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TATA STEEL



Environmental Product Declaration

Trisobuild™ System by Tata Steel
Colorcoat® assessed cladding system



Environmental Product Declaration

An Environmental Product Declaration (EPD) provides a summary of the environmental impacts of a product or system during each stage of its life.

The data published for each of the Colorcoat® assessed cladding systems is based on an initial Life Cycle Analysis (LCA) study that we conducted in 2002 in accordance with the international standard ISO 14040-3. We first published EPDs in 2008, and as part of the CarbonNeutral® protocol, all EPDs are subject to a 3 yearly review. The review takes into consideration any changes to the manufacturing processes and changes to the calculation standard methodology. This approach has subsequently been refined and extended to include more products and systems.

Tata Steel has an ongoing commitment to reduce CO₂ emissions associated with pre-finished steel manufacture. This is reflected in the overall reduction (10-18%) of the environmental impact reported in this EPD since our initial calculations in 2008.

Consideration Points

- The durability of a product will always affect the results of a LCA because of the environmental impact of maintenance, and the need to replace less durable products during the lifespan of the building. Nearly 50 years of development has enabled us to ensure that Colorcoat® by Tata Steel is the most advanced pre-finished steel product available with the most comprehensive and extensive guarantees for long-term durability.
- A series of sensible assumptions have been made to take into account transport of cladding materials between manufacturing locations, installation and end of life.
- End of life scenarios for pre-finished steel cladding systems are based upon current practice. For built-up systems this means the steel content is recycled, whilst insulation is sent to landfill. Factory insulated composite panels are shredded, the steel content is recycled and the insulation sent to landfill.
- There are many reasons why the Colorcoat® assessed cladding systems have slightly different environmental impacts. Although steel and insulation content predominates the analysis, Confidex Sustain® allows all of the assessed cladding systems to achieve zero carbon status by offsetting all unavoidable CO₂ emissions.
- This EPD summarises the environmental credentials of a cladding system. This information can be used in conjunction with whole life cost data, aesthetic considerations, appropriate maintenance regimes and other building specific factors such as speed of construction, to determine the optimum cladding solution for your building. We continually review and update the LCA to ensure they fully reflect the latest standards, the latest EPDs are available online at www.colorcoat-online.com/epd.

Cladding system assumptions

- This EPD covers cladding systems using Colorcoat HPS200 Ultra® or Colorcoat Prisma® external cladding used with a Colorcoat® PE 15 liner sheet.
- The functional unit is 1m² of pre-finished steel cladding in the main body of the roof or wall excluding rooflights and edge details at eaves, ridges and walls.
- Complete transport of material is included in calculation from the pre-finished steel manufacturer to the profiler; to the construction site and at end of life to a scrap recycling facility. An average road transport distance from the profiler to the construction site has been used.
- The cladding system is covered in entirety and includes fixings, insulation and the internal and external pre-finished steel cladding sheets and their associated spacers, installation and demolition.
- Sealant strips, mastics and tapes have been excluded due to their negligible impact on the whole system analysis.
- The cladding system lifetime is defined as the appropriate Confidex® Guarantee Period for the Colorcoat® pre-finished steel product specified.
- Detailing and installation are in accordance with the MCRMA, system manufacturers installation guide and Tata Steel best practice.

Creating a sustainable system

Figure 1. Cradle to cradle analysis

The cradle to cradle analysis covers all life cycle stages.

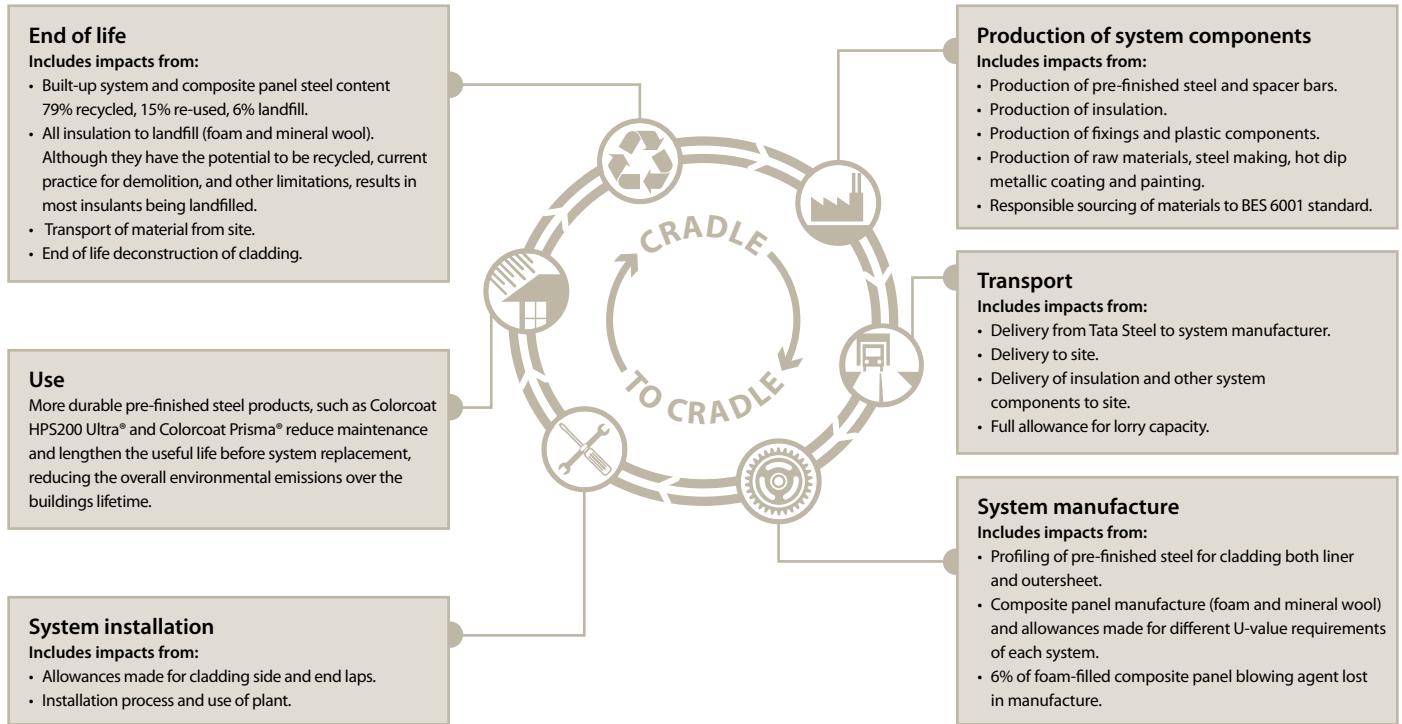
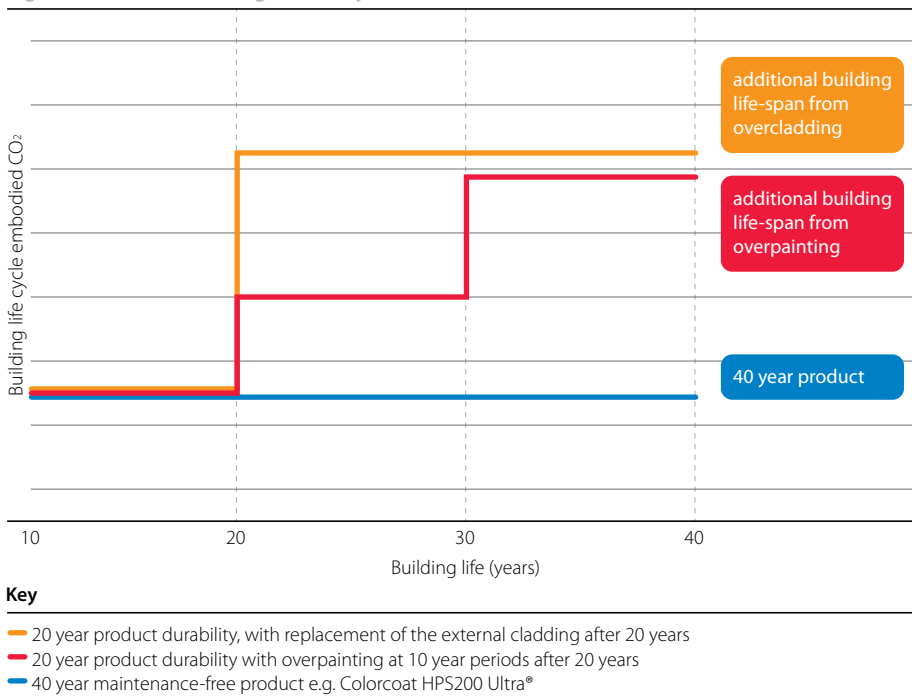


Figure 2. Effect of cladding durability on total embodied CO₂



The effect of durability on total building life emissions

Durability of a material is not a factor when calculating an EPD, however it is a key consideration, when calculating the life cycle impact of the completed building.

Specifying more durable products, will reduce the requirement for in service maintenance and repair or replacement.

The graph compares the total embodied CO₂ over a 40 year building life of 2 different pre-finished steel cladding systems.

A 40 year maintenance free product will have no additional emissions during the building life.

A product with a 20 year performance will need to be maintained and either replaced or be subject to an overpainting regime, typically at 10 year intervals.

Independent verification

This EPD summarises the environmental credentials of this Colorcoat® assessed cladding system. These have been independently assessed and verified by a selection of third parties.

The Edinburgh Centre for Carbon Management

The Edinburgh Centre for Carbon Management (ECCM) is an international leader in emissions assessment, specialising in Green House Gas (GHG) emission accounting and quantification. ECCM has assessed our methodology used to develop these EPDs.

Price Waterhouse Coopers

PWC are one of the world's leading professional services firms. Operating in 150 countries, they advise some of the most successful organisations on the globe, as well as its most dynamic entrepreneurs and thriving private businesses. PWC independently verified our LCA (below) conducted in accordance with ISO 14040-3, the basis for our EPD calculations.

Third party peer review

In addition, we have had our EPD process reviewed by third party peers. This includes installation, fixing and paint manufactures, and highlights the extent to which we value the integrity of the development of our EPDs.

The life cycle assessment of potential environmental impacts has been carried out on a range of impact categories which are most applicable to pre-finished steel.

The details of each impact category are detailed below. While these are listed as discrete categories, changing product specification/manufacturing process to enhance one category, may have an adverse effect on another.

Life cycle assessment (LCA)

Embodied CO₂ (Global warming)

The rising of global temperatures due to emissions of green house gases measured in kg of CO₂. This includes the impact of high global warming potential gases such as the Hydrofluorocarbons (HFCs) used in PIR foam manufacture.

Embodied energy

The quantity of energy required to manufacture, and supply to the point of use, a product, material or service. The embodied energy of pre-finished steel is comparable to many other construction materials. However, as it can be recycled without effecting quality, the embodied energy is reduced over multiple life cycles. Therefore, the embodied energy is much less significant than the energy consumed through heating, cooling and lighting of a typical building.

Acidification

The damage caused to trees and life in lakes and rivers as a result of the decrease in pH of terrestrial watercourses due to the release of acidifying gases to atmosphere.

Confidex Sustain®

As part of the Confidex Sustain® process, the recalculated EPDs are then subject to an audit by an external assessor, the CarbonNeutral Company.

The CarbonNeutral Company

The CarbonNeutral Protocol is the market leading global standard, developed by The CarbonNeutral Company, to guarantee the integrity and credibility of clients' carbon neutral certification and enable them to be certified CarbonNeutral®.

The Protocol assures quality of offset projects, carbon footprint assessments and communication and is regularly reviewed by an Independent Advisory Group. The company's 'audit trail' includes an annual independent verification of CarbonNeutral® programmes – from contracts with carbon offset partners through to contracts with clients and everything in between.

CarbonNeutral® is the registered trademark of The CarbonNeutral Company and is a global standard to certify that businesses have measured and reduced their CO₂ emissions to net zero for their company, products, operations or services. Permission to display the CarbonNeutral® mark is only given to clients whose carbon reduction programme is implemented in accordance with The CarbonNeutral Protocol.

In this case the manufacturer should balance these to give the lowest overall effect.

We have carried out a LCA for this cladding system for all the below categories. Results for embodied energy and global warming are published in this document. For information on other results, please visit www.colorcoat-online.com/epd.

Eutrophication

A form of water pollution that can result in the loss of plants and animals in aquatic ecosystems. The release of nitrogen and phosphorus from fertilisers and detergents and organic matter from effluent can lead to an acceleration of the natural oxygen depletion in water courses.

Photochemical oxidant formation

Emissions of Volatile Organic Compounds (VOCs) and nitrogen oxides can interact in the lower atmosphere to cause smog which can be harmful to human health and the environment.

Abiotic resource depletion of fossil fuel

The depletion of fossil fuel such as oil and coal due to their extraction and consumption.

The Colorcoat® brand

Tata Steel is one of Europe's largest steel producers. Our Shotton Works in North Wales exclusively manufactures our internationally recognised Colorcoat® brand; the mark of quality and metal envelope expertise covering a range of pre-finished steel products, specifically developed for roof and wall cladding systems for the building envelope. As the leader in metal building envelopes for nearly 50 years, we have made sustainability a key part of what we do and how we work with the market. The environmental challenges we all face are significant, we are working hard to reduce our impact and to be part of the solution. Colorcoat® products are manufactured in the UK, are certified to independently verified international management system, ISO 14001 and are truly recyclable, unlike most other construction products.

Colorcoat® BES 6001 approved

Colorcoat® products are certified to BES 6001 Responsible Sourcing standard, the first pre-finished steel envelope products in the world to achieve this.

Colorcoat HPS200 Ultra®

Designed to withstand even the most demanding and aggressive environments, Colorcoat HPS200 Ultra® provides super durability and corrosion resistance. Confidex® guaranteed for up to 40 years, combining ultimate performance with unrivalled reliability.

Colorcoat Prisma®

Colorcoat Prisma® combines a versatile palette of contemporary and traditional colours with durability and inherent flexibility. With a contemporary colour range and optically smooth finish that can deliver a modern building envelope that will look as good as the day it was installed for years to come. Confidex® guaranteed for up to 30 years, with no maintenance or inspection required to maintain its validity.

Colorcoat® assessed system

We have assessed the environmental impact of this cladding system, which has been designed to perform to the highest standards of thermal performance, air-tightness and structural performance and can be recycled at the end of its life, ensuring the most sustainable system for the building envelope.

Confidex Sustain®

Confidex Sustain® offers the first CarbonNeutral® building envelope in the world, the CO₂ emissions calculated in this EPD are used to calculate and offset the cladding systems impact from cradle to cradle i.e. from manufacture through installation and use to end of life in terms of re-use, recycling or disposal. It goes beyond considering just one element of the cladding system to assess and offset all parts including the internal and external pre-finished steel cladding sheets, fixings and insulation. For every 1kg of CO₂ measured we will offset 1kg of CO₂ in climate friendly projects overseas.

Building on the success of the Confidex® Guarantee, Confidex Sustain® is available when a Colorcoat HPS200 Ultra® or Colorcoat Prisma® pre-finished steel is used as part of a Colorcoat® assessed cladding system with a Colorcoat® PE 15 liner sheet.

How to Apply

To apply for Confidex Sustain® you will need to ensure Colorcoat HPS200 Ultra® or Colorcoat Prisma® by Tata Steel are specified for the exterior roof or walls, along with Colorcoat® PE 15 for the interior with a Colorcoat® assessed cladding system.

Anyone in the supply chain can register, but more commonly it is the system manufacturer on the client's behalf using our on-line registration service.

Following registration, the building owner will receive a Confidex Sustain® certificate with details of how much carbon has been offset and the types of project we are investing in.



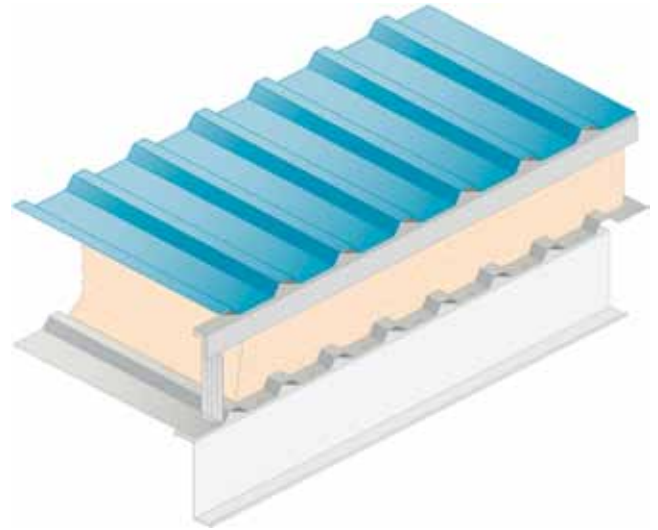
Trisobuild™ Roof System by Tata Steel

Trisobuild™ Systems from Tata Steel comprise of a pre-finished steel trapezoidal liner profile, a Platinum® approved spacer system, an insulation layer and a Colorcoat® pre-finished steel external weathering profile.

A comprehensive range of internal and external profiles are available, all of which have been comprehensively tested, and third party assessed for structural capability by the Steel Construction Institute (SCI).

Trisobuild™ System solutions achieve high levels of thermal, air-tightness, fire and acoustic performance, to meet the needs of the building envelope specification.

The systems ancillary components (i.e. fixings, sealants, roof lights, fall arrest, gutters and walkways) are specified from a range of approved Platinum® System Guarantee suppliers who are selected on the basis of their ability to meet stringent technical criteria combined with a 25 year product durability.



Material declaration

Table 1. Material declaration (weight and % per m²). Figures rounded to two decimal places.

	0.25 U value		0.20 U value		0.15 U value	
Cladding inner and outer sheet	10.29	80.50%	10.29	77.88%	10.29	73.72%
Spacer bar and brackets	0.66	5.17%	0.67	5.07%	0.68	4.87%
Insulation	1.79	13.97%	2.21	16.70%	2.94	21.07%
Fixings	0.05	0.36%	0.05	0.35%	0.05	0.33%
Total	12.78	100%	13.21	100%	13.95	100%

Figure 3. Embodied CO₂ and energy for reducing U values.

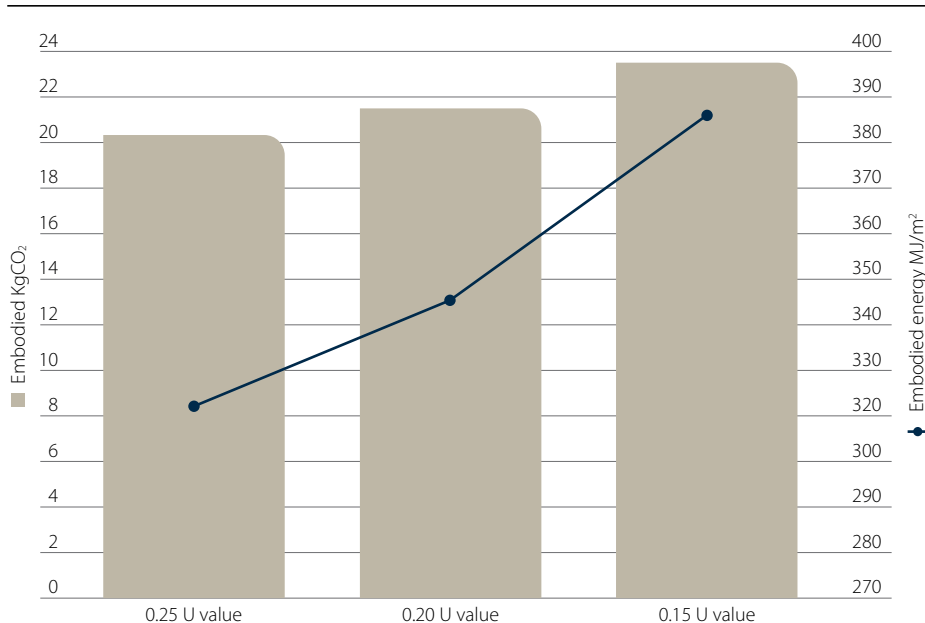




Table 2. CO₂ emissions (KgCO₂) for Trisobuild™ Roof System using Colorcoat HPS200 Ultra® or Colorcoat Prisma®.

	0.25 U value	0.20 U value	0.15 U value
Production and installation	36.77	37.93	39.95
End of life	-16.34	-16.34	-16.34
Total	20.43	21.59	23.61

Table 3. Embodied energy (MJ/m²) for Trisobuild™ Roof System using Colorcoat HPS200 Ultra® or Colorcoat Prisma®.

	0.25 U value	0.20 U value	0.15 U value
Production and installation	468.32	491.58	532.08
End of life	-146.07	-146.06	-145.97
Total	322.25	345.52	386.11

Full EPD results on further categories are published online and available at www.colorcoat-online/epd

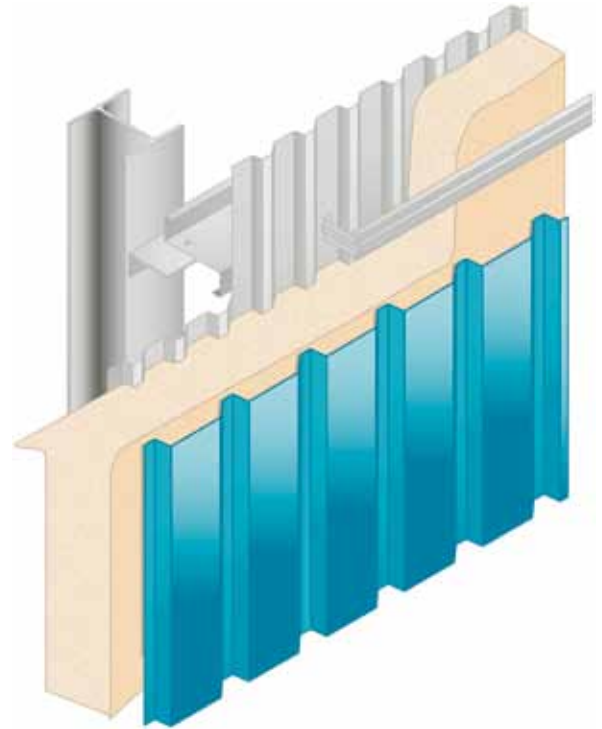
Trisobuild™ Wall System by Tata Steel

Trisobuild™ Systems from Tata Steel comprise of a pre-finished steel trapezoidal liner profile, a Platinum® approved spacer system, an insulation layer and a Colorcoat® pre-finished steel external weathering profile.

A comprehensive range of internal and external profiles are available, all of which have been comprehensively tested, and third party assessed for structural capability by the Steel Construction Institute (SCI).

Trisobuild™ System solutions achieve high levels of thermal, air-tightness, fire and acoustic performance, to meet the needs of the building envelope specification.

The systems ancillary components (i.e. fixings, sealants, roof lights, fall arrest, gutters and walkways) are specified from a range of approved Platinum® System Guarantee suppliers who are selected on the basis of their ability to meet stringent technical criteria combined with a 25 year product durability.



Material declaration

Table 1. Material declaration (weight and % per m²). Figures rounded to two decimal places.

	0.35 U value		0.30 U value	
Cladding inner and outer sheet	8.35	81.34%	8.35	79.64%
Spacer bar and brackets	0.61	5.94%	0.62	5.91%
Insulation	1.26	12.27%	1.47	14.01%
Fixings	0.05	0.45%	0.05	0.44%
Total	10.27	100%	10.49	100%

Figure 3. Embodied CO₂ and energy for reducing U values.

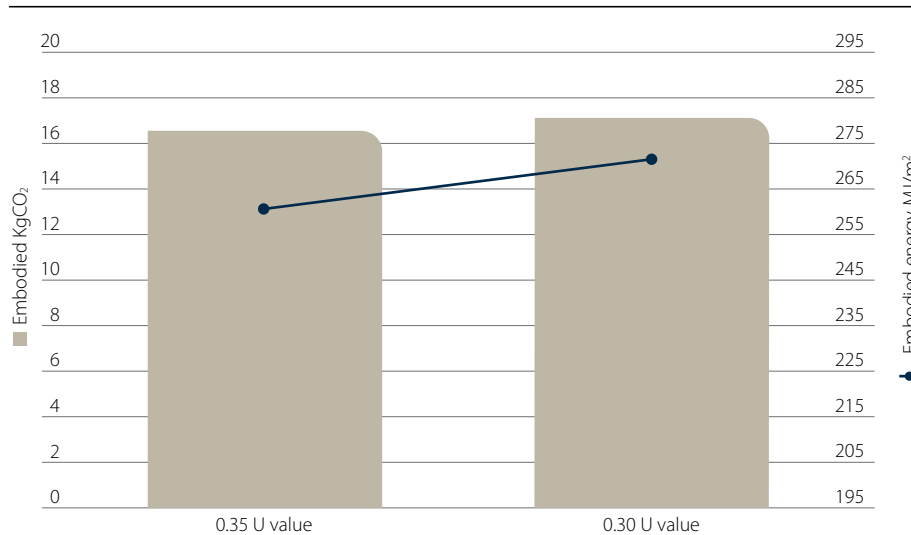




Table 2. CO₂ emissions (KgCO₂) for Trisobuild™ Wall System using Colorcoat HPS200 Ultra® or Colorcoat Prisma®.

	0.35 U value	0.30 U value
Production and installation	30.01	30.61
End of life	-13.39	-13.40
Total	16.62	17.21

Table 3. Embodied energy (MJ/m²) for Trisobuild™ Wall System using Colorcoat HPS200 Ultra® or Colorcoat Prisma®.

	0.35 U value	0.30 U value
Production and installation	382.29	394.06
End of life	-120.93	-120.97
Total	261.36	273.09

Full EPD results on further categories are published online and available at www.colorcoat-online/epd