, for example, the top of roller doors, overhanging eaves or underneath photovoltaic panels, will not benefit from this natural cleaning effect.

Dirt build up on cladding.

Cleaning

Cleaning should be carried out when dirt and debris are visibly apparent, not merely out of habit. The presence of dirt and debris not only affects the appearance, but may also lead to a breakdown of the coating. Furthermore, over many years, corrosion of the metal substrate may occur if a 'poultice' of debris, dirt, retained water and aggressive chemicals is allowed to build up.

Large quantities of debris can also lead to the overflowing or ponding of water, particularly in guttering, which may also lead to corrosion. To avoid this, debris should be swept into a pile, using a soft-bristled brush and removed. Shovels or hard tools should be avoided. All dirty areas should then be washed down using clean water. Do not use salt water or high pressure jets with a hose.

If necessary use an suitable cleaning product, which should be tested for compatibility on a sample first or on a less visible area of cladding. It is the responsibility of the contractor or the cleaning product supplier to ensure compatibility. A soft-bristled brush can be used for particularly stubborn deposits.

There are a number of generic and proprietary products such as weak phosphoric acid solutions, WD40 etc, which have been shown to work effectively at removing certain products.

Tata Steel can take no liability for any issues caused by the use of these products and recommend that all such products are assessed locally for compatibility.

While Tata Steel can also make general suggestions such as use of a soft bristle brush, use of light pressure etc, it is the responsibility of the contractor carrying out the cleaning to apply these guidelines.

Oil can be removed by wiping the area with white spirit before cleaning and rinsing as for general dirt and debris.

In some areas birds can be a nuisance. A build up of bird droppings can occur on roofs and this may significantly alter the pH of the surface water run off. Buildings used as communal roosts, where an excessive build up of bird droppings is possible, should be regularly monitored and cleaned down.

Graffiti

Graffiti can be removed with specialist cleaners, and repaint systems are available. These fall into three categories:

- Specialist graffiti removal products such as solvents and gels.
- Waxy sacrificial anti-graffiti treatments can be post-applied to the pre-finished steel. These can be power-washed off, removing graffiti and the treatment at the same time. Re-application of the treatment would then be required.
- Anti-graffiti coatings can also be applied. These render any graffiti easy to clean off, using hot water or cleaning solutions and do not need re-application after the graffiti is removed.

Note: Tata Steel guarantees will no longer be valid when a (semi) permanent protective layer is applied to the pre-finished steel.

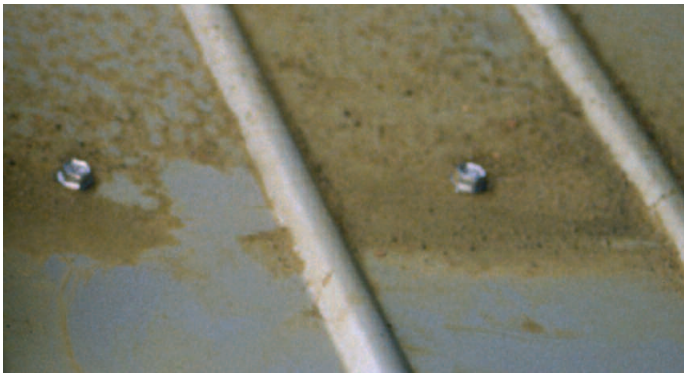
Build up of fungal growth

Fungal growth can occur on virtually any surface when the micro-environment is conducive to it. Colorcoat HPS200 Ultra® and Colorcoat Prisma® are formulated to be resistant to mould growth but in extreme circumstances this can still be problematic.

In general, fungi grow as a result of certain conditions, such as the presence of fungal spores, moisture and also of nutrients from various types of dirt. As with dirt and debris, fungal growth will not only affect the appearance, but can also lead to a breakdown of the coating and ultimately result in corrosion of the sheet. Washing the surface can remove fungal growth. A basic solution may be applied to a pre-washed surface by means of a low pressure spray or brush containing:

Household detergent	0.5%
Trisodium Phosphate	3.0%
5% Sodium Hypochlorite solution	25.0%
Clean, fresh water	71.5%

This should be rinsed thoroughly with clean water after treatment.



Mould growth on pre-finished steel cladding.

A number of maintenance, refurbishment and rectification methods are available within the construction market that can restore the appearance of a building and significantly extend the building's life. Depending on the issue and the type of building, this may include the options of touch-up paints (for superficial reparation); over-cladding; a strip and repaint; or the replacement of the existing cladding. Whilst overpainting is a widely used rectification method, Tata Steel's independent tests have shown overpainting on walls can impact the European fire standards classification. For roofs, independent testing and certification has confirmed no deterioration in fire classification, therefore overpainting on roofs can be considered as an appropriate method of reparation.

Physical damage

Physical damage may occur for a number of reasons such as impact and abrasion. If there is minor damage, such as scuffing of the paint coating less than the depth of any emboss, then no remedial action is required. If there is more serious damage, such as breaching of the paint coating, then remedial action is suggested. If the coating has been breached, then the metal substrate will be vulnerable to corrosion. The repair of breaching should be carried out by removing any loose or flaking paint, cleaning the area and, when dry, covering the breach using a recommended touch-up paint. If the metallic coating has been breached, exposing the underlying steel, then application of an air-curing zinc rich paint can be used to replenish the sacrificial protection layer. It is important to ensure that any applied paint is no wider than the original scratch. To achieve this, the paint should be applied with a medium-to-fine artist's paintbrush. If the damage is extensive, the panel should be replaced, which is easy to do with pre-finished steel.

Natural breakdown of the coating

In the case of natural breakdown of the coating, a decision must be made as to the severity of the breakdown. Ultimately, repainting or re-cladding may be necessary.

For more information about PRD and durability visit www.colorcoat-online.com/durability

Caution must be exercised as repainting is not simply a case of applying proprietary paint to the surface of the cladding. It is important that a compatible coating solution is defined and the use of an approved contractor will ensure correct application. Tata Steel can recommend appropriate repaint solutions.

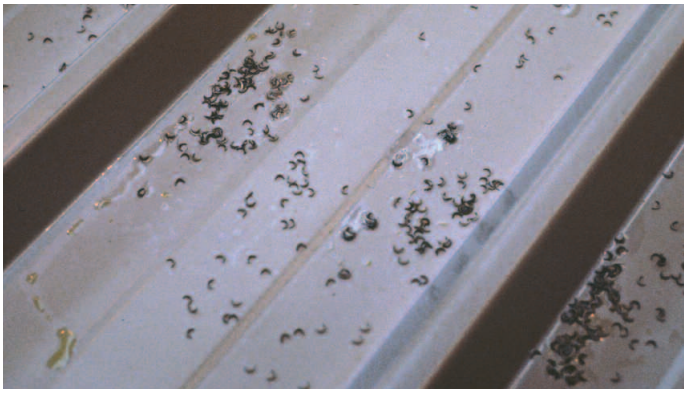
For more information about repainting and over-cladding solutions visit www.colorcoat-online.com/refurbishment_solutions

Construction debris

Metallic debris, such as swarf, rivet stems or other debris that may remain after construction or modification to the building will be vulnerable to corrosion, leading to an unsightly staining of the cladding. Debris of this nature should simply be removed at as early a stage as possible, carefully so as not to damage the underlying coating.

Staining caused by the corrosion of construction debris can be removed using a 5% Hydrochloric acid solution. This should be followed by thorough washing and rinsing as with general dirt and debris. Specialist cleaning products may be required for particularly stubborn marks.

Other debris may include expanded foam, bitumen, tar and mastics, all of which require specialist cleaners. Concrete, cement and plaster may also be present as debris and can be removed with a 5% Phosphoric acid solution. This should be followed by thorough washing and rinsing as with general dirt and debris.



Swarf left on a roof.

Strippable film

If strippable film is left in place for too long then the adhesive sets and the tack increases to the point where the removal of the film becomes difficult and sometimes impossible. This can also apply to UV-opaque black films if left for long enough. The removal of bonded film or residual adhesive can typically be carried out using WD40 or white spirit, followed by thorough washing and rinsing as with regular dirt and debris. It is important that the manufacturers specific advice on film removal is always followed.

Faulty fasteners

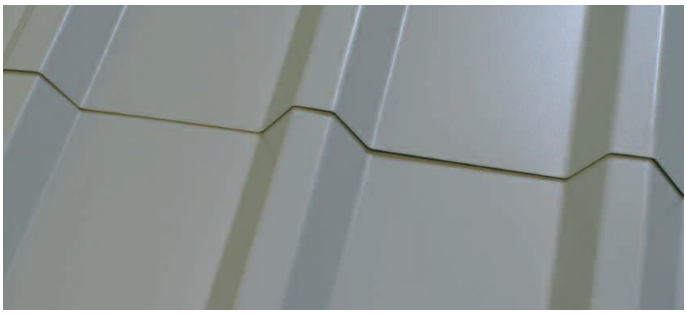
Fasteners which are faulty through damage or corrosion should be removed and replaced. Corrosion can lead to unsightly staining and potential corrosion of the cladding. Caps, if used, should be placed over uncovered fasteners, or replaced if damaged. Inappropriate fasteners of incorrect material or design should also be replaced as again they could lead to corrosion of the panels.

Damaged fastener on roof cladding.

Site cut edges

A cut edge is an area of exposed substrate where a pre-finished steel cladding sheet has been cut. All exposed, site cut edges must be produced to an optimum standard. Where it is not possible to protect the site cut edge from weathering by a cover flashing, they should be treated with a suitable edge protection paint or lacquer. The requirement for this sort of protection is particularly important in:

- Highly aggressive environments such as marine and industrial.
- Low and very low-pitched roofs.



Cut edge on roof cladding.

Burrs at cut edges should be minimised by effective shearing practice. Where possible the down burr edges should be on the down slope edge of the roof pitch.

On damaged edges, remedial treatment is achieved by abrading back the effects of corrosion and then applying a suitable primer and topcoat to match the colour of the existing cladding.

Penetrations

Check around existing penetrations, such as pipe-work and rooflights where the panels have been breached. Clearly, these penetrations have a significant site cut edge and so should be treated as for site cut edges, or sealed using recommended solutions. These areas will be vulnerable to corrosion and ponding, which should be avoided by using the appropriate weather protection.

A penetration in roof cladding.

Inspection and maintenance checklist

Check for	Action
Build up of dirt and debris	Remove debris and wash these areas.
Build up of fungal growth	Remove growth and wash these areas.
Physical damage and natural coating breakdown	Assess the extent of the damage or breakdown and either repair it with touch-up paint, replace the panel or repaint using a specialist contractor.
Construction debris	Immediately remove all debris.
Strippable film	Remove the film and wash these areas with an appropriate solution.
Faulty fasteners	Replace the fasteners and any missing caps.
Site cut edges	Use approved maintenance products.
Penetrations	Use specialist contractors and approved maintenance products.
Photovoltaic installation	See specific requirements of the Confidex® Guarantee PV addendum for Colorcoat HPS200 Ultra® and Colorcoat Prisma®.

Roof and wall maintenance survey

Maintenance survey completed by	
Date of maintenance survey	
Date of next scheduled maintenance survey	

Locations	Maintenance issues	Remedial action required	Completed?
Roof cladding sheets	❑ Build up of dirt/debris		
	❑ Damage to coating		
	❑ Exposed cut edges		
	❑ Penetrations		
	❑ Temporary coatings or adhesive labels		
Roof cladding fixings	❑ Inappropriate, incorrectly fitted and/or corroding		
	❑ Broken or missing washers or covers		
Gutters, hoppers, gullies and down pipes	❑ Build up of dirt/debris		
	❑ Build up of fungal growth		
	❑ Damage to coating		
	❑ Exposed cut edges		
Flashings including ridge cappings	❑ Build up of dirt/debris		
	❑ Build up of fungal growth		
	❑ Damage to coating		
	❑ Exposed cut edges		
Eaves and verges	❑ Build up of dirt/debris		
	❑ Build up of fungal growth		
	❑ Damage to coating		

Roof and wall maintenance survey continued

Locations	Maintenance issues	Remedial action required	Completed?
Penetrative features	❑ Build up of dirt/debris		
	❑ Exposed cut edges		
Access hatches	❑ Build up of dirt/debris		
	❑ Build up of fungal growth		
	❑ Build up of mould		
Upstands and parapet sheets	❑ Build up of dirt/debris		
	❑ Build up of fungal growth		
	❑ Damage to coating		
	❑ Exposed cut edges		
	❑ Penetrations		
	❑ Temporary protective films or adhesive labels		
Wall cladding sheets	❑ Build up of dirt/debris		
	❑ Build up of fungal growth		
	❑ Damage to coating		
	❑ Exposed cut edges		
	❑ Penetrations		
Wall cladding fixings	❑ Broken or missing washers or covers		
	❑ Inappropriate and/or corroding		
Sealant, filler blocks and isolation tape	❑ Inappropriate and/or corroding		
	❑ Perished, mouldy or missing		

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