TATA STEEL

TATA

Colorcoat Prisma® technical details

The ultimate combination of durability and aesthetic appeal

INTRODUCTION

The choice of pre-finished steel product is fundamental to the visual appearance and both the functional and environmental performance of the building envelope. Colorcoat Prisma® is a technically and aesthetically superior pre-finished steel that represents the ultimate combination of durability and aesthetic appeal. As such, it provides the designer with the freedom to create architecturally striking buildings with exceptional performance, that meet the desired functionality of the building.

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COLORCOAT® PRE-FINISHED STEEL

Expertise

Tata Steel has been developing and manufacturing the Colorcoat® range of pre-finished steel for nearly five decades. Over the years, our developments have been at the forefront of new advances in pre-finished steel resulting in longer lasting products and unprecedented colour ranges.

We continue to apply our knowledge and understanding to ensure that Colorcoat® remains a market-leading brand. We actively engage with architects and other specialists to build on our experience and detailed knowledge of the construction market and to lead the way in developing new products. Sustainability is a key driver for the Construction industry with an increasing demand to build with this in mind. Tata Steel have an in depth knowledge of the environmental impacts of not only Colorcoat® products but also the various roof and cladding systems that they are part of. This understanding means that we are able to support you in designing sustainable building envelope solutions.

At Tata Steel we are committed to making products that meet the needs of the market and to making them in the most responsible way. Our commitment to sustainability also means we actively manage our impacts and contribution throughout the full life of our products - with our suppliers, within our own operations, through the supply chains we serve and by taking responsibility for recycling steel. Colorcoat Prisma® has achieved BES 6001 responsible sourcing certificate which reinforces our commitment to sustainability.

Quality

With a world-class reputation in steel, Tata Steel products and services are widely used in the construction market. Utilising steel produced by Tata Steel in the UK, Colorcoat Prisma® is manufactured to exacting standards at Shotton in North Wales.

Our products are subject to carefully monitored processes and comprehensive, independent testing to ensure compliance with the highest and most demanding European standards. The superior and proven long-term performance of our pre-finished steel products means we are able to guarantee Colorcoat Prisma® for up to 30 years for industrial and commercial buildings. Colorcoat Prisma® is also supported by a comprehensive range of services, technical advice and guidance.

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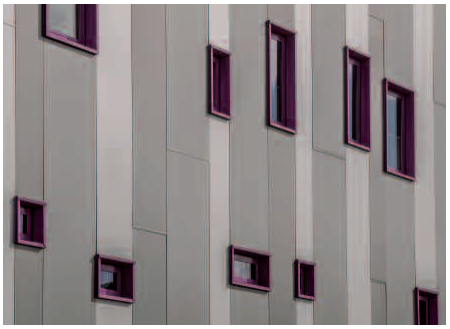
DEVELOPMENT OF COLORCOAT PRISMA®



Colorcoat Prisma® is the result of over 10 years of development and testing, and almost 50 years experience in developing and manufacturing the Colorcoat® range of pre-finished steel.

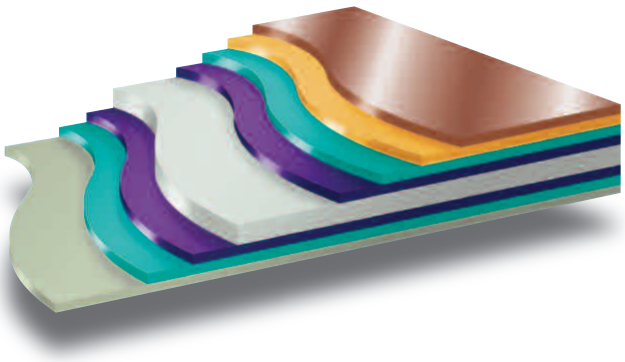
Colorcoat Prisma® attributes and benefits:

- Contemporary colours including solids, metallics and matt shades providing an optically smooth finish for modern designs.
- All colours surpass requirements of RUV4 and RC5 certification as per EN 10169:2010 proving outstanding colour retention and corrosion resistance.
- Optimised Galvalloy® metallic coating for ultimate corrosion resistance and cut edge protection.
- Confidex® Guarantee for up to 30 years with no maintenance or inspections required to maintain its validity in Zone 1 and Zone 2 areas.
- BBA Certification in excess of 40 years for all colours, providing independent verification.
- Available with Confidex Sustain® in the UK and Ireland to offer the world's first CarbonNeutral® building envelope.
- Ideal when used in integrated renewable energy generation systems. Colorcoat Prisma® is proven to provide superior solar-thermal absorption capability and excellent durability when used as a collector for active solar air heating solutions such as Colorcoat Renew SC® by Tata Steel.
- Double sided capability for buildings with demanding internal environments, rainscreens and rainwater goods where double sided protection is required.
- Comes with reverse side branding making traceability easy, so you can rest assured that your building is protected with the highest quality from Tata Steel.
- Common sizes are available on short production lead times for Europe.
- Approved by the Water Regulatory Advisory Scheme (WRAS) for cold water use and as such can be used as part of a rainwater collection system with no detriment to the water quality.
- Excellent fire performance properties, and is suitable for internal linings and external surfaces of wall and roof coverings.

AESTHETICS THAT LAST

Colorcoat Prisma® combines a versatile palette of contemporary and traditional colours with durability and inherent flexibility. This results in modern and durable roofs and walls with a finish that will look as good as the day it was installed for years to come.

Figure 1. Colorcoat Prisma® layers illustration



Key

- Top coat with polyamide beads
- Corrosion resistant primer
- Pre-treatment
- Galvalloy®
- Base substrate
- Galvalloy®
- Pre-treatment
- High performance backing coat

Robust paint technology

Colorcoat Prisma® comes in a range of solid, metallic and natural matt shades that are designed to withstand the rigors of the external environment.

Colorcoat Prisma® is a 50 micron high build robust paint system which incorporates polyamide beads, and provides a greater level of durability when compared with typical PVDF and polyester paint systems.

By incorporating the latest polymer technology, Colorcoat Prisma® is able to achieve the optimum combination of physical properties and weathering resistance.

Colorcoat Prisma® is made up of a number of layers which perform different functions. The Galvalloy® metallic coating and high build primer provide the corrosion resistance, and the topcoat utilises the latest polymer technology to provide abrasion and UV resistance.

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DEVELOPMENT OF THE COLOUR RANGE

Following consultation with architects and colour specialists, the standard Colorcoat Prisma® range includes 12 solid colours, 12 metallic colours and 3 matt colours. The range offers an excellent choice of colour to ensure the demands of contemporary and architecturally challenging projects can be met whether it be a bold statement or a subtle design.

Metallics

The majority of metallic flakes used within the paint formulation are made from Aluminium and are specially coated to ensure maximum acid resistance, enabling the metallic effect to last longer.

When incorporated into Colorcoat Prisma® these flakes provide a silver effect and a degree of sparkle or, in combination with conventional colouring pigments, can provide a coloured metallic effect. The extent to which the pigments reflect light is dependent on the pigment type, size, content and orientation.

Two common pigment types are manufactured and utilised in Colorcoat Prisma®: 'Cornflake' – flat flakes with irregular shapes and 'Silver Dollar' – flat discs with uniform shape and size that enables a brighter metallic effect to be achieved.

In order to create the special metallic colours, Colorcoat Prisma® incorporates a greater ratio of 'Silver Dollar' pigments, providing a greater degree of 'sparkle' than the conventional solid metallic colours.

Figure 2. 'Cornflake' flakes with irregular shapes

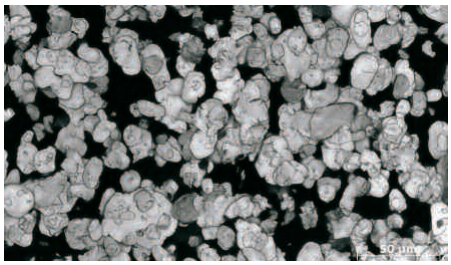
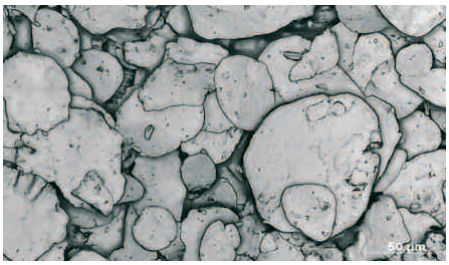


Figure 3. 'Silver Dollar' flat discs with uniform shape and size



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Solid colours

The solid colour range includes 12 colours to reflect the increasing use of Colorcoat Prisma® as a product for roof cladding, particularly for individual residential dwellings popular in Eastern Europe. These are also ideal for industrial and commercial roofs and walls requiring superior aesthetics.

Matt colours

The range also includes three matt colours. These colours are available with typical gloss levels of 5%. The matt colours have been chosen to replicate more traditional building materials such as terracotta, slate tiles and weathered copper. This makes them ideal for a variety of applications from church roofs to contemporary rainscreens.

To view the full standard colour range or to order samples visit www.colorcoat-online.com/samples or call the Colorcoat Connection® helpline on +44 (0)1244 892434 to order a colour card.

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COLOUR REASSURANCE

When sourcing material for your building envelope, consideration should be given to colour availability, consistency and matching components.

Colour availability

A range of the most popular colours are available on short production lead times, and all colours are available from our Colorcoat® Accredited Distributors in standard sizes.

To check the quickest colour availability for your project contact us on the Colorcoat Connection® helpline on +44 (0) 1244 892434.

Repertoire®

As an additional service, whether you want your building to stand out, or blend with the surroundings, we can create a unique identity for your building.

Through our Repertoire® Colour Consultancy service, available in Zone 1 and Zone 2 areas in Europe, we can match almost any solid colour for roof or wall cladding. We require a minimum order quantity of 2500 m^2, and can work from either physical swatches or reference standards.

Metal hand samples

Metal hand samples are available for all colours. For a true representation of colour and effect, please obtain metal hand samples from the Colorcoat Connection® helpline or online at www.colorcoat-online.com/samples

Colour consistency

If tonal consistency is critical, all cladding for a single elevation should come from the same production batch. All metallic shades exhibit a degree of directionality.

Matching components

If accessories made from other materials are to be colour-matched to the roof or wall cladding, the best reference is the actual profiles or panels delivered to site, or material from the same batch.

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DOUBLE SIDED

Colorcoat Prisma® is available double sided, meaning the same Colorcoat Prisma® topcoat and corrosion resistant primer are applied to the reverse side of the product. This new option provides the ideal solution for demanding applications where an increased level of protection is required on both sides of the steel substrate.

Any colour from the standard colour card can be specified as the topcoat colour, with RAL 9010 White or RAL 9002 Hamlet available as the standard colour for the reverse coat. Both the topcoat and the reverse coat are a nominal total thickness of 50 microns.

Other standard solid colours, RAL 9006 Silver Metallic or RAL 9007 Grey Aluminium may be available for the reverse coat colour.

Please contact the Colorcoat Connection® helpline for details on minimum order quantities and for further information.

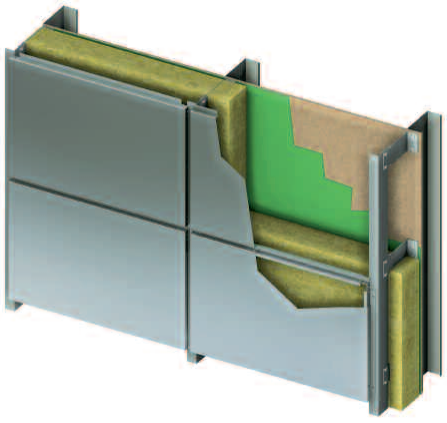
Rainwater goods

Double sided pre-finished steel is used extensively in Europe for rainwater goods such as gutters, down pipes and associated accessories. The availability of double sided Colorcoat Prisma® now allows these rainwater goods to be manufactured from the same product as your building envelope so allowing colour matching to your roof and/or wall cladding. Available with a 15 year anti-perforation warranty dependant upon exact project requirements.

Rainscreen applications

Double sided Colorcoat Prisma® is ideally suited for rainscreen applications where in addition to the external face and cut edges, increased protection is provided at the reverse side to deal with the micro climate between the rainscreen and the building wall. The reverse colour for this specific application is RAL 9002 Hamlet at a nominal thickness of 35 microns.

Available with a bespoke guarantee providing cover for up to 25 years.



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UNRIVALLED GALVALLOY® CORROSION PROTECTION

Colorcoat Prisma® uses our unique Galvalloy® metallic coating, a special mix of Zinc and Aluminium that provides unrivalled corrosion protection, even at cut edges.

How does Galvalloy® work?

The metallic coating is essential to the performance of the pre-finished steel. Traditionally, pre-finished steel products have used a Zinc metallic coating which is often referred to as Hot-Dipped Galvanised Steel (HDG). This HDG coating does provide improved corrosion protection, in comparison with uncoated steel, but often leaves cut edges vulnerable to increased rates of corrosion and will ultimately lead to peeling and/or premature paint delamination.

To address this problem, Colorcoat Prisma® uses the unique and proven Galvalloy® metallic coating. Galvalloy® is made with a special mix of 95% Zinc (Zn) and 5% Aluminium (Al) that conforms to EN 10346:2009.

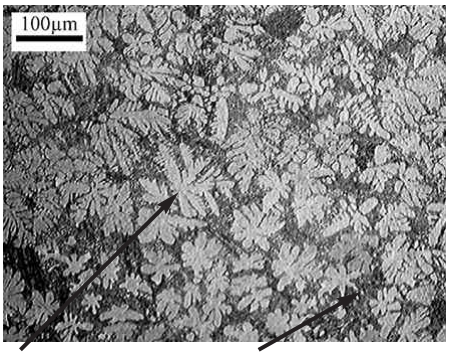
The carefully developed proportions of Zinc and Aluminium (Zn-Al) in Galvalloy® offer a combination of increased barrier and sacrificial protection when compared with conventional HDG coatings.

The sacrificial protection results from preferential corrosion of the Zinc over the steel, and the barrier protection results from the presence of a stable Aluminium oxide layer on the surface of the Galvalloy® coating, both of which inhibit and slow the rate of anodic undercutting compared to conventional HDG metallic coatings.

The Aluminium in the metallic coating of Galvalloy® and the manufacturing parameters are optimised to give a very fine two-phase microstructure compared with the uniform microstructure of HDG.

A typical microstructure of Galvalloy® is shown in figure 4 where the primary Zinc dendrites make up approximately 20% of the bulk microstructure and the Zinc/Aluminium eutectic the remaining 80%.

Figure 4.
Typical Galvalloy® microstructure



For a product using conventional HDG, the corrosive attack will dissolve all of the metallic coating at the same rate – leading to obvious peeling of the paint system as the paint has nothing to adhere to.

For the same time period, the optimised Galvalloy® microstructure has a major advantage in that the corrosion will occur in two stages.

Initially, the Zinc phase will be corroded preferentially to the Zinc/Aluminium eutectic. As the paint adheres to the eutectic structure, no edge peel is observed.

Over time, the eutectic structure will corrode – but at a greatly reduced rate when compared with HDG coatings and thus results in longer durability.

In addition to exhaustive artificial testing, Galvalloy® has been subjected to prolonged and independent natural weather testing since its introduction in 1998. Its proven, superior performance means that Galvalloy® lasts for a longer time period than HDG and remains the preferred metallic coating for Colorcoat Prisma®.

The micro cross-section of Galvalloy® illustrates the before, figure 5, and after, figure 6, corrosion process. It clearly shows the Zinc dendrites corroding at a faster rate than the Zinc and Aluminium eutectic composition. The protective Zinc and Aluminium phase is left behind and remains adhered to the organic coating providing improved corrosion protection.

Figure 5.
Galvalloy® microstructure before corrosion

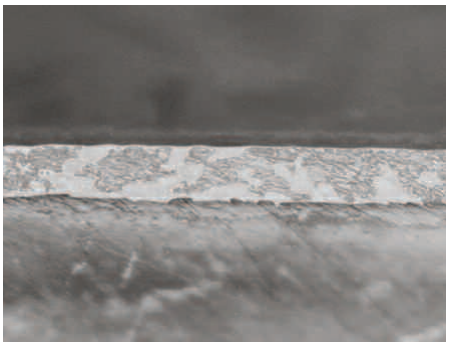
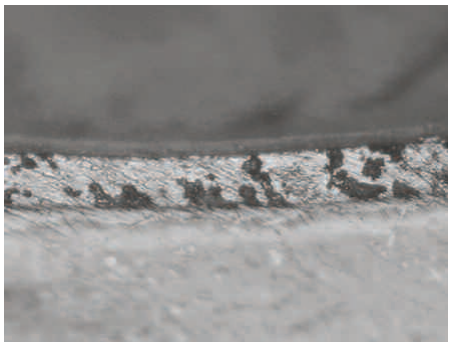


Figure 6.
Galvalloy® microstructure after corrosion



Figures 5 and 6 illustrate how, as the lighter coloured Zinc dendrites ultimately corrode, the unique microstructure of the Galvalloy® layer ensures that the surface coating remains adhered to the eutectic surface.

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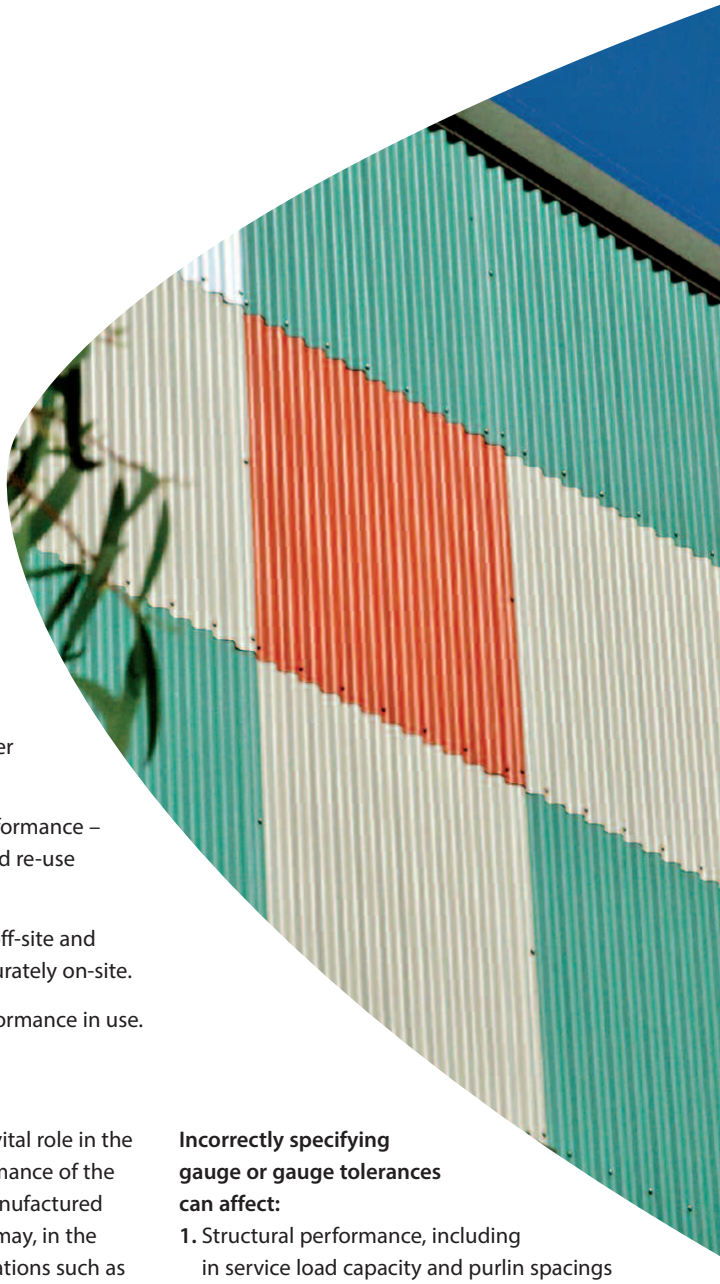
STEEL SUBSTRATE



With a world class reputation in steel, Tata Steel products and services are widely used in the construction market. The steel substrate for Colorcoat Prisma® is manufactured by Tata Steel.

Strong, versatile and truly recyclable, steel is a compelling choice for the building envelope.

Steel has one of the highest strength-to-weight ratios of any building material – producing strong, lightweight structures enabling fast build programs that are cost effective without any compromise on quality.

Steel provides:

- Functionality, versatility, strength and flexibility.
- Ability to work well with other materials.
- Excellent environmental performance – offering high recyclability and re-use potential.
- Ability to be pre-fabricated off-site and constructed quickly and accurately on-site.
- Excellent durability and performance in use.

Images courtesy of Metall Profil

Designing with steel

The gauge of the steel plays a vital role in the physical properties and performance of the roof or wall cladding that is manufactured from it. Incorrect specification may, in the worst cases, have safety implications such as roof fragility.

The European standard EN 10143:2006 defines the tolerances for different grade, width and gauge material for normal and special tolerance categories. In the case of Colorcoat Prisma®, the gauge is measured as the steel substrate plus the Galvalloy® metallic coating.

Tata Steel supplies pre-finished steel to normal and special tolerances according to EN 10143:2006 to ensure that the cladding performs as designed.

Incorrectly specifying gauge or gauge tolerances can affect:

1. Structural performance, including in service load capacity and purlin spacings as well as safety implications during construction and maintenance.
2. Building visual appearance, lighter gauge material is more prone to damage during installation, and distortion of the profile around fasteners due to slight misalignment of the primary/secondary structure.

EasyProfile substrate

Some architectural profiles are difficult to form from standard structural steel grades produced according to EN 10346:2009. To help with this Colorcoat Prisma® is also available with EasyProfile substrate. This is a softer and more malleable substrate with controlled mechanical properties that allows the client to produce more demanding building envelope profiles without the risk of profiling defects such as springback.

When metallic substrates are painted and cured at peak metal temperatures (PMT) of between 216°C to 250°C, bake hardening occurs which results in the yield strength of the painted material being > 60 N/mm^2 above the yield strength of the unpainted material.

The microstructure of steel has a significant effect on the strength and performance of the steel. It is controlled in two ways: chemical composition and the processing route which includes the size, shape and distribution of the grains.

The EasyProfile substrate allows more consistent mechanical properties than the standard substrate and utilises a cleaner steel chemistry together with modified heat treatment cycles through the galvanising line. This enables difficult profiles to be produced, from Colorcoat Prisma®, without springback.

Reverse side branding

Colorcoat Prisma® is produced with a Tata Steel identity on the reverse side, printed every metre, that includes the Colorcoat® product name, date and time of manufacture.

This provides reassurance to the client that the product specified is an authentic Tata Steel product, and can also be used to ensure you are using material from the same batch where tonal consistency is critical. It can also be used to confirm the directionality when using metallic colours.

Figure 7. Standard substrate showing 'springback'

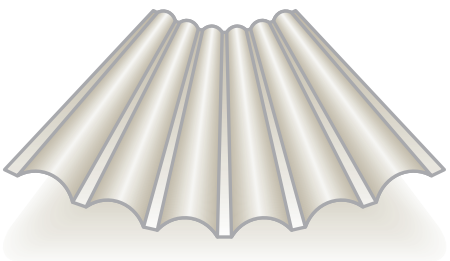


Figure 8. EasyProfile substrate with no 'springback'

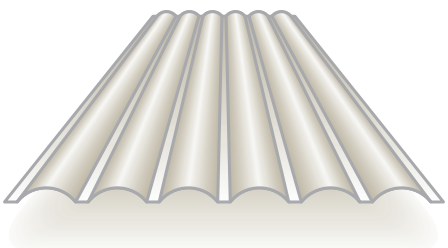


Figure 9. Reverse side branding

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PRODUCT PERFORMANCE

The combination of its unique Galvalloy® metallic coating and high-build paint system provides Colorcoat Prisma® with the ultimate combination of corrosion resistance and aesthetic appeal. It has been independently assessed and exposed to an extensive testing regime to assess its performance.

Table 1. Typical properties

Colorcoat Prisma®			Test standard
Nominal organic coating thickness	(µm)*	50	EN 13523-1
Specular gloss (60°):			
Non-matt colours	(%)	30-40	EN 13523-2
Matt colours	(%)	<5	EN 13523-2
Scratch resistance:			
Non-matt colours	(g)	>3500	EN 13523-12
Matt colours	(g)	>3000	EN 13523-12
Abrasion resistance (Taber, 250 rev, 1 kg):			
Non-matt colours	(mg)	<20	EN 13523-16
Matt colours	(mg)	<25	EN 13523-16
Flexibility:			
Minimum bend radius	(T)	0.5T@16°C	EN 13523-7
Reverse impact	(J)	≥18	EN 13523-5
Adhesion (cross hatch)	(%)	100	EN 13523-6
Pencil hardness		H	EN 13523-4
Maximum cont. operating temp.	(°C)	90	
Corrosion resistance:			
Salt spray	(h)	1000	EN 13523-8
Humidity	(h)	1000	EN 13523-26
Corrosion resistance category		RC5	EN 10169:2010
UV resistance category		Ruv4	EN 10169:2010

*µm = micron

Notes

1. The figures contained in this table are typical properties and do not constitute a specification. Tested in accordance with EN 13523. For details on test methods visit **www.colorcoat-online.com**
2. For health and safety datasheets contact the Colorcoat Connection® helpline on +44 (0) 1244 892434.

The durability of a paint system is important as it shows its ability to withstand attack from different sources such as sunlight, water, oxygen and salts. As such buildings in coastal locations are subject to more demanding conditions than urban or rural sites as they are exposed to all these elements as well as abrasives such as wind-blown sand.

Sunlight is the most destructive of these elements and will eventually lead to a loss of gloss, fading, chalking, brittleness and eventually loss of coating adhesion. The length of time this takes depends on the paint system.

The atmosphere around a building also contains chemicals and pollutants that should be taken into account, the amount of which varies with location.

These chemicals and pollutants accelerate corrosion by attacking the chemical bonds and the metallic pigments that make up the paint polymers. Colorcoat Prisma® has been rigorously tested against all these elements and the results are shown on the following pages.

ABRASION RESISTANCE

To ensure the integrity of Colorcoat Prisma®, we use independent laboratory testing to measure its performance against corrosion, effect of sunlight, chemical attack and abrasion. All testing of products is carried out in UKAS accredited laboratories to International Standards.

The durability of Colorcoat Prisma® is derived from its Galvalloy® metallic coating, its high performance primer and its topcoat which contains polyamide beads.

These layers also provide excellent scratch and abrasion resistance for easier handling and processing.

Scratch tests

The scratch test method is a technique that applies critical loads to a sample to test at what point failure appears, testing the cohesive and/or adhesive properties of pre-finished steel. During the test, samples of Colorcoat Prisma® were scratched with a needle which was drawn at a constant speed under a progressive load.

The test was concluded when sufficient weight was added to cut through the Colorcoat Prisma® sample revealing its metallic coating. The more weight recorded, the greater the resistance of the topcoat. Colorcoat Prisma® was tested alongside a typical PVDF, and an alternative equivalent product.

The results shown in figure 10 illustrate that considerably less weight was required to expose the metallic coating underneath both the alternative equivalent and the PVDF coating. As a result of the polyamide beads in the topcoat, Colorcoat Prisma® performed extremely well during the test demonstrating its excellent scratch and abrasion resistance.

Falling sand test

Abrasion resistance is commonly tested by the 'falling sand' test to ASTM D968:2001. This test measures the stream of falling sand required to wear through an organic coating system in order to determine its resistance. The test is concluded once the metallic coating is exposed and the quantity of sand is recorded in litres.

Colorcoat Prisma® was tested against a typical PVDF coating. The results of the test are shown in figure 11 below.

As shown, considerably more sand was required to expose the substrate on the Colorcoat Prisma® sample – demonstrating its excellent abrasion resistant properties.

Figure 10.
Scratch resistance of pre-finished steels (EN 13523-12)

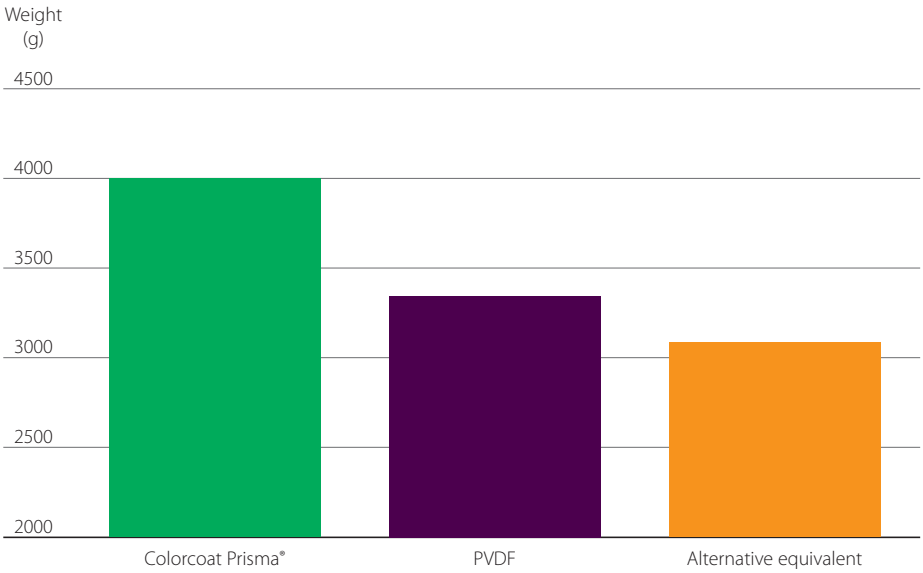
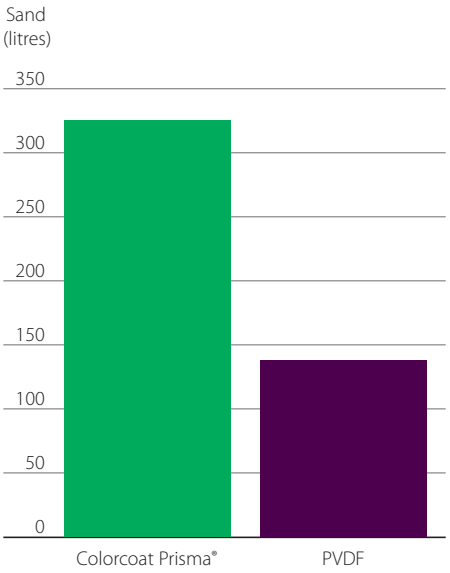


Figure 11.
Abrasion resistance comparison (ASTM D968:2001)



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CORROSION RESISTANCE

Natural weathering

Natural weathering testing is an essential part of testing the corrosion resistance of a pre-finished steel product. Colorcoat Prisma® has undergone a comprehensive programme of testing in key weathering climates around the world. Exposure sites were chosen in order to provide the full spectrum of weathering zones from equatorial and tropical climates to urban, rural, industrial and coastal locations.

Colorcoat Prisma® was tested at; Florida, Arizona, Australia, Singapore, Bohus Malmon, Brest and at sites in the UK to assess corrosion resistance. This has enabled us to build up a comprehensive assessment of the performance of Colorcoat Prisma® in a wide range of extreme climates.

Colorcoat Prisma® has undergone extensive corrosion testing in accordance with the European Standard EN 10169:2010; *'Continuously organic coated (coil coated) steel flat products'.*

Samples of Colorcoat Prisma® were exposed to the extreme coastal environment at Brest on the West Coast of France in order to assess corrosion resistance.

The European Standard requires the samples to have more than 2 years exposure at the site during which time they must be able to resist blistering, coating damage and exhibit an edge peel <2 mm in order to achieve RC5 corrosion rating, the highest corrosion resistance classification.

After independent assessment, The French Corrosion Institute concluded that all colours in the Colorcoat Prisma® range achieve RC5 corrosion rating in accordance with EN 10169:2010. An example of one of the Colorcoat Prisma® test panels is shown in figure 12. This shows virtually no edge peel, and no surface damage or blisters after 2 years exposure.

Figure 13.
RC5 Certificate for Colorcoat Prisma®

Institut de la Corrosion
French Corrosion Institute

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TATA Steel UK Research, Development & Technology
Swinden Technology Centre
Moorgate, Rotherham S60 3AR UK

Classification of Natural Weathering [Type of Panels 2 and 3 – EN 13523-19]

Panel Identification No & Description	Start of Exposure	Date of Inspection	Accumulative Time of Exposure (months)	Exposure Site & Corrosivity Category (EN ISO 12944-2)	Orientation of Exposed Panel
7KK17 – Colorcoat Prisma	25/2/2008	10/03/2010	24 months	Sainte Anne BREST (France) Carbon Steel – C5 (Very High) Zinc – C3 (medium)	90°North and 5°South

Average Edge Delamination (mm)	Damage on Bend	Blistering
Conforms to RC5 requirements	Conforms to RC5 requirements	Conforms to RC5 requirements

Corrosion Resistance Category (as defined by EN 10169-2)

The coil coated material ref **7KK17 (Colorcoat Prisma)** may be classified RC5 according to standard EN10169-2

Brest, April 1st, 2010

Written by Jean-Michel Hamoignon

Approved by Nathalie Le Bozec

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SIRET : 441 396 595 00023 - APE 742C

Accelerated corrosion tests

Samples of a representative selection of the colour range were put through a series of rigorous tests designed to predict the corrosion resistance of Colorcoat Prisma® in different environments - coastal (salt spray), humidity, prohesion (cyclic wet and dry), and Kesternich (acid rain). The tests are symbolic and are far more aggressive than would be seen in real world situations.

Figure 12. A Colorcoat Prisma® test panel after more than 2 years exposure

Figure 14. Tata Steel weathering site, Bohus Malmon (coastal)

Institut de la Corrosion
French Corrosion Institute

LONG-TERM WEATHERING

Samples of Colorcoat Prisma® with one edge exposed, and a cross scribed into the coating to simulate site damage were placed in UKAS accredited test chambers for the required test duration. The results of these accelerated corrosion tests are given in table 2, where the typical extent of any delamination from both the cut edge and scribe, together with the extent of any blistering or paint surface degradation is recorded.

Representative photographs of Colorcoat Prisma® in matt Terracotta after 1000 hours testing in this suite of accelerated tests are shown in figures 15 to 18.

Both saltspray (continuous fog of sodium chloride) and prohesion (cyclic phases of sodium and ammonium chloride fog followed by a drying cycle) are extremely aggressive accelerated corrosion tests yet the extent of paint delamination at both the cut edge and scribe is minimal.

Following 1000 hours, in the humidity and water soak tests, no blistering or significant paint delamination is observed indicating excellent paint adhesion between the Galvalloy® metallic coating and organic layers of Colorcoat Prisma®.

As can be seen from the typical results and in figures 15 to 18, the performance of Colorcoat Prisma® in the suite of accelerated corrosion tests is excellent and demonstrates how well the Galvalloy® metallic coating in combination with the Colorcoat Prisma® paint system protects the steel.

Table 2. Accelerated corrosion tests

Corrosion test	Test duration	Test standard	Maximum average edge delamination (mm)	Maximum average scribe delamination (mm)	Test panel surface
Saltspray	1000 hours	EN 13523-8	< 4 mm	< 4 mm	No other panel degradation
Prohesion	1000 hours	ASTM G85-02	< 4 mm	< 4 mm	No other panel degradation
Water soak	1000 hours	EN 13523-9	0 mm	0 mm	No other panel degradation
Humidity	1000 hours	EN 13523-25	0 mm	0 mm	No other panel degradation
Kesternich	20 cycles	ISO 3231-98	< 3 mm	< 3 mm	No other panel degradation

Note: The figures in this table are typical properties and do not constitute a specification.

Figure 15. Test panel after saltspray 1000 hrs

Figure 16. Test panel after prohesion 1000 hrs

Figure 17. Test panel after humidity 1000 hrs

Figure 18. Test panel after water soak 1000 hrs

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UV RESISTANCE

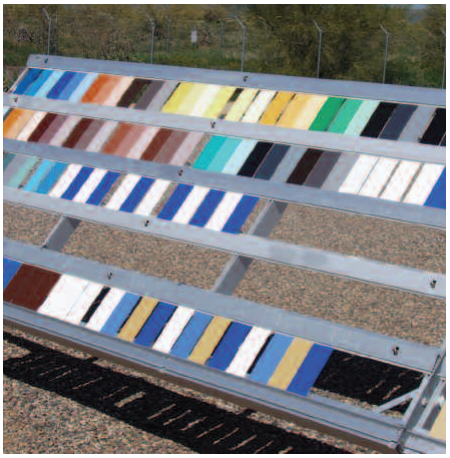
A pre-finished steel must resist the damaging affects of Ultra-Violet (UV) degradation where a deterioration in both the colour and gloss retention are precursors of paint degradation. Consequently the ability of a paint to maintain both colour and gloss are seen as indicators of the longevity of a paint system.

UV resistance testing

To meet the requirements of RUV4 samples are exposed to artificial QUVA radiation for 2000 total hours, or exposure for 2 years at an accredited weathering site with a cumulative UV radiation in excess of 4500 MJ/m² per year.

EN 10169:2010 stipulates for RUV4 the percentage gloss retention (GR) must be greater than 80% after each test, and the extent of colour change must be < 2 ΔE for artificial UV testing and < 3 ΔE following natural weathering exposure. In both tests, Colorcoat Prisma® easily meets these requirements in terms of the stipulated colour and gloss retention.

Figure 19. Tata Steel weathering site, Arizona (desert)



The superior UV resistance of Colorcoat Prisma® has been independently verified by ATLAS following exposure at their Florida weathering facilities.

Samples of Colorcoat Prisma® have completed over 6000 total hours in the QUVA test and both gloss retention and colour change assessed. Even after this extended testing period, Colorcoat Prisma® solid, metallic and matt samples have a colour change of less than 1 ΔE as can be seen in figures 20 and 21.

Following the tests, the complete colour range of Colorcoat Prisma® has been classed as RUV4, providing reassurance to the client that its specification will result in a building retaining its true colour for longer.

Figure 20. % Gloss Retention for Colorcoat Prisma® in QUVA

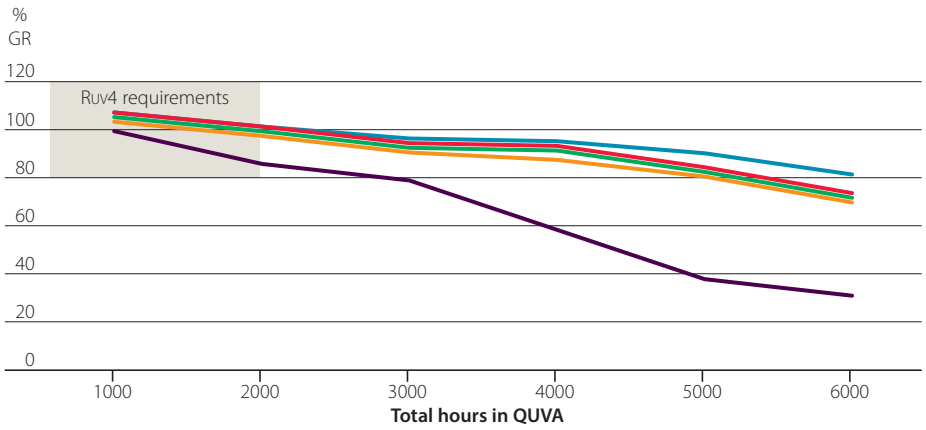
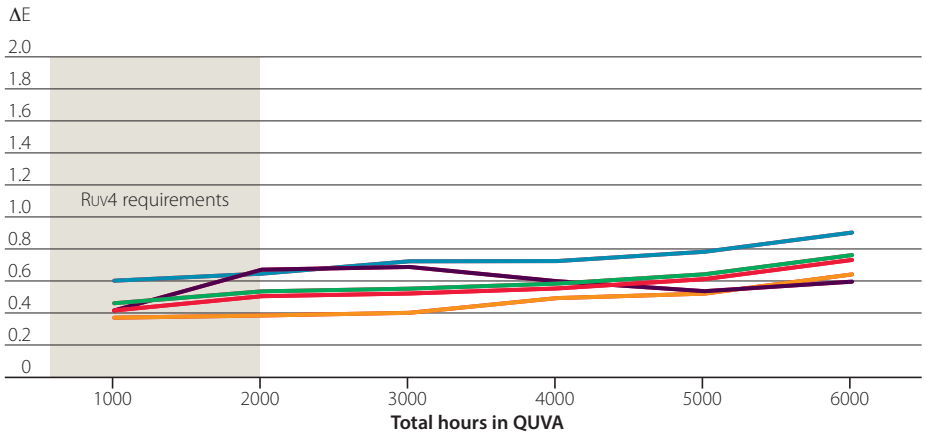


Figure 21. ΔE for Colorcoat Prisma® in QUVA



Key

All colours | Standard colours | Solid colours | Metallic colours | Matt colours

EN 10169:2010 defines the test methodology and classification for UV resistance, products can be classified from Ruv1 to Ruv4 – Ruv4 being the most extreme.

Samples of Colorcoat Prisma® Silver Metallic (RAL 9006) and Orion have been exposed at the Atlas weathering site in Florida for 5 years. As can be seen from Figures 23 and 24, after this 5 years exposure the ΔE is less than 1, which is typically not noticeable with the human eye, and the % gloss retention is approximately 80. These exposures demonstrate the excellent colour stability of Colorcoat Prisma® in long term demanding UV environments.

The photographs in Figures 25 and 26 show the actual samples after the 5 years exposure against the unexposed Colorcoat Prisma® again indicating the excellent colour stability.

Figure 22. Ruv4 Certificate

ATLAS MATERIAL TESTING SOLUTIONS

AMETEK MEASUREMENT & CALIBRATION TECHNOLOGIES

SOUTH FLORIDA TEST SERVICE
A Division of Atlas Material Testing Technology LLC
10100 Southwest 216th Street
Miami, Florida 33170 U.S.A.
Phone: +1 305-245-3659
Fax: +1 305-245-9122
www.atlas-mts.com

NATURAL WEATHERING TEST CERTIFICATE

TEST NUMBER:	FS38205
COMPANY:	Tata Steel UK Ltd. Swinden Technology Center Moorgate Rotherham S60 3AR United Kingdom
CLIENT:	Mr. Martin Cosgrove
TEST METHOD: **EXPOSURE TYPE:**	ASTM G7 Direct Weathering – Florida 45° South with Open Backing
EXPOSURE DATE: **COMPLETION DATE:** **EXPOSURE DURATION:**	December 22, 2010 December 22, 2012 24 Months
RADIANT EXPOSURE:	Total: 12,741 MJ/m² TUVR: 547 MJ/m²
SPECIMEN QUANTITY:	9
SPECIMEN CODES:	1 – Hamlet – Colorcoat Prisma - 10KR023 2 – Oxide Red – Colorcoat Prisma – 10KR022 3 – Clover – Colorcoat Prisma – 10KR024 4 – Metallic Silver RAL 9006 – Colorcoat Prisma – 10KR029 5 – Anthracite – Colorcoat Prisma – 10KR049 6 – Ephyra – Colorcoat Prisma – 10KR048 7 – White – Colorcoat Prisma – 10KR043 8 – Kronos – Colorcoat Prisma – 10KR045 9 – Aquarius – Colorcoat Prisma – 10KR057
EVALUATIONS:	Instrumental Color (CIE LAB Color Scale) Specular Gloss (60°)
ADDITIONAL INFORMATION:	Based on the requirements of EN10169:2010 Classification: Ruv4

ACCREDITED TESTING

Figure 23. Colorcoat Prisma® 5 years exposure in Florida

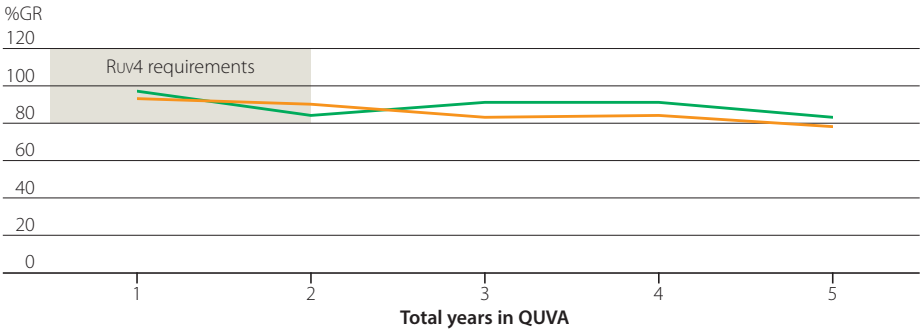
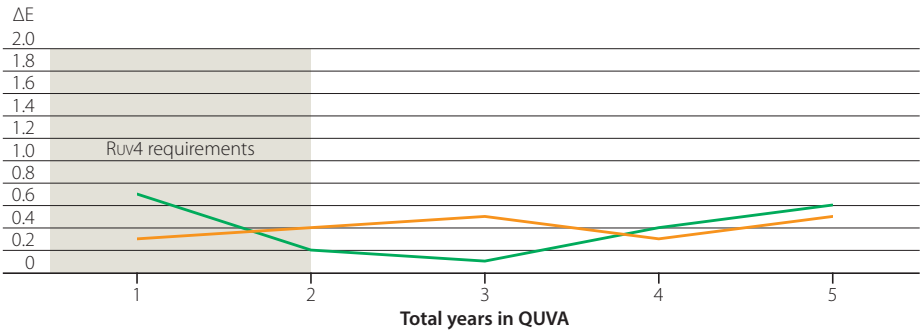


Figure 24. Colorcoat Prisma® 5 years exposure in Florida



Key

Colorcoat Prisma® RAL 9006 — Colorcoat Prisma® Orion

Figure 25. Colorcoat Prisma® Silver Metallic (RAL 9006) after 5 years exposure.

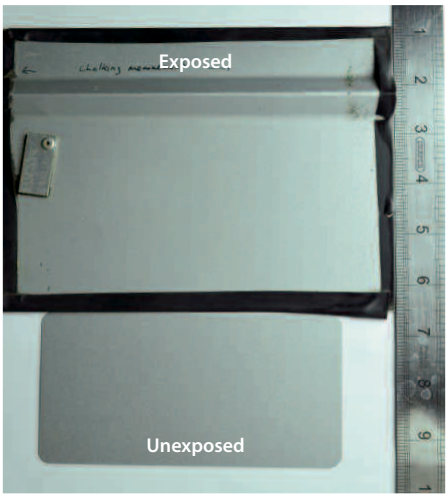
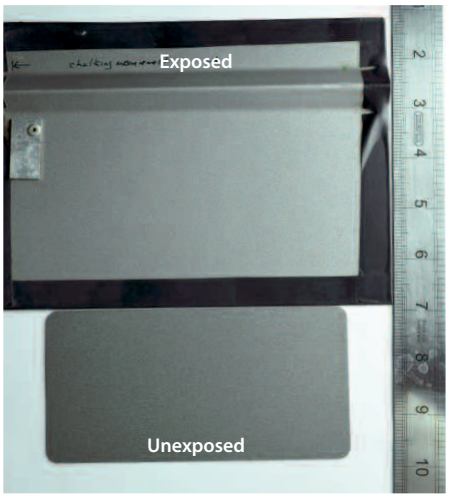


Figure 26. Colorcoat Prisma® Orion after 5 years exposure.



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CONFIDEX® GUARANTEE

Peace of mind

Any building project is a complex job with many different components, materials and contractors involved to make it all happen. And once the build has finished you need peace of mind that if anything does go wrong with your pre-finished steel you can get things fixed. This is why we have developed our Confidex® Guarantee for Colorcoat Prisma®.

Confidex® is the product performance guarantee for the weatherside of Colorcoat Prisma®, when used in an external conventional building envelope application namely roof and wall cladding using single skin, built-up or composite panel construction in industrial and commercial buildings.

Confidex® offers the longest and most comprehensive guarantee for pre-finished steel available in Europe. Extended and comprehensive testing involving both natural and artificial exposure has given us the ability to guarantee Colorcoat Prisma® for up to 30 years.

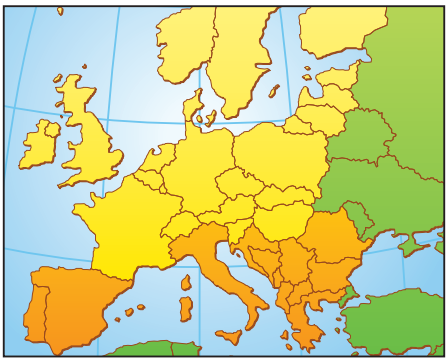
The Confidex® Guarantee is project specific and upon registration online - provides a contractual relationship between Tata Steel and the building owner meaning that in the case of a claim the contact with Tata Steel is direct rather than having to go through the supply chain, saving time and money.

With no mandatory inspections or maintenance, we remove the need to go on to the roof to maintain the validity of the guarantee – Confidex® is the only pre-finished steel guarantee on the market that offers this.

What's more, the Confidex® Guarantee is transferable, so should the building owner change it is simply a case of filling in the form on the back of the guarantee certificate and posting back to Tata Steel.

Who registers?
Usually the building owner, cladding contractor or the cladding system manufacturer, but anyone in the supply chain can apply online at:
www.colorcoat-online.com/registration

If you want to check your building has been registered, contact the Colorcoat Connection® helpline on +44 (0) 1244 892434.

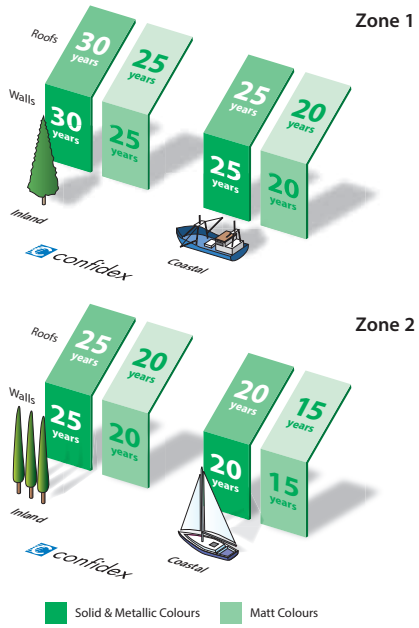


Northern Europe – Zone 1 Southern Europe – Zone 2

For areas outside of Confidex® zones please contact Tata Steel for more information.

Application specific warranties are also available for non-standard cladding applications; i.e. individual residential roofs, rainscreens, rainwater goods and when used with PV modules. Please contact the Colorcoat Connection® helpline for guarantees associated with such applications.

Figure 27. Diagram of Confidex® Guarantee periods for Zone 1 and 2.



Notes

1. Figures under the Coastal heading are for buildings within 1 km of any coast.
2. Full terms and conditions of the Confidex® Guarantee are on the online application form, available at **www.colorcoat-online.com/registration**
3. Confidex® must be registered within 3 months of the building completion date for the guarantee to be valid.
4. The Confidex® Guarantee periods on the diagram above are applicable to Zone 1 and Zone 2. For more information visit **www.colorcoat online.com/confidexmap**

confidex

Table 3. Comparison of guarantees

Area	Confidex® Guarantee	Other guarantees
Headline guarantee and cut edges	Headline guarantee statement of up to 30 years including cut edges.	Cut edges may only be covered for 10 years.
Rectification costs	Full remedial action so all rectification costs covered.	Some limit the claim to the invoice value of the Steel, which may offer the full value at the beginning but can reduce over the duration of the guarantee.
Inspection and maintenance free	No annual inspections or maintenance are required for the duration of the guarantee to maintain its validity.	Some claim to be maintenance free but require regular inspection logs to be kept.
Non standard colours	Solid colours specified through Repertoire® are covered by the Confidex® Guarantee.	Do not generally provide any guarantee for non standard colours.
Guarantee transfer	Can easily be transferred should building ownership change.	Some suggest transferring ownership is possible but at the discretion of the supplier i.e. the transfer is not assured.
In the event of a coating failure	Building owner contacts Tata Steel directly to address claim.	Some require the building owner to contact the supply chain with the cladding manufacturer ultimately making contact with the steel supplier to pursue claim.
Roof pitches	Covers roof pitches down to 1°.	Higher roof pitches drain more easily so not all guarantees cover pitches below 6°.
Processing of pre-finished steel	Tata Steel requires the product to have been used within 18 months of manufacture, and the Confidex® Guarantee registered within 3 months of building completion.	Some guarantees require the product to have been used within 4 weeks of manufacture.
Application process	Simple, short online form.	Lengthy paper based questionnaire to complete.
Coastal environments	0-1km.	0-3km.

The British Board of Agrément Certificate

Don't just take our word for it, Colorcoat Prisma® has been assessed by the British Board of Agrément (BBA) which is the UK's major authority offering approval of construction products, systems and installers.

The BBA awards Agrément Certificates to a product only after it has successfully passed a comprehensive assessment involving laboratory testing, on-site evaluations and inspections of production.

Colorcoat Prisma® has been awarded Agrément Certificate 91/2717 by the BBA for industrial, commercial, retail and leisure use and for residential and non-residential dwellings.

The BBA states: *"Colorcoat Prisma® coating and metal treatment will protect the steel substrate against corrosion for a period in excess of 30 years in normal industrial, urban, suburban and rural environments."*

BBA BRITISH BOARD OF AGRÉMENT CERTIFICATE No 91/2717

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FIRE PERFORMANCE

Fire performance is a fundamental requirement when considering the performance of a building in a potential fire situation for Building Regulations and insurance requirements.

UK Building Regulations

Following a decision to harmonise standards in the construction sector across Europe, new European standards have been introduced into the regulations. At present in the UK, there is a period of co-existence of standards and either EN Standards or BS 476 can be used to demonstrate compliance.

Wall applications

British Standard tests

1. Surface spread of flame products
BS 476 Part 7 'Method for classification of surface spread of flame of products', specifies a test method for measuring the lateral spread of flame along the surface of the sample. The classification system is based on the rate and extent of the spread of flames (results are classified from 1 the best, to 4 the worst).

When tested, Colorcoat Prisma® has a Class 1 surface spread of flame.

2. Fire propagation
BS 476 Part 6. 'Method of test for fire propagation of products' - The test specifies the procedure for measuring the fire propagation indices of the product.

When tested, Colorcoat Prisma® has a fire propagation index I = 3.2 and a sub index $i_1 = 2.0$.

3. Class 0 Surface
A Class 0 or "low risk" surface is defined in the Building Regulations as having a Class 1 surface spread of flame and fire propagation indices $I \leq 12$ and $i_1 \leq 6$ or is composed throughout of materials of limited combustibility.

Colorcoat Prisma® meets the requirements for a Class 0 surface.

4. Fire resistance of external walls and internal compartmentation
BS 476 Part 22 'Fire resistance of non-load bearing elements' test measures the performance of a wall when exposed to heat on one face from a furnace with a defined temperature characteristic.

Colorcoat Prisma® can be used in wall cladding systems which are assessed according to BS 476 Part 22.

European Standard tests

Euroclassification - Reaction to fire
Reaction to fire classification is carried out in accordance with EN 13501. Colorcoat Prisma® has been tested to the following European test standards.

EN 13823, often referred to as the single burning item test.
EN 11925, a small flame igniteability test.
EN 1716, measurement of calorific value.

When tested in a configuration as defined in EN 14782, Colorcoat Prisma® can be classified as A1.

Roof applications

British Standard tests

External fire exposure roof test
The performance of roof systems to resist fire spreading to the roof of a building, from a fire outside the building itself, is assessed by testing samples of the roof in accordance with BS 476 Part 3.

The test rates the resistance of the roof structure to fire penetration with results rated from A (best) to D (worst), and the spread of flame across the roof again with results rated from A (best) to D (worst).

When tested as an external roofing cladding system, Colorcoat Prisma® achieves Class AA which is the highest rating.

European Standard tests

Euroclassification - External fire performance for roofs/roof coverings
EN 1187 defines a number of different test methods for assessing the performance of roofs/roof coverings. Performance is rated from B ROOF (best) to F ROOF (worst). EN 1187 test method 4 is based on BS 476 part 3 and is the only method accepted in the UK.

When specified as an external roofing cladding system, Colorcoat Prisma® achieves a Class B ROOF.

EN 1187 test methods 1, 2 and 3 are usually specified in Europe, dependant upon the location.

EN 1187 test method 1	German test
EN 1187 test method 2	Nordic test
EN 1187 test method 3	French test

Colorcoat Prisma® when used in configurations covered by EN 14782 is deemed to satisfy without the need for testing, the requirements for external fire performance in accordance with Commission Decision 2000/553/EC.

Insurance requirements

Insurance companies often specify additional fire performance criteria and/or tests which building components must meet. Cladding systems that meet the requirements of these tests are seen as presenting a lower level of fire risk.

The Association of British Insurers (ABI) which uses the Loss Prevention Certification Board (LPCB) assessment, and FM Global who have their own FM Approvals, are the two main bodies that undertake testing.

ABI and Loss Prevention Certificate Board (LPCB)
The LPCB specifies two separate standards:

- LPS 1181 Fire growth tests
- LPS 1208 Fire resistance

FM Global and FM Approvals

FM Approvals is the testing and certification body for FM Global.

It applies to two separate standards for assessment of wall systems and panel roofs:

- 4881 Approved Standard for Class 1 Exterior Wall Systems
- 4471 Approved Standard for Class 1 Panel Roofs

The standards cover a number of key performance criteria including fire, wind, traffic, hail and water-tightness.

Colorcoat Prisma® can be used in roof and wall cladding systems which can meet the requirements of the LPCB and FM approvals assessments.

Figure 28.
Example of material during an LPS 1181 test

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WATER HARVESTING

Colorcoat Prisma® is the first pre-finished steel manufactured in the UK to be registered with the Water Regulations Advisory Scheme (WRAS) for cold water use.

WRAS Approval

Colorcoat Prisma® having passed the tests undertaken by the Water Quality Centre, of effect on water quality, is suitable for use in contact with potable (drinking) water.

This approval enables all colours of the standard colour range of Colorcoat Prisma® to be used as part of a rainwater collection system without any detrimental effect to the water quality. It also means that it is suitable for use in drinking water storage tanks.

Any product or fitting in contact with wholesome water in the UK, must comply with The Water Supply Regulations 1999. As an Act of Parliament this is a substantial document but in summary the product or fitting should not 'waste, misuse, cause undue consumption or contaminate water supplied by an undertaker'. The Water Act 2003 defines wholesome water as water used for drinking, cooking, washing or sanitary purposes. A WRAS Material Approval demonstrates that a specific material or component does not contaminate the wholesome water and therefore satisfies that particular requirement of The Regulations.

The test methods and criteria used by WRAS to assess non-metallic materials are described in BS 6920:2000 *'Suitability of non-metallic products for use in contact with water intended for human consumption with regard to their effect on the quality of the water'.*

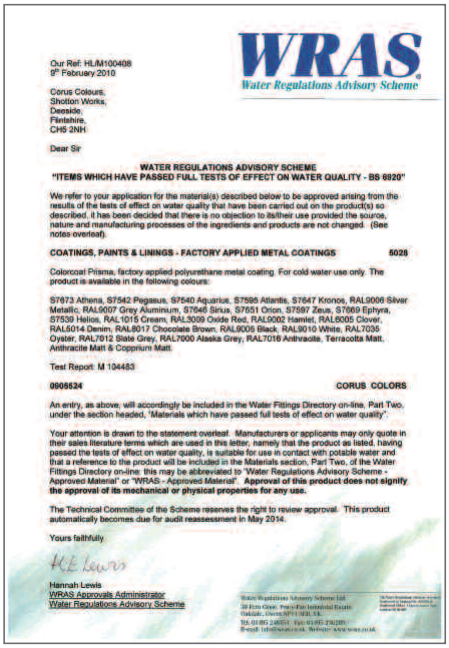
The BS 6920:2000 Standard tests for:

- Impact odour/flavour on the water.
- Cause change in the appearance of the water (colour, turbidity).
- Growth of micro-organisms.
- Extraction of substances which may be harmful to human health.
- Extraction of metals.

WRAS approval does not strictly apply to use of rainwater harvesting, but it offers any prospective clients peace of mind with the knowledge that Colorcoat Prisma® does not contaminate wholesome water so it will not contaminate the harvested water.

Colorcoat Prisma® is included in the WRAS online directory **www.wras.co.uk**

Figure 29. WRAS Certificate (WRAS approval number for Colorcoat Prisma® is 0905524.)



WRAS
Water Regulations Advisory Scheme

Our Ref: HL/M100408
9th February 2010

Corus Colours,
Shotton Works,
Deeside,
Flintshire,
CH5 2NH

Dear Sir

WATER REGULATIONS ADVISORY SCHEME
"ITEMS WHICH HAVE PASSED FULL TESTS OF EFFECT ON WATER QUALITY - BS 6920"

We refer to your application for the material(s) described below to be approved arising from the results of the tests of effect on water quality that have been carried out on the product(s) so described, it has been decided that there is no objection to its/their use provided the source, nature and manufacturing processes of the ingredients and products are not changed. (See notes overleaf).

COATINGS, PAINTS & LININGS - FACTORY APPLIED METAL COATINGS **5028**

Colorcoat Prisma, factory applied polyurethane metal coating. For cold water use only. The product is available in the following colours:

S7673 Athena, S7542 Pegasus, S7540 Aquarius, S7595 Atlantis, S7647 Kronos, RAL9006 Silver Metallic, RAL9007 Grey Aluminium, S7646 Sirius, S7651 Orion, S7597 Zeus, S7669 Eghyra, S7539 Helios, RAL1015 Cream, RAL3009 Oxide Red, RAL9002 Hamlet, RAL8005 Clover, RAL6014 Denim, RAL8017 Chocolate Brown, RAL9005 Black, RAL9010 White, RAL7035 Oyster, RAL7012 Slate Grey, RAL7000 Alaska Grey, RAL7016 Anthracite, Terracotta Matt, Anthracite Matt & Coppirum Matt.

Test Report: M 104483

0905524 **CORUS COLORS**

An entry, as above, will accordingly be included in the Water Fittings Directory on-line, Part Two, under the section headed, 'Materials which have passed full tests of effect on water quality'.

Your attention is drawn to the statement overleaf. Manufacturers or applicants may only quote in their sales literature terms which are used in this letter, namely that the product as listed, having passed the tests of effect on water quality, is suitable for use in contact with potable water and that a reference to the product will be included in the Materials section, Part Two, of the Water Fittings Directory on-line: this may be abbreviated to 'Water Regulations Advisory Scheme - Approved Material' or "WRAS - Approved Material". **Approval of this product does not signify the approval of its mechanical or physical properties for any use.**

The Technical Committee of the Scheme reserves the right to review approval. This product automatically becomes due for audit reassessment in May 2014.

Yours faithfully,

HL Lewis

Hannah Lewis
WRAS Approvals Administrator
Water Regulations Advisory Scheme

COMPLIANCE WITH REACH

Tata Steel has long been at the forefront of responsible sourcing. Colorcoat Prisma® is fully compliant with REACH regulations regarding the use of chemical substances including pigments.

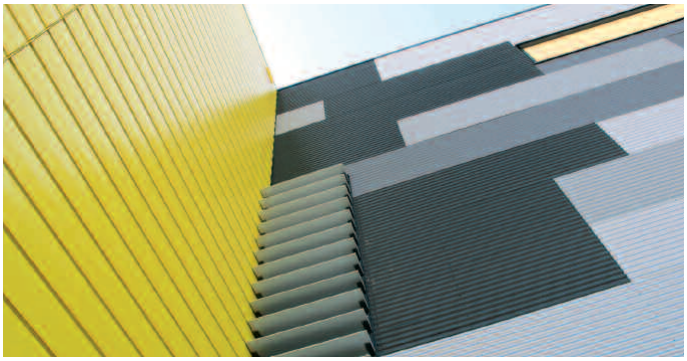
REACH (Registration, Evaluation and Authorisation of Chemicals) is a European Regulation. It addresses the production and use of chemical substances and their potential impacts on both human health and the environment. It requires manufacturers and importers to gather information on the properties of their chemical substances and to register the information in a central database run by the European Chemicals Agency (ECHA) in Helsinki.

At Tata Steel we do not utilise lead chromate based pigments in the Colorcoat Prisma® colour range.

Tata Steel is the first pre-finished steel producer to achieve BES 6001 (very good rating) in recognition of responsible sourcing.

With almost every business in Europe having a responsibility under REACH legislation, specifying Colorcoat Prisma® provides clients with the confidence that they are meeting their corporate social responsibility (CSR) obligations and using a product that is fully compliant.

Colorcoat Prisma® is fully compliant with all current REACH legislation. To assist customers, updates on REACH obligations, together with product health and safety data sheets, are available.



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RENEWABLE ENERGY APPLICATIONS

Colorcoat Prisma® is ideal when used in integrated renewable energy systems. It has been proven to provide superior solar-thermal absorption capability and excellent durability when used as a collector for active solar air heating solutions such as Colorcoat Renew SC® by Tata Steel and is also the only approved pre-finished steel for use with SOLON SOLbond Integra, a highly efficient, lightweight and frameless PV solution.

Colorcoat Renew SC®

Colorcoat Renew SC® is a highly efficient solar air heating system from Tata Steel, that encompasses system design, renewable energy generation and control to provide space heating and ventilation air for suitable building types whether it's new build or retrofit.

How it works

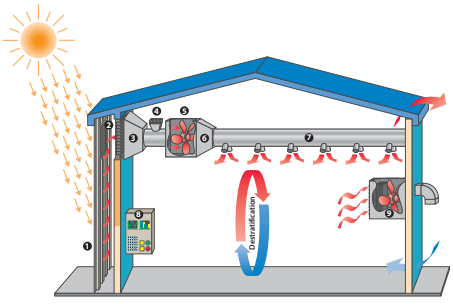
This renewable energy system captures heat from the sun and draws it into the building through a micro perforated Colorcoat Prisma® collector installed as an additional skin onto a southerly facing wall.

The pre-heated fresh air can then be distributed directly into the building as ventilation air or ducted to the main heating system to reduce energy load.

Benefits

- The superior solar absorption rates and proven durability of Colorcoat Prisma® maximise the efficiency and longevity of the solar collector.
- Colorcoat Renew SC® can provide up to 50% of a building's daytime space heating requirements.
- Typically up to 75% efficient in converting solar energy into usable heat.
- Typically provides an average carbon payback of just four months.
- As part of the system, Tata Steel have developed a user friendly software model that enables us to determine the optimum system design for your needs and provide accurate predictions of renewable energy delivery, CO_2 savings and payback periods.
- Colorcoat Renew SC® also includes a pre-engineered control system to maximise the delivery of renewable heat and enable data monitoring and metering for future system optimisation.

Figure 30. Diagram of airflow through the Colorcoat Renew SC® system



Key

1 Colorcoat Prisma® microperforated solar collector
2 Summer by-pass damper
3 Inlet damper
4 Recirculation damper
5 Fan/air-handling unit
6 Transition duct
7 Distribution duct
8 Colorcoat Renew SC® control system
9 Supplementary heating system

Solar thermal performance

The collector colour and the material used is critical for determining the thermal absorptivity rates and collector efficiency. Our technical knowledge and expertise has resulted in the development of a range of colours that deliver good efficiencies.

Table 1. Solarthermal performance by colour

Colorcoat Prisma®	Solarthermal Performance
Black	Very High
Kronos	
Anthracite	High
Anthracite Matt	
Chocolate Brown	
Clover	
Atlantis	
Slate Grey	
Helios	Good
Oxide Red	
Alaska Grey	
Zeus	
Grey Aluminium	
Pegasus	
Denim	
Terracotta Matt	
Orion	Moderate
Copprium Matt	
Ephyra	
Aquarius	Low
Silver Metallic	
Athena	
Oyster	
Sirius	
Hamlet	
Cream	
White	

Guaranteed with Colorcoat Prisma®
When part of the Colorcoat Renew SC® system, the corrosion resistance and colour stability of Colorcoat Prisma® is guaranteed for up to 25 years in inland Northern European locations.

Photovoltaics

Colorcoat Prisma® is the only approved pre-finished steel for use with SOLON SOLbond Integra, a unique roof top PV solution that combines the strength and durability of Colorcoat Prisma® with the high power frameless SOLON SOLbond PV modules.

The system consists of high efficiency SOLON SOLbond PV modules weighing less than 10 kg/m^2; a pre-finished steel roof system using Colorcoat Prisma® by Tata Steel, and a specially formulated silicone bonding adhesive enabling the installation of SOLON SOLbond PV modules directly onto the roof surface.

The components are combined to form a lightweight, frameless system, with up to 25 years warranty for maximum investment security.

SOLON SOLbond Advantages:

- High efficiency, high power-density.
- Low system weight – less than 10kg/m^2.
- No roof penetrations.
- No framing substructure required.
- 10-year product guarantee[1)].
- Up to 25 years warranty on adhesive bonding[2)].
- 5-stage performance guarantee over 25 years[1)].
- Includes SOLON photovoltaic insurance[3)].
- Positive sorting of power classes (0 to + 4.99 Wp).

1) According to SOLON Product and Performance Guarantee.
2) According to SOLON SOLbond Integra Terms and Conditions of Warranty and Guarantee. Valid for roofs approved by SOLON.
3) Valid for the countries of the European Union.

Colorcoat Prisma® Advantages:

- Backed by up to 25 years performance guarantee. Compatible with SOLON SOLbond performance guarantees.
- Optimum combination of corrosion resistance, UV resistance and temperature stability.
- The complete standard range of solid colours and specially selected metallic colours of Colorcoat Prisma® by Tata Steel have been approved for use with SOLON SOLbond Integra.
- SOLON SOLbond and Colorcoat Prisma® are perfectly suited to the Sika bonding system for optimum panel bond strength.
- Colorcoat Prisma® colours surpass requirements of RUV4 and RC5 certification as per EN 10169:2010.

Figure 31. SOLON SOLbond Integra with Colorcoat Prisma®

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SUSTAINABILITY

Sustainability in terms of material usage, construction, occupation and end of life has become an important consideration in the design and specification of buildings. Our commitment to sustainable practice is exemplified in the development, manufacture and support of Colorcoat Prisma®.

Increasing focus on sustainability is being driven by factors such as legislation, consumer pressure and a desire to provide a better quality of life for people without compromising the future. We have an ongoing commitment to reduce CO_2 emissions associated with pre-finished steel manufacture and we work with leading experts to ensure that both Colorcoat® products, and the roof and wall cladding systems that they are part of, contribute to sustainable building envelope solutions - now and in the future.

Steel manufacture

Tata Steel is continuing to work hard to substantially reduce the embodied CO_2 in its steel products. We have a climate change strategy with a clear objective to reduce CO_2 emissions from steelmaking by 20% by 2020. This is being delivered through a mix of major and smaller investment projects, good housekeeping and burden optimisation in steelmaking.

We are also working on a long-term 'Ultra Low Carbon Dioxide Steel' project with other European steelmakers to identify a step change reduction in CO_2 emissions in excess of 50%.

The steel used in Colorcoat Prisma® is made by Tata Steel at Port Talbot in South Wales where £60 million has been invested to capture the 'offgas' generated in steelmaking for use as an energy source. As well as significantly reducing electricity and natural gas requirements, the scheme reduces the plant's CO_2 emissions by 3% per year.

Colorcoat Prisma® manufacture

Colorcoat Prisma® is manufactured at the Tata Steel site at Shotton in North Wales. At Shotton our strategies to deliver significant reduction in site CO_2 emissions have included: a move from road to 100% rail for all feedstock coming from Tata Steel in South Wales; a focus on process and operational energy reduction initiatives such as installation of variable speed drives, energy-efficient lighting and participation in an 'energy from waste' scheme.

Colorcoat Prisma® uses steel made by Tata Steel from a combination of recycled steel scrap and molten iron. At Shotton we set targets to ensure the efficient use of materials such as Zinc and paint to minimise waste. More than 95% of our Zinc pot waste is reclaimed and recycled. Solvents used for washdowns are filtered, distilled and returned to us as a 50% recycled blend.

Sustainable design and use

A key part of sustainable design is specifying products that offer long-term performance and minimised emissions during the life time of the building.

We have worked closely with the leading architectural school at Oxford Brookes University to study the operational impacts of a building and identify the contribution that pre-finished steel cladding can make to its efficient running. This work has found that the operational CO_2 of a building can far outweigh the embodied CO_2 associated with the building fabric and construction. On very large buildings it can account for as much as 80% of total CO_2 of the building life cycle.

Optimising the building envelope efficiency through insulation, high air-tightness levels and the minimization of linear thermal bridging can reduce the operational impacts. We have provided best practice advice and guidance on detailing in our Colorcoat® technical papers so that cladding systems manufactured using Colorcoat Prisma® can reduce the associated heat losses from the building envelope.

All Tata Steel supply chain partner roof and wall cladding systems in the UK have details designed and modelled to improve the thermal performance of the building. For more information visit www.colorcoat-online.com/technical

Investing in sustainable building envelopes

Tata Steel, together with the Low Carbon Research Institute and Welsh Assembly Government, has invested £6 million in the creation of a 'Sustainable Building Envelope Centre' at the Tata Steel site in Shotton, North Wales. The aim is to create a construction process which will enable the façade of buildings – both roof and walls – to be transformed from a passive energy conservation role to an active energy generation, storage and management function.

Tata Steel Europe is also the lead industrial partner in an academic and industrial consortium led by Swansea University that is working on a multi-million pound project to develop hi-tech, sustainable, coated products for building envelopes. The project, named SPECIFIC (the Sustainable Product Engineering Centre for Innovative Functional Industrial Coatings) aims to develop a portfolio of products that will turn buildings into power stations to generate over one third of the UK's requirement for renewable energy by 2020.

System environmental assessment

In the UK all roof and wall systems using pre-finished steel achieve a Green Guide A+ rating. Manufacture and processing of Colorcoat Prisma® into building envelope products, through our approved supply chain, can maximise credits assessed through BREEAM.

Colorcoat Prisma® is exclusively from Tata Steel and, as such, is fully traceable. Our manufacturing site has an environmental management system which has been certified to ISO 14001.

End of life

When the building envelope comes to the end of its life, there are options to either extend it's life further or ensure that it is disposed of safely and with minimum impact both economically and environmentally. By using appropriate maintenance and remedial action such as over-painting, Colorcoat Prisma® can last almost indefinitely. If corrective action is not an option there is a well established and very efficient infrastructure which ensures that all steel collected at end of life goes back into steel manufacture. This means that the investment in steel-making is never wasted, making steel the most sustainable construction material.

Colorcoat Prisma® is truly recyclable without any loss of quality, time after time. This makes Colorcoat Prisma® a cradle to cradle product in that, at the end of its life, it can be reused or recycled rather than be disposed of as waste.

Life cycle assessment

We take a holistic approach to understanding and minimising the environmental impacts over the whole life of the building. Therefore we constantly strive to ensure that the manufacturing processes and materials used to manufacture Colorcoat Prisma® are the most sustainable available. Moreover it's enhanced robustness and durability means that it significantly outperforms other pre-finished steel in terms of environmental impacts over the full life cycle.

To demonstrate environmental impacts and to allow you to make detailed comparisons and informed decisions when purchasing construction products, Tata Steel has carried out comprehensive life cycle assessments on a wide range of cladding systems using Colorcoat Prisma®. For further details please visit www.colorcoat-online.com/sustain

Confidex Sustain®

A cradle-to-cradle analysis of the life cycle for Colorcoat® assessed cladding systems means that the products environmental impacts are fully measurable and traceable. You can easily account for carbon emissions during both the construction and use of the product and can be assured that when selecting Colorcoat Prisma®, emissions have been understood and minimised at each stage.

As well as taking every step to reduce emissions from manufacture through to system installation, use and End of life, Tata Steel offer the first CarbonNeutral® building envelope by measuring and offsetting its unavoidable emissions from cradle to cradle. This reduces complexity and helps you to build to carbon zero standards as well as covering the performance of the Colorcoat Prisma® used on the building.

Confidex Sustain® is an enhancement of the Confidex® Guarantee, currently only available for the UK.

For a list of assessed cladding systems, to pre register your projects or for more information on Confidex Sustain®, please call the Colorcoat Connection® helpline on +44 (0) 1244 892434 or visit www.colorcoat-online.com/sustain

BES 6001 Responsible Sourcing standard

Many companies are recognising the need to prove that they are building with sustainability in mind. One way in which manufacturers can help is through responsible sourcing. Responsible sourcing provides an approach to managing a product from the point at which a material is mined or harvested in its raw state through manufacture and processing, use, re-use and recycling.

Through its commitment to sustainability and by managing its environmental impacts Tata Steel are leading the way as the first pre-finished manufacturer to secure BES 6001 certification for its Colorcoat® products Manufactured at Shotton including Colorcoat Prisma®.

Colorcoat® products by Tata Steel have gone beyond compulsory requirements to achieve a 'Very Good' rating, reinforcing the Colorcoat® mark of quality and expertise. The universal rating not only demonstrates Tata Steel's commitment to producing materials in a sustainable way, but also allows you to make informed decisions and meet your own sustainability targets more easily.

Specifying Colorcoat Prisma® will provide the ultimate reassurance that your pre-finished steel is sourced responsibly and sustainably, recognised by the BREEAM family of certification schemes and the Code for Sustainable Homes, where credits are awarded for construction products independently certified through BES 6001.

For advice and guidance on responsible sourcing and a range of other Construction related issues including BREEAM, contact the Colorcoat Connection® helpline on +44 (0) 1244 892434.

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CASE STUDIES

Deeside Leisure Centre

Is a multi-million pound project to improve the facilities at Deeside Leisure Centre and to reduce the overall energy consumption of the building. Colorcoat Renew SC®, an active solar air heating system from Tata Steel, has helped the Centre to reduce operational costs, improve the building's environmental performance and supply clean, fresh air to provide the optimum environment for occupancy comfort.

Colorcoat Renew SC® captures heat from the sun and draws it into the building through a micro perforated Colorcoat Prisma® collector installed as an additional skin onto the southerly facing wall.

The pre-heated fresh air can then be distributed directly into the building as ventilation air or ducted to the main heating system to reduce energy load.

Using 260 m² of Colorcoat Prisma® in Slate Grey as the solar collector, combining inherent durability with proven superior absorption rates for maximum collector efficiency. The system is expected to provide 70 MWh solar radiation and 40 MWh reduction of thermal losses each year, equating to payback in less than 10 years providing benefits to for years to come.

This project is an excellent example of how the building fabric can be utilised to improve the sustainability credentials of both new and existing buildings.

Chatterley Valley

If you think you know what a warehouse looks like, even a quick glimpse at the Chatterley Valley Blue Planet distribution warehouse in Newcastle-under-Lyme, North Staffordshire, will confound your expectations. Where most warehouses are rectilinear this one is sinuously curved; where most are of a single dull colour, this one is clad in stripes and different shades of green.

There were two drivers of this design. One being the desire to make the building as environmentally friendly as possible. The other was to fit as unobtrusively as possible into an inhabited area with a building that many would view from above, from housing on nearby hillsides.

The building utilised Colorcoat HPS200 Ultra® for the roof and Colorcoat Prisma® for the walls. Colorcoat Prisma® was considered carefully not only for its superior aesthetics but also its environmental credentials.

The architect looked very carefully at the sourcing of materials, selecting wherever possible those that had an A or an A+ rating in BRE Global's Green Guide to Specification. Colorcoat Prisma® has since secured BES 6001 certification for responsible sourcing, providing the ultimate assurance that the pre-finished steel is sourced sustainably and can also qualify for credits within BREEAM. All materials were considered not only in terms of how they were sourced but also of how they will eventually be disposed of, Colorcoat Prisma® was ideal as it is truly recyclable without any loss of quality, time after time, at the end of its life it can be reused or recycled rather than be disposed of as waste.

All these factors contributed to this building being the first of its type to achieve a BREEAM 'Outstanding' rating.

COLORCOAT® SERVICES

The Colorcoat® brand is recognised as the exclusive Tata Steel mark of quality and metal envelope expertise. Colorcoat® products are supported by a comprehensive range of services, technical advice and guidance.

Colorcoat® technical support team

Our knowledge and expertise of the complete range of systems available with Colorcoat® products means that the advice and support that we can offer you is truly objective. We can help you to achieve the best technical solution for your building with the optimum in performance and environmental credentials.

If you are building to specific sustainability credentials or performance criteria, we can work with you at the design phase of your project to help you integrate these requirements and deliver technically superior buildings that match your vision.

Whether you require information on the latest building regulations, calculations for a specific project or advice on integrating renewable technologies you can contact the Colorcoat Connection® helpline on + 44 (0)1244 892434 to request a visit from your regional representative for impartial advice and support on a broad range of topics including:

- Specification support.
- Building Regulations.
- Energy efficiency, savings and paybacks.
- Building integrated renewable technologies and feasibility studies.
- Responsible sourcing.
- System suitability, durability and guarantees for project specific applications.
- Environmental Product Declarations and calculations.
- Structural implications.
- Health and Safety.
- Fire performance.
- Acoustics.
- Sustainability assessment tools such as BREEAM.

Colorcoat Connection® helpline

This dedicated helpline offers immediate and easily accessible advice and guidance on a wide range of construction issues. Contact us on +44 (0) 1244 892434.

Colorcoat® technical papers

We have produced a number of technical papers that can help you address key issues for UK building design and construction, from low carbon building design to fire performance.

For a full list of downloadable papers, visit www.colorcoat-online.com/technical

Colorcoat® supply chain partners

Colorcoat® products are available through our market-leading supply chain partners. We recommend their CE-marked and SCI-assessed systems for the very highest quality and service in the UK and worldwide.

For further details on our supply chain partners in the UK, please visit www.colorcoat-online.com/SCP

Tata Steel accredited distributors

Our Tata Steel accredited distributors in the UK can provide you with any colour from the Colorcoat Prisma® range in small quantities. These are ideal for small projects, flashings, soffits, louvers, fascias, canopies and corner details.

For details of Tata Steel accredited distributors visit www.colorcoat-online.com/distributors

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