CI/SfB | | (4-) | Nh2 | (A3j)
February 2013

TATA STEEL

TATA

Colorcoat® Technical Paper

Ensuring consistent appearance of pre-finished steel wall cladding

CLADDING INSTALLATION

Tata Steel has been developing and manufacturing the Colorcoat® range of pre-finished steel for metal building envelope systems, for nearly five decades. It is important to be aware of the factors that can affect the overall appearance of a building façade, and the simple guidelines and procedures that can be followed to maximise both the visual, and functional performance of pre-finished steel wall cladding systems.

Working together to provide guidance

For nearly 50 years, Tata Steel have developed close strategic relationships with some of the leading roof and wall cladding system manufacturers. In developing the guidance in this Colorcoat® technical paper Tata Steel worked together with CA group, Eurobond and Euroclad.

Both Tata Steel and these market leading system manufacturers have worked with the SCI and had input into their guidance documents on steelwork tolerances and how these affect the building appearance and performance. This close involvement between Tata Steel, our supply chain partners and the SCI ensures that the guidance given here represents the industry best practice.

Contents

Overview

Tata Steel has been developing and manufacturing the Colorcoat® range of market leading products for nearly 50 years. As a result, Colorcoat® is internationally recognised as the mark of quality and metal envelope expertise, and covers a wide range of pre-finished steel products specifically developed for the building envelope.
The pre-finished steel plays a major role in the aesthetics and durability of the building envelope and as such needs careful consideration to ensure the right product is chosen. Colorcoat® products are very versatile and can be used in a variety of projects such as contemporary buildings for housing, schools, hospitals, stadiums, and offices, as well as the more traditional industrial and commercial buildings.

The decision to use Colorcoat® pre-finished steel products in such projects extends beyond the functional performance of the steel and the chosen wall cladding system, to the visual appearance of the building.

This technical paper aims to give cladding contractors and other construction professionals helpful guidelines to follow for the installation of Colorcoat® pre-finished steel wall cladding systems. These guidelines have been developed by Tata Steel in conjunction with their supply chain partners and installation contractors. Following the recommendations in this paper will help to ensure a consistent appearance and minimise any distortion of colour or reflectivity effects that may occur during the installation of the pre-finished steel wall cladding that affect the visual appearance of the building.

Steelwork alignment and tolerances

It is essential that the primary and secondary steelwork is installed and checked for alignment prior to the installation of the cladding and any issues corrected. Otherwise, misalignment of the sheeting rails will be transmitted to the external façade.

The effect of misalignment may manifest itself in a number of ways, dependant upon the cladding system used.

1. Façade panels

Façade panels are generally very rigid and are supported at the panel edges. This can lead to a faceted, non-planar appearance, with slight angular inconsistencies between adjacent panels.

2. Built-up cladding systems

Built-up cladding systems are very tolerant of steelwork misalignment and are able to follow the underlying steelwork. This feature is very desirable from an air-tightness and weather-tightness stance, however the deviations in alignment of the steelwork will be directly transmitted to the external façade and will generally be seen as a slight wave along/across the cladding.

3. Factory insulated foam filled and mineral wool composite panels

Factory insulated composite panels are very rigid and will try to resist being distorted to accommodate the misalignment of the supporting steelwork. In practice, the panels will distort slightly and so will the secondary steelwork. The relative effects will depend upon the stiffness of the panel and the stiffness and support of the cladding rails. This can prevent the panel edge joints from sealing correctly and would generally be seen as a slight wave along the panel length and/or an angular misalignment across adjacent panels.

Best practice and guidance for setting out and installation can be found in the SCI P346 publication 'Best practice for the specification and installation of metal cladding and secondary steelwork'[1].

Poorly installed secondary steelwork.

Misaligned cladding panels resulting from poorly installed secondary steelwork.

Cladding orientation

Cladding with the profile running horizontally is far more susceptible to apparent changes in colour, gloss and reflectivity. This effect is even greater on long buildings and is particularly noticeable at eye level.

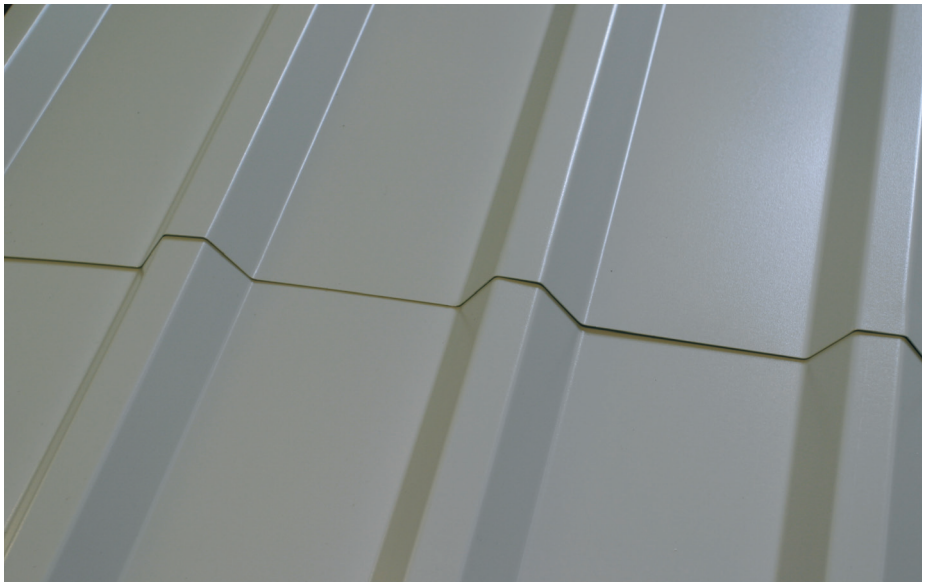
When installing long lengths of cladding with a horizontal profile it is wise to incorporate regular vertical features into the façade to break up the continuous profile into shorter sections.

Vertical breaks incorporated into horizontal cladding.

Profile shape and uniformity

Profile shape and uniformity have an important role in ensuring consistent colour across the sheet. Profiles, which have wide troughs or crowns, can distort slightly and may become slightly bowed across the trough/crown, which will result in variations in the reflected light angle.

Inclusion of stiffening ribs or a micro-rib profile will tend to reduce this effect. Particular attention needs to be paid to end and side lap joints, where there is a double thickness of material, to ensure minimum distortion of the profile, which could create undesirable visual effects.



Tight overlap joint in accurately profiled sheets.

Material gauge

Lighter gauge material is more prone to distortion and subsequent visual effects. As a general recommendation, material used for wall cladding with a vertical profile should not be less than 0.5 mm gauge. Where a built-up cladding system with the profile laid horizontally is specified, use of 0.7 mm gauge material is recommended.

It is important to ensure, when specifying the material gauge, that the minimum and maximum actual gauge is within the tolerance as defined in EN 10143:2006[2]. For example a 1250 mm wide 0.7 mm coil must be supplied within the gauge range 0.64 mm to 0.76 mm. To ensure the structural integrity and visual appearance of the cladding system it is important that the material gauge and tolerance used is the same as that which is specified.

Fasteners and local compression

The installer must ensure that the correct type of fastener for the application is used and that screw fasteners are tightened to the correct torque setting.

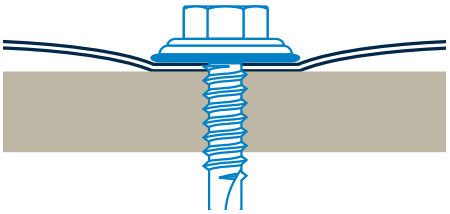
Over-tightening of fasteners can cause local distortion of the sheeting around the fastener head, which will show up as a slight variation in colour or gloss. Over-tightening will also lead to failure of the EPDM sealing washer.

Under-tightening of fasteners can lead to further loosening of the fastener in the future, allowing the cladding to distort.

Under-tightened stitcher screws will prevent proper compression of sealant tapes and will allow the joints to open slightly and affect the aesthetic appearance, as well as the weather-tightness of the construction.

Fasteners should be installed in every end lap trough and alternate troughs at intermediate locations. Side lap stitcher screws should be installed at the cladding manufacturers recommended frequency.

Correctly tightened colour-matched fastening.



Local distortion due to over-tight fasteners.

Thermal effects

Façades with a southerly aspect will be subject to high solar gains, which will cause the cladding to expand or contract. For pre-finished steel cladding systems, this effect is minimal and is accommodated within the movements of the structural framework.

Factory insulated foam filled composite panels can show significant temperature differences between the internal and external surfaces, which can lead to slight bowing of the panels. This effect is more pronounced with longer panels. Pre-finished steel with lighter colours or lower solar absorption will be less prone to this effect.

Colour and paint type

High gloss and metallic paint finishes are most susceptible to apparent changes in colour and appearance. When specifying these products, extra care must be taken to minimise any contributing factors.

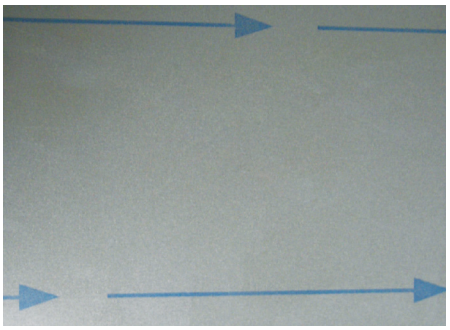
Metallic finishes often display a directional characteristic. For this reason, the pre-finished steel must be supplied to the profiler in a consistent orientation and must then be profiled and installed to maintain this. The use of strippable film with direction indicators is recommended.

All Colorcoat® pre-finished steel products are manufactured and inspected to, colour, gloss, texture and emboss release standards. In general the material used for a building should all be sourced from the same manufacturing batch. Metallic finishes should ideally be sourced from the same coil but must be sourced from the same manufacturing batch.

This eliminates the risk of any difference in appearance between panels, which are within tolerance but at each end of the specification.

When extending or repairing an existing building, it should be noted that the existing pre-finished steel cladding system will have weathered and there will be a difference in actual appearance with the new material.

Initial specification of pre-finished steel, such as Colorcoat HPS200 Ultra® or Colorcoat Prisma®, which have enhanced colour and gloss retention, will minimise this effect. The Repertoire® colour-matching service is available with these Colorcoat® products should a colour- match be required to an existing building.



Metallic paint finish with strippable film showing direction of application.

Conclusion

This Colorcoat® technical paper highlights the main factors which need to be considered to ensure the actual building appearance is consistent with the design. In addition it is advisable that the specifier should also ensure that installation is undertaken by an approved cladding contractor in accordance with the system manufacturers recommendations.

References

1. The SCI P346 publication 'Best practice for the specification and installation of metal cladding and secondary steelwork'. The Steel Construction Institute (2006 edition).
2. EN 10143:2006 Continuously hot-dip coated steel sheet and strip. Tolerances on dimensions and shape.

www.colorcoat-online.com

Printed with biodegradable vegetable inks on material sourced from responsible managed forests, certified in accordance with the FSC. Contains 10% recovered fibre, diverting waste from landfill.

Tata Steel
Colors
Shotton Works
Deeside
Flintshire
CH5 2NH
T: +44 (0) 1244 812345
F: +44 (0) 1244 892345
www.colorcoat-online.com

Colorcoat Connection® helpline
T: +44 (0)1244 892434
F: +44 (0)1244 892321
e-mail: colorcoat.connection@tatasteel.com

Language English UK 0213