TATA STEEL

TATA

Celsius®420

The ultimate hot-finished structural steel hollow section range

Celsius® 420: The next generation of hot-finished structural steel

Click on content links, control arrows, or use tabs for easy section navigation.

Introduction

- Raising the standard
- Specification of Celsius® 420
- Suitable applications and size range

Click arrow for section links

Section 1

Introduction

Click here for enquiries: **Technical** **Commercial**

Click here

to find out why Celsius® 420 raises the standard

Raising the standard

At Tata Steel, we've taken our leading Celsius® product range and made it even better. Celsius® 420 is the next generation in true hot-finished structural steel hollow sections. Through advances in our steel manufacturing capability, Celsius® 420 offers a stronger steel grade of 420 megapascals that achieves up to 17% weight saving with less welding and enhanced aesthetic appeal.

Click image above to play the video

Celsius® 420 has been extensively trialled and tested to confirm its chemical composition and mechanical properties, so you have complete reassurance it will perform as specified.

Supported by full certification and batch testing, Celsius® 420 ensures consistency and quality, combined with complete reliability and proven performance.

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Celsius®420

HOT-FINISHED STRUCTURAL STEEL RANGE

- Up to 17% weight saving
- Stronger steel grade
- Lighter structures and components
- Enhanced aesthetics
- Lower CEV

Raising the standard

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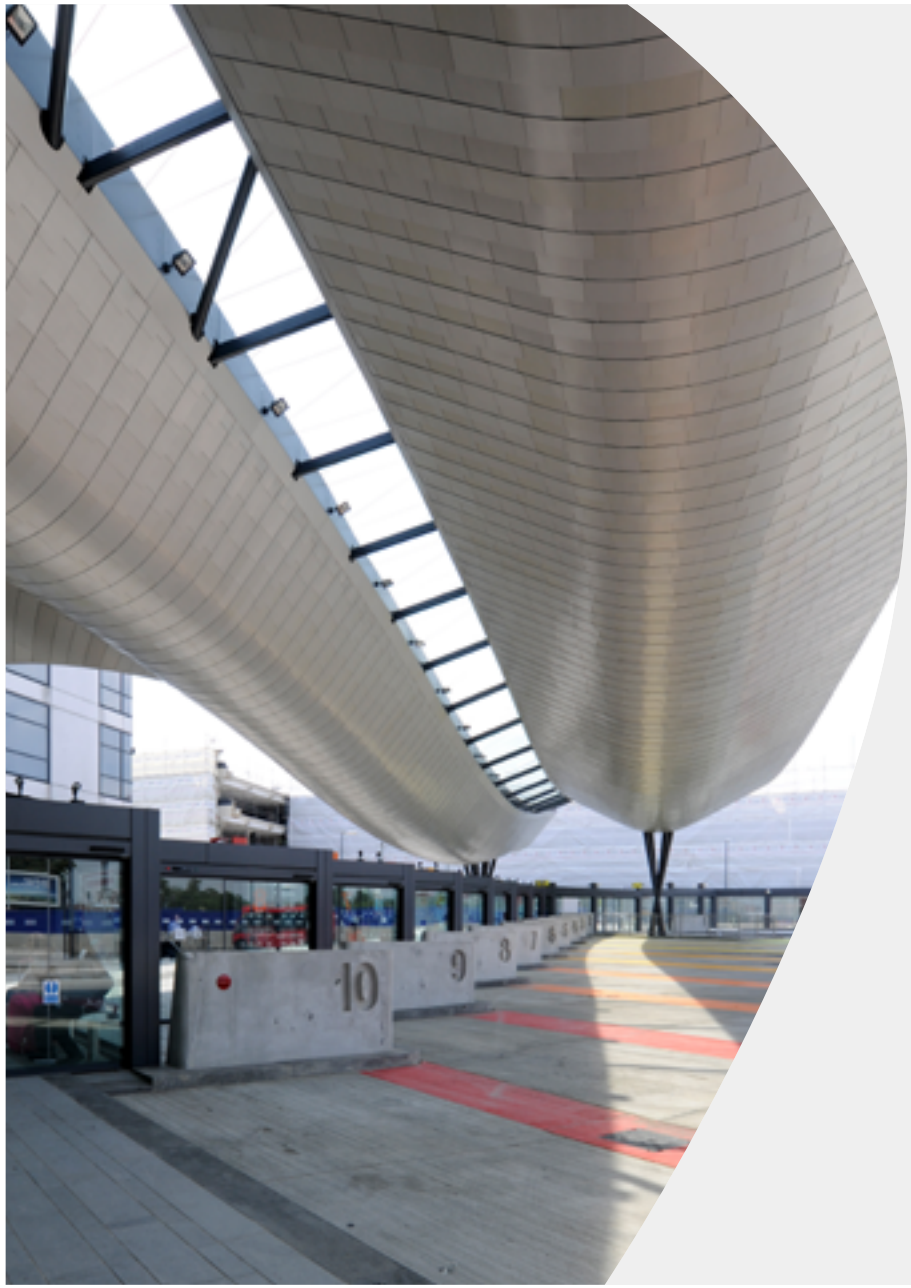

Challenging project requirements

More ambitious construction projects, along with advances in mechanical applications and manufacture, create challenging applications for structural steel hollow sections. Delivering stronger structures without the associated increase in weight, material and fabrication costs poses a significant challenge. We combine 50 years' expertise in steel chemistry and metallurgy with extensive technical and application know-how to support your aspirations to build lighter structures.

Weight and cost reduction

Celsius® 420 helps you achieve weight and cost reductions through a stronger steel grade with a yield strength of 420 megapascals. This means less welding, foundations and temporary structures onsite, and offers up to a 17% weight saving when compared with Celsius® 355 for more cost-effective construction.

Advances in steel manufacturing

As a true hot-finished structural steel hollow section, Celsius® 420 offers the same unique benefits as the Celsius® 355 range. Our expertise in metallurgy and steel making has allowed us to keep the same unique benefits with additional strength whilst maintaining a lower Carbon Equivalent Value (CEV).

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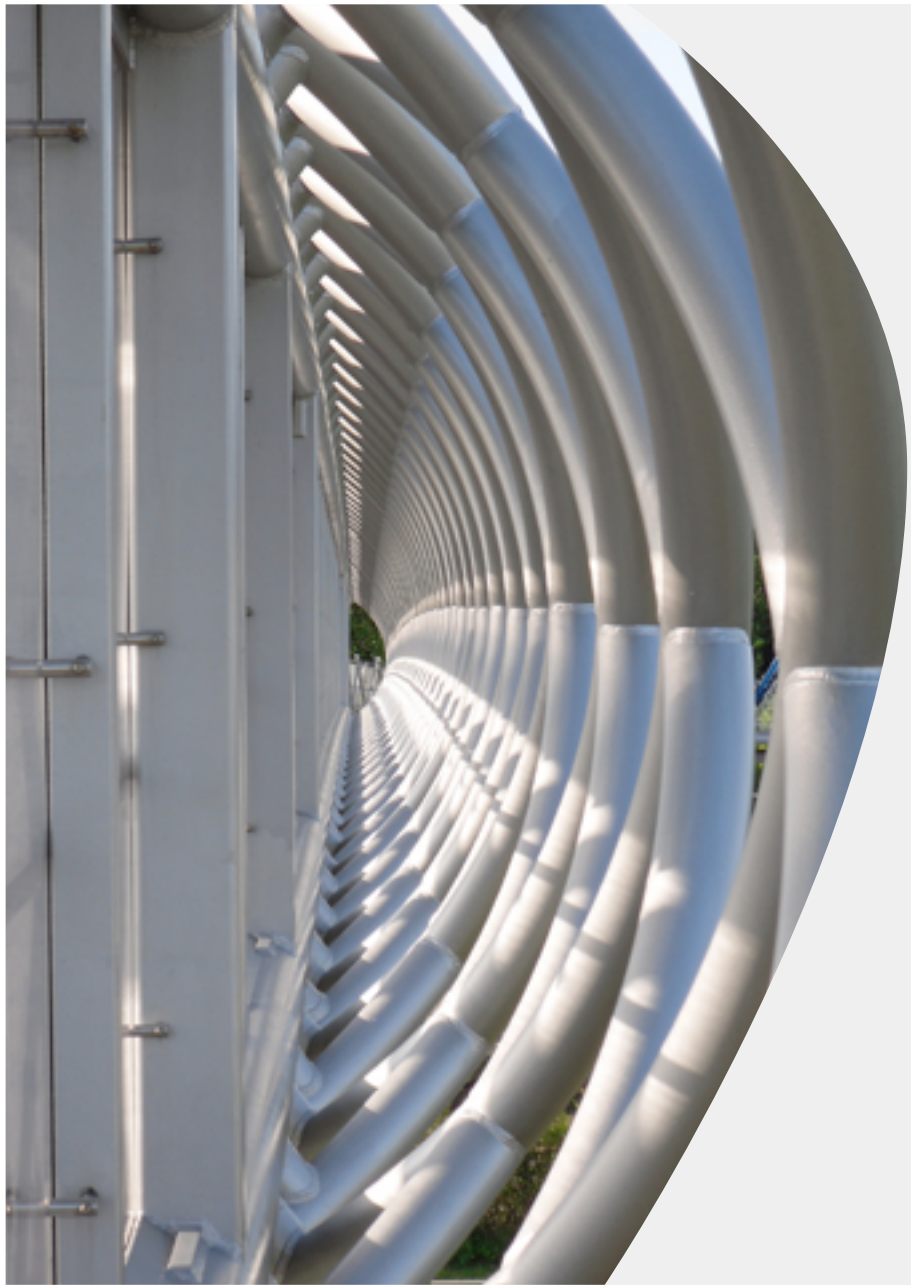
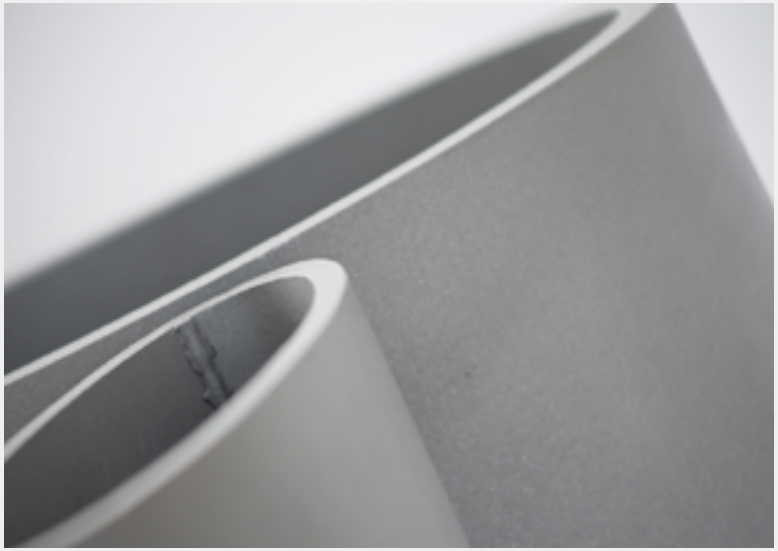


Specification of Celsius®420

In relation to the EN 10210 design standard for structural steel hollow sections, Celsius® 420 exceeds the requirements for S420 NH non-alloy and fine grain steels. With a lower Carbon Equivalent Value (CEV) of 0.45, compared to the 0.5 product standard, Celsius® 420 combines higher yield strength with a lower carbon content for improved weldability and fabrication.

Click here for technical details to support your project design and specification.



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Suitable applications and size range

Celsius® 420 is engineered for large-scale construction and demanding building projects, alongside challenging applications in industrial and 'off-highway' vehicles, such as excavators, bulldozers and dumper trucks. It can also be used in the offshore industry for both primary and secondary applications.

Possible applications include:

- excavators
- dumper trucks
- industrial machines
- agricultural vehicles
- vehicle axles
- offshore applications
- construction applications and many more.

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Section 2

Innovation

Innovation

- Reliable and proven performance
- Manufacturing process

Click arrow for section links

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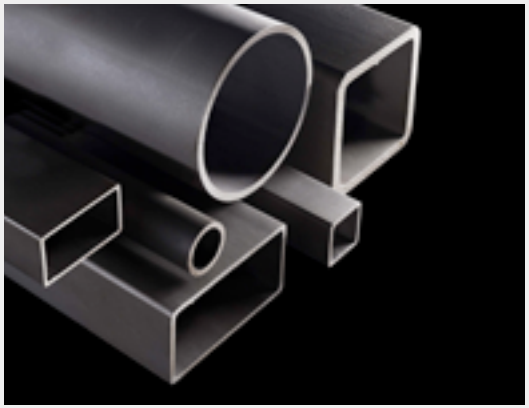
Click here to see what documentation backs up Celsius® 420

Reliable and proven performance

Our innovative Celsius® 420 range builds on the successful heritage, reliability and proven performance of our Celsius® brand of a true hot finished hollow section. It offers even stronger, lighter, more cost-effective and aesthetically appealing structural steel hollow sections to help meet and exceed the most demanding and challenging applications. The range offers improved weldability and a low Carbon Equivalent Value (CEV) of 0.45, compared to a product standard of 0.5. Steel with a lower CEV is better for welding and requires no pre-heat treatment beforehand, while the controlled silicon content ensures good galvanisability.



All Celsius® 420 products are also supported by stringent trials and batch testing. In addition, Tata Steel provides full documentation including; Specific Inspection 3.1 Certification, Declaration of Performance and Factory Production Control certificates.

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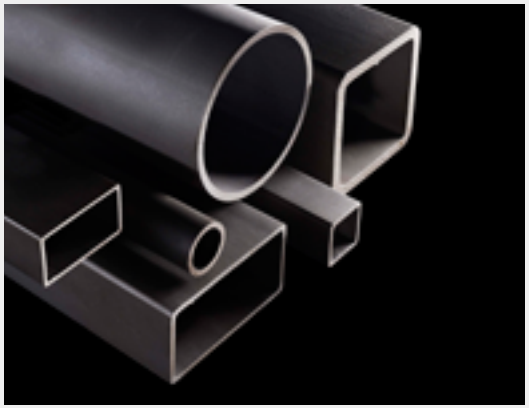

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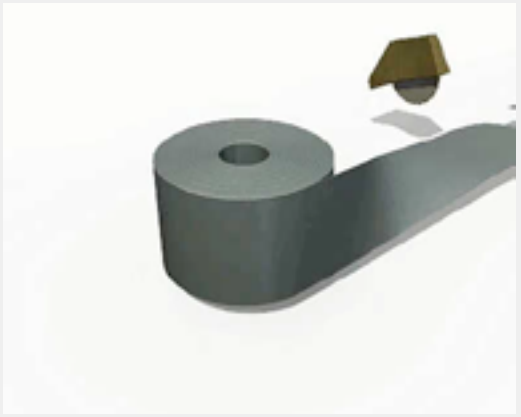
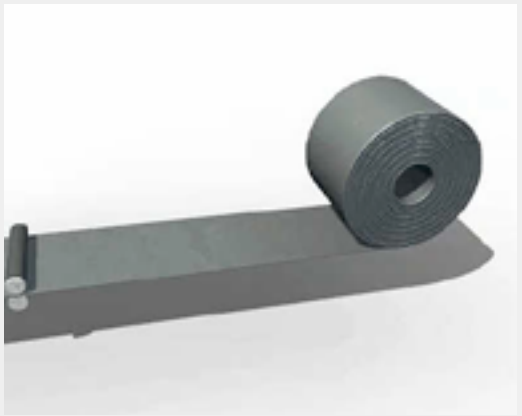
Click here
to see how
it's done

Manufacturing



Hartlepool manufacturing process

Click image above to play the video



Corby manufacturing process

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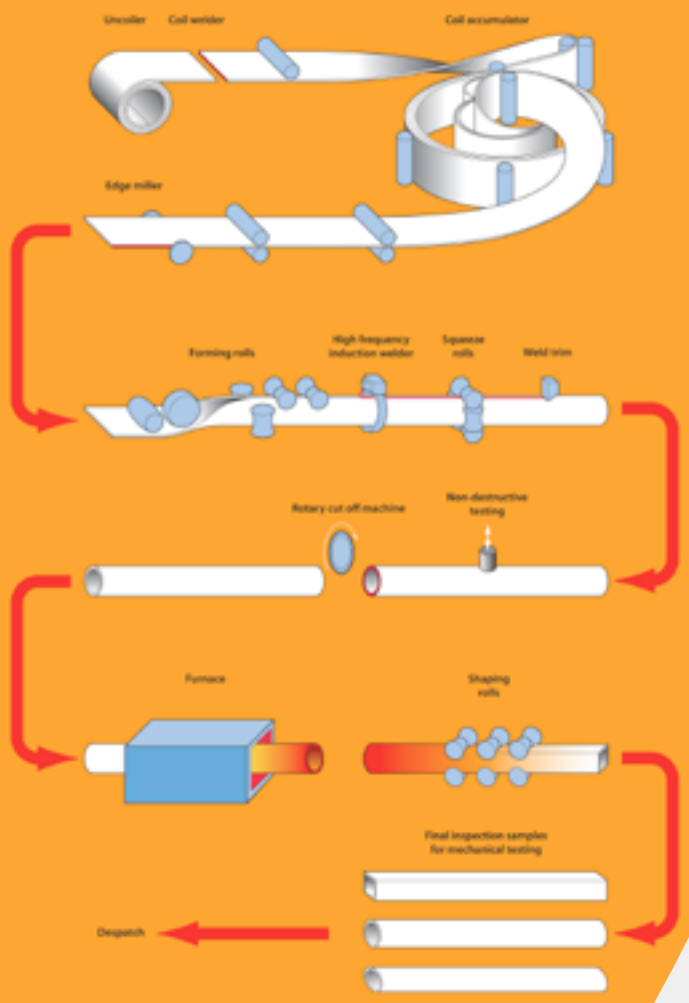
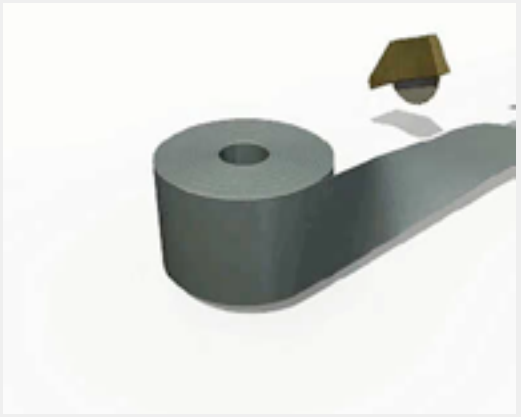


Manufacturing



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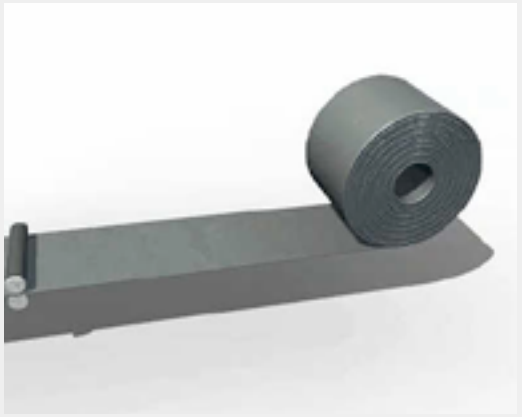

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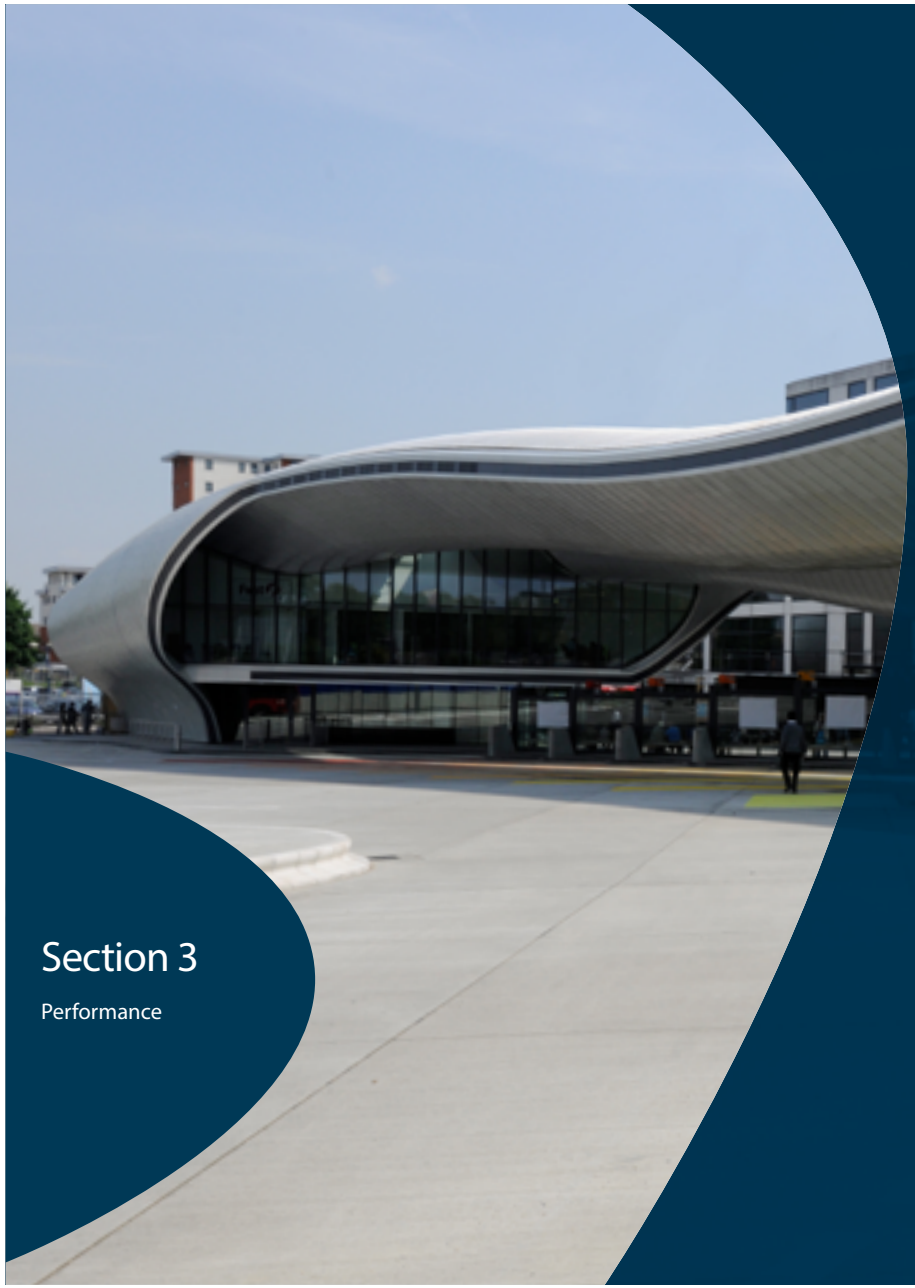

Section 3

Performance

Performance

- Celsius® 420 compared to cold formed
- Celsius® 420 compared to warm
- Celsius® 420 compared to seamless

Click arrow for section links

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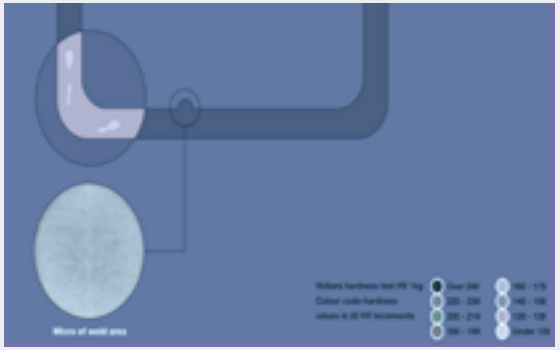
Click here

to find out the advantages of a hot-finished fully normalised manufacturing process

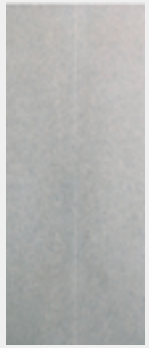
Celsius® 420 compared to cold formed

Celsius® 420 is a full body normalised structural hollow section which has many advantages compared to other similar hollow sections.

- Tighter corner profiles allow smaller surface area, which therefore result in less weight.
- Due to the full body normalising, the weld line becomes fully integrated with the remaining tube, ensuring much greater product consistency.
- No loss of yield or tensile strength during heating or manipulating ensures consistent hardness values around the whole surface perimeter.
- Celsius® 420 is full body normalised and finally shaped at a high temperature, ensuring that the product is fully stress relieved.



Fully integrated weld line



Normalised weld

Standard weld

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- Tighter corner radius
- Uniform grain structure
- Fully stress relieved
- Consistent hardness values

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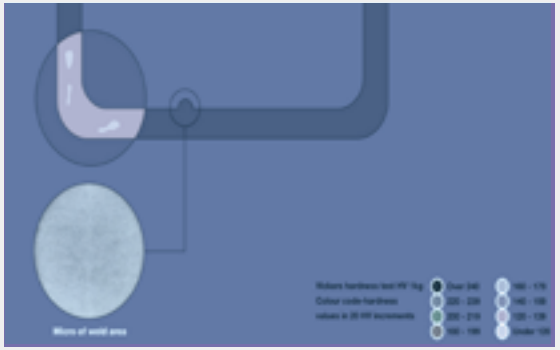

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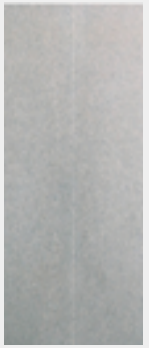

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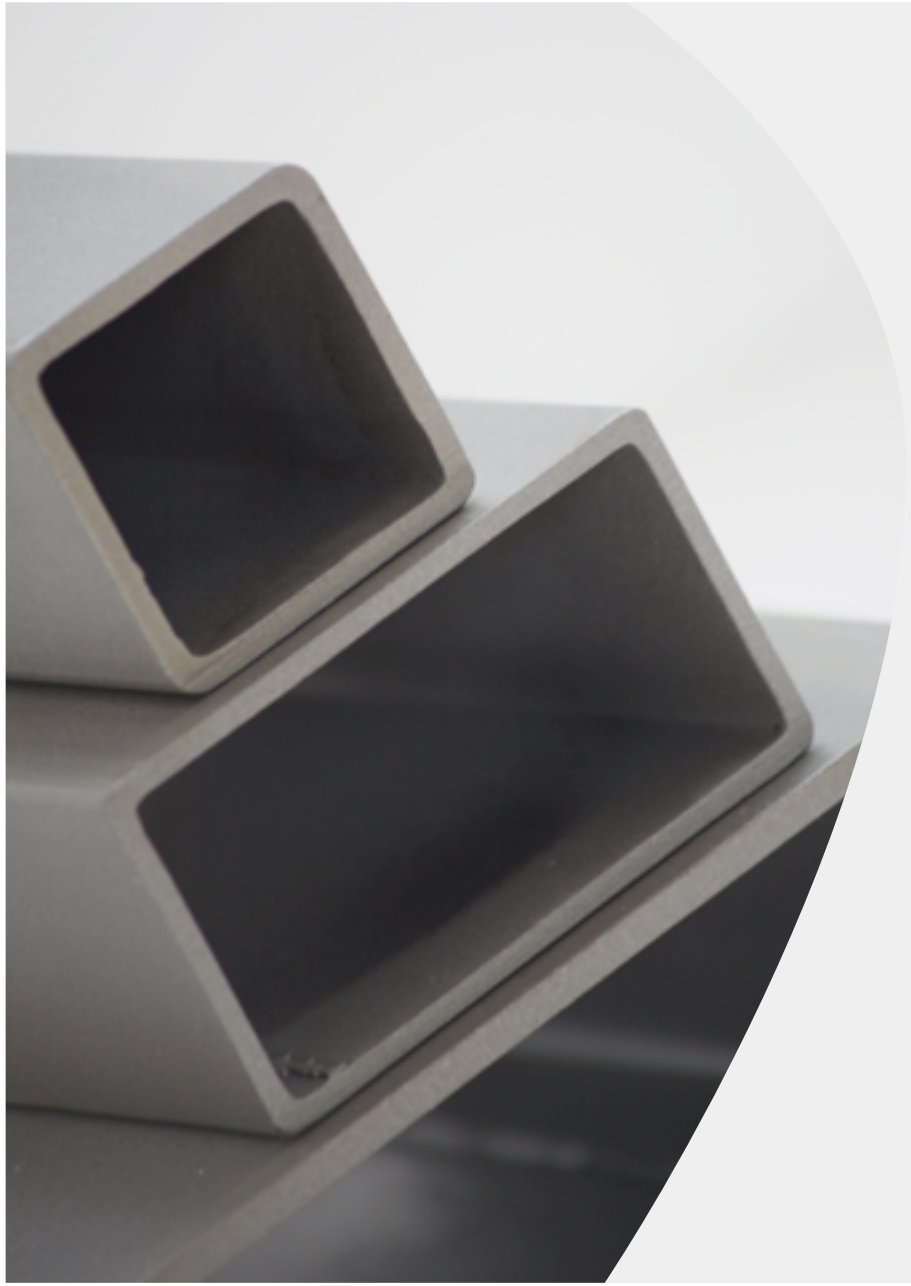

Celsius® 420 compared to warm

- Celsius® 420 is full body normalised and finally shaped after it has passed through the furnace at 850°C. Celsius® 420 product is fully stress relieved allowing for consistency around the whole perimeter, whether that be on the weld line, corner or flat.
- The warm product is manufactured cold then shaped, leading to similar weaknesses to cold formed products. This leads to a rounded corner when compared to Celsius® 420.

Celsius® 420 **Warm**

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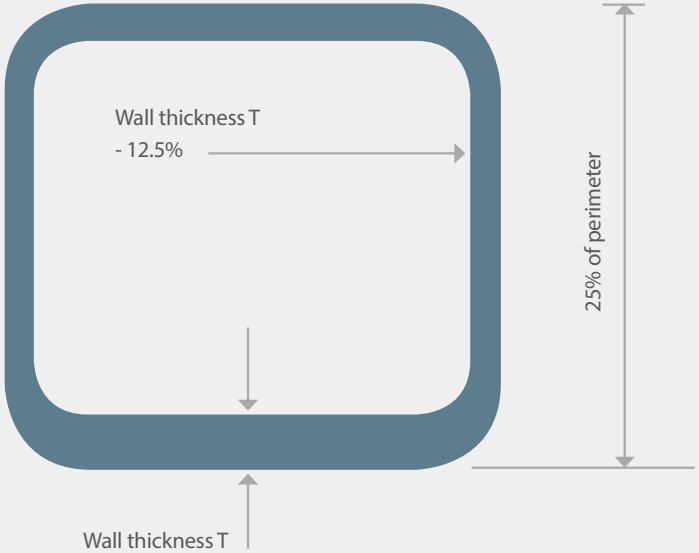
Celsius® 420 compared to seamless

Due to the manufacture from coil, we have more control over the finished Celsius® 420 structural hollow section, this is shown in the product standard EN 10210 for the following:

- Better wall thickness
- Better control of eccentricity and ovality
- More consistent control of overall lengths.



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Section 4

Design

Design

- Supporting your design ambitions
- Product range
- Improved visual appeal

Click arrow for section links

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Click here to discover the product range of Celsius® 420

Supporting your design ambitions

Design freedom and greater aesthetics are at the core of Celsius® 420. The complete range combines the ultimate structural steel grade with enhanced aesthetics to support your design ambitions, all backed by full technical support and specification guidance. The homogeneous grain structure of Celsius® 420 created during the manufacturing process means it is fully stress relieved. This allows the product to be welded at any point around its perimeter and also avoids distortion when manipulating and galvanising.

Celsius® 420 is ideal for challenging conditions where fatigue, low temperature, offshore and seismic areas occur. With the full body normalised and high strength it will give the designer all the benefits for a safe, economical application.

Product range

Celsius® 420's wide range of circular, rectangular, square and elliptical hollow sections will help you meet an extensive scope of specification requirements, and will provide even greater design freedom.

Click on the below options to discover the specific size ranges available:

Circular

Rectangular

Square

Elliptical

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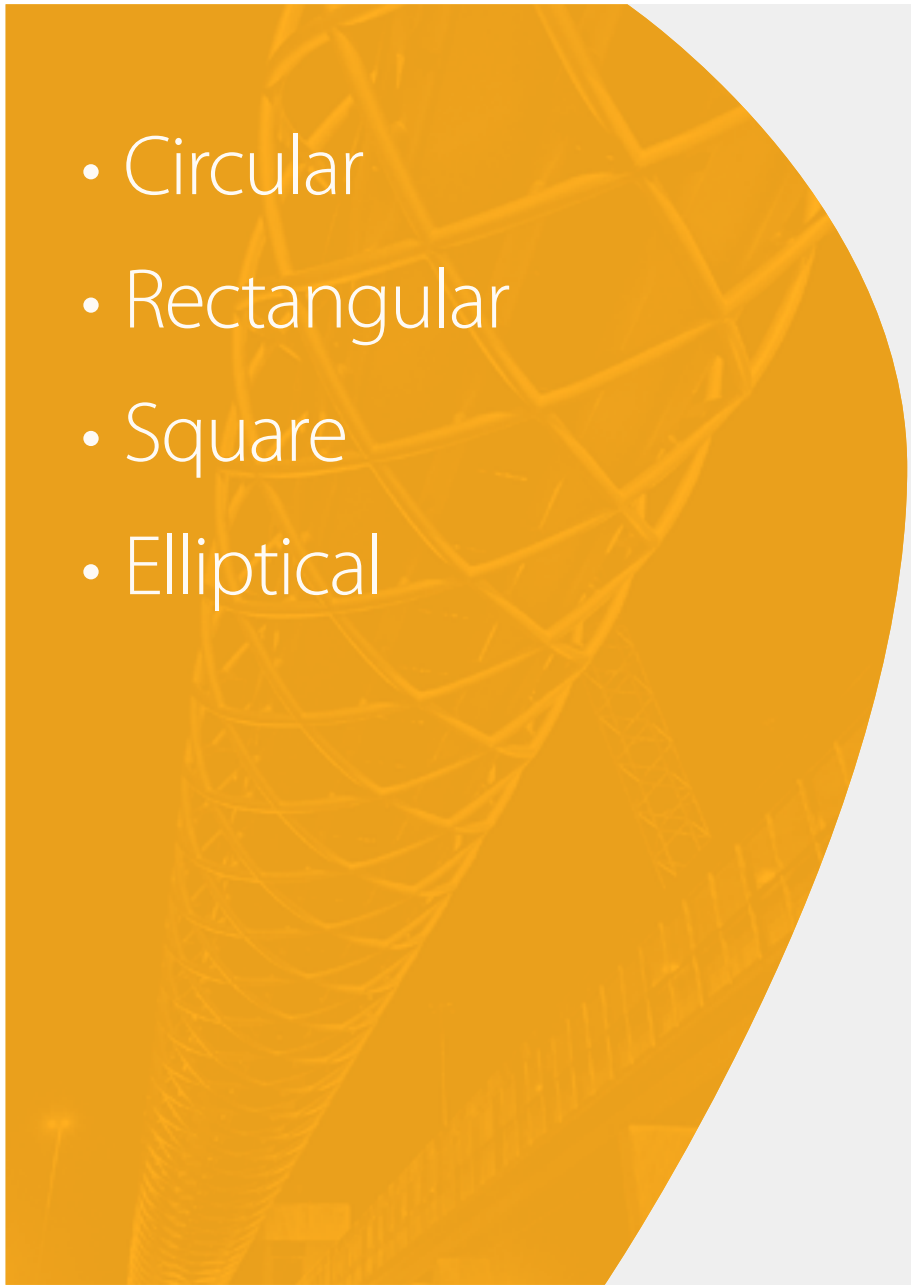

- Circular
- Rectangular
- Square
- Elliptical

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Circular

Rectangular

Square

Elliptical

Click here for enquiries: **Technical** **Commercial**

Celsius® 420 Circular Hollow Sections

Outside Diameter (mm)	Thickness (mm)									
	2.6	2.9	3.2	3.6	4.0	4.5	5.0	6.3	8.0	10.0
21.3	■	■	■							
26.9	■	■	■	■						
33.7	■	■	■	■	■	■				
42.4	■	■	■	■	■	■	■			
48.3	■	■	■	■	■	■	■	■		
60.3	■	■	■	■	■	■	■	■		
76.1		■	■	■	■	■	■	■	■	
88.9			■	■	■	■	■	■	■	
101.6			■	■	■	■	■	■	■	
114.3			■	■	■	■	■	■	■	
139.7					■	■	■	■	■	
168.3							■	■	■	■
193.7							■	■	■	■
219.1							■	■		
244.5							■	■		
273.0							■	■		

For minimum order quantities, please contact your account manager.

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Celsius® 420 Rectangular Hollow Sections

Size (mm)	Thickness (mm) 3.0	3.2	3.6	4.0	5.0	6.3	8.0	10.0
50 x 30	■	■	■	■	■			
60 x 40	■	■	■	■	■	■		
80 x 40	■	■	■	■	■	■	■	
90 x 50	■	■	■	■	■	■	■	
100 x 50	■	■	■	■	■	■	■	
100 x 60	■	■	■	■	■	■	■	
120 x 60	■	■	■	■	■	■	■	
120 x 80			■	■	■	■	■	
150 x 100				■	■	■	■	■
160 x 80				■	■	■	■	■
180 x 60				■	■	■	■	■
180 x 100				■	■	■	■	■
200 x 100				■	■	■	■	■
200 x 120					■	■	■	■
200 x 150					■	■	■	■
220 x 120					■	■	■	■
250 x 100					■	■	■	■
250 x 150					■	■	■	■
250 x 200								■
260 x 140					■	■	■	■
260 x 180							■	■
300 x 100					■	■	■	■
300 x 150							■	■
300 x 200					■			
350 x 150					■			
350 x 250								■
400 x 120						■	■	■
400 x 200								■
500 x 300							■	■

For minimum order quantities, please contact your account manager.

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Celsius® 420 Square Hollow Sections

Size (mm)	Thickness (mm)							
	3.0	3.2	3.6	4.0	5.0	6.3	8.0	10.0
40 x 40	■	■	■	■	■			
50 x 50	■	■	■	■	■	■	■	
60 x 60	■	■	■	■	■	■	■	
70 x 70	■	■	■	■	■	■	■	
80 x 80	■	■	■	■	■	■	■	
90 x 90			■	■	■	■	■	
100 x 100			■	■	■	■	■	
120 x 120				■	■	■	■	■
140 x 140					■	■	■	■
150 x 150					■	■	■	■
160 x 160					■	■	■	■
180 x 180					■	■	■	■
200 x 200					■	■	■	■
220 x 220							■	■
250 x 250					■			
260 x 260						■	■	■
300 x 300								■
400 x 400							■	■

For minimum order quantities, please contact your account manager.

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Celsius® 420 Elliptical Hollow Sections

Size (mm)	Thickness (mm)				
	4.0	5.0	6.3	8.0	10.0
150 x 75					
200 x 100					
250 x 125					
300 x 150					
400 x 200					
500 x 250					

For minimum order quantities, please contact your account manager.

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Improved visual appeal

We know aesthetics is key to the development of Celsius® 420. As the tube is shaped after normalising, the product is formed with a tighter corner in both squares and rectangles. Celsius® 420 guarantees a maximum 2T (2x the thickness) corner profile compared to the product standard EN 10210 which is 3T.

Celsius® 420 comparisons

EN 10210 Hot finished EN 10219 Cold formed	Area (A) cm^2	Moment of Inertia (I) cm^4	Elastic modulus (Z) cm^3
120 x 120 x 8 RHS	35.2	726	121
120 x 120 x 8 RHS	33.6	677	113

BIM models

Easy-to-understand and accessible Celsius® 420 BIM models are available for all Celsius® 420 products. They are designed to make collaborative design easier and they are fully compliant with forthcoming UK Government policy, which aims to see all centrally procured projects achieve Level 2 BIM by 2016 and global standards.

This provides peace of mind and reassurance that you are complying with the latest industry requirements. In addition, Celsius® 420 is backed by full technical and post-sales support from our qualified engineers, providing impartial design advice, specification guidance and welding expertise for even the most challenging and ambitious designs, drawing on 50 years of industry experience to help you find the very best solution for your project.

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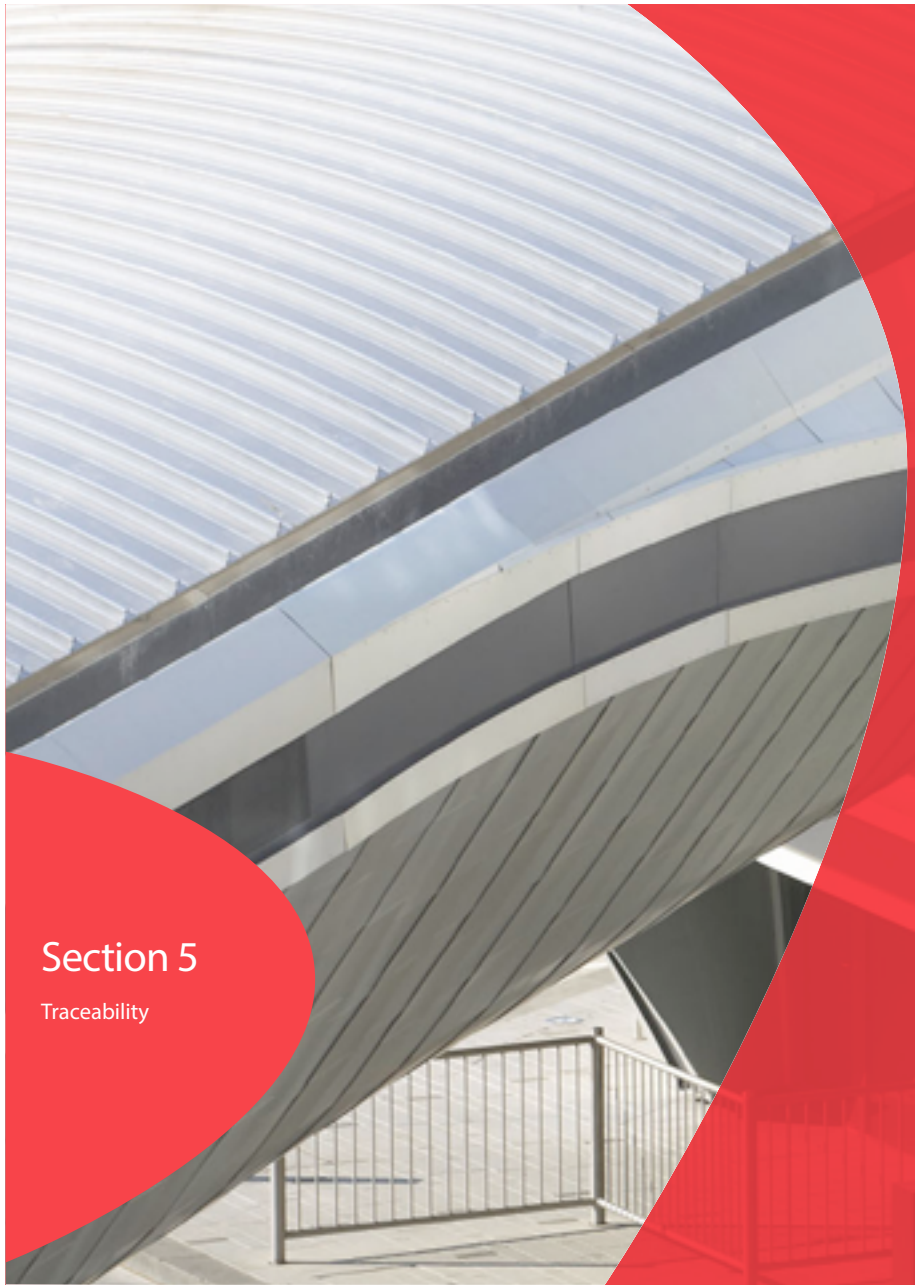

Traceability

- Complete reassurance
- Manufactured in the UK

Click arrow for section links

Section 5

Traceability

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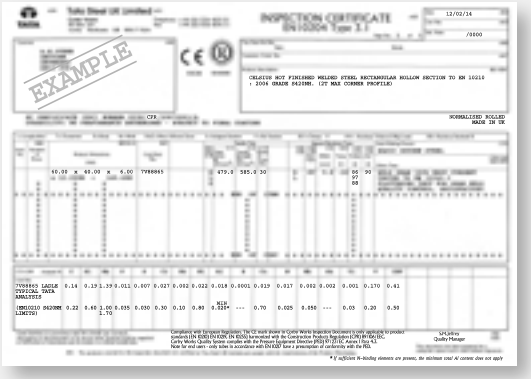
What makes Celsius® 420 fully traceable?
Click here

Complete reassurance

Celsius® 420 gives you complete confidence in the sourcing and supply of hot-finished structural steel hollow sections from a company you trust. At Tata Steel, we are committed to providing fully traceable hot-finished structural steel products, from raw material through to manufacture. Celsius® 420 is the new product standard, offering an integrated supply chain with proven performance to give you complete reassurance on material quality and composition.

Manufactured solely in the UK at Tata Steel's integrated steel works at Port Talbot, Hartlepool and Corby, Celsius® 420 builds on the strong heritage and quality standards of Tata Steel, combining 50 years of expertise and innovation in metallurgy, steel strip and coil products.

It is manufactured and tested to the highest standards and boasts full traceability, including Specific Inspection 3.1 Certification with a full chemical composition stated on inspection certificate, Factory Production Control (FPC) and Declaration of Performance (DoP).


INSPECTION CERTIFICATE

EXAMPLE

Click here for enquiries: **Technical** **Commercial**

- Integrated supply chain
- Manufactured in the UK
- Specific Inspection 3.1 Certification
- Declaration of Performance (DoP)
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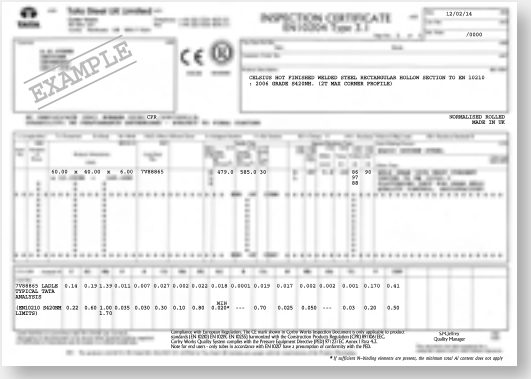

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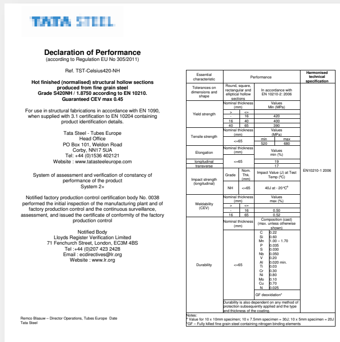
Manufactured in the UK

Knowing the provenance of structural products is critical in order to maximize your confidence in their quality, reliability and performance. Manufactured at Port Talbot, Hartlepool and Corby in the UK, the Celsius® range has a fully traceable supply chain, from raw material right through to final production.

Celsius® 420 is certified as 'very good' to the BRE responsible resourcing standard BES 6001, providing assurance that you are specifying a sustainable product that can maximise the potential for obtaining credits under the Responsible Sourcing of Materials sections of BREEAM, and demonstrating our commitment to sustainable manufacturing to support your sustainability goals.



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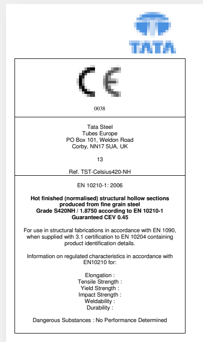
Declaration of Performance



TATA

CE

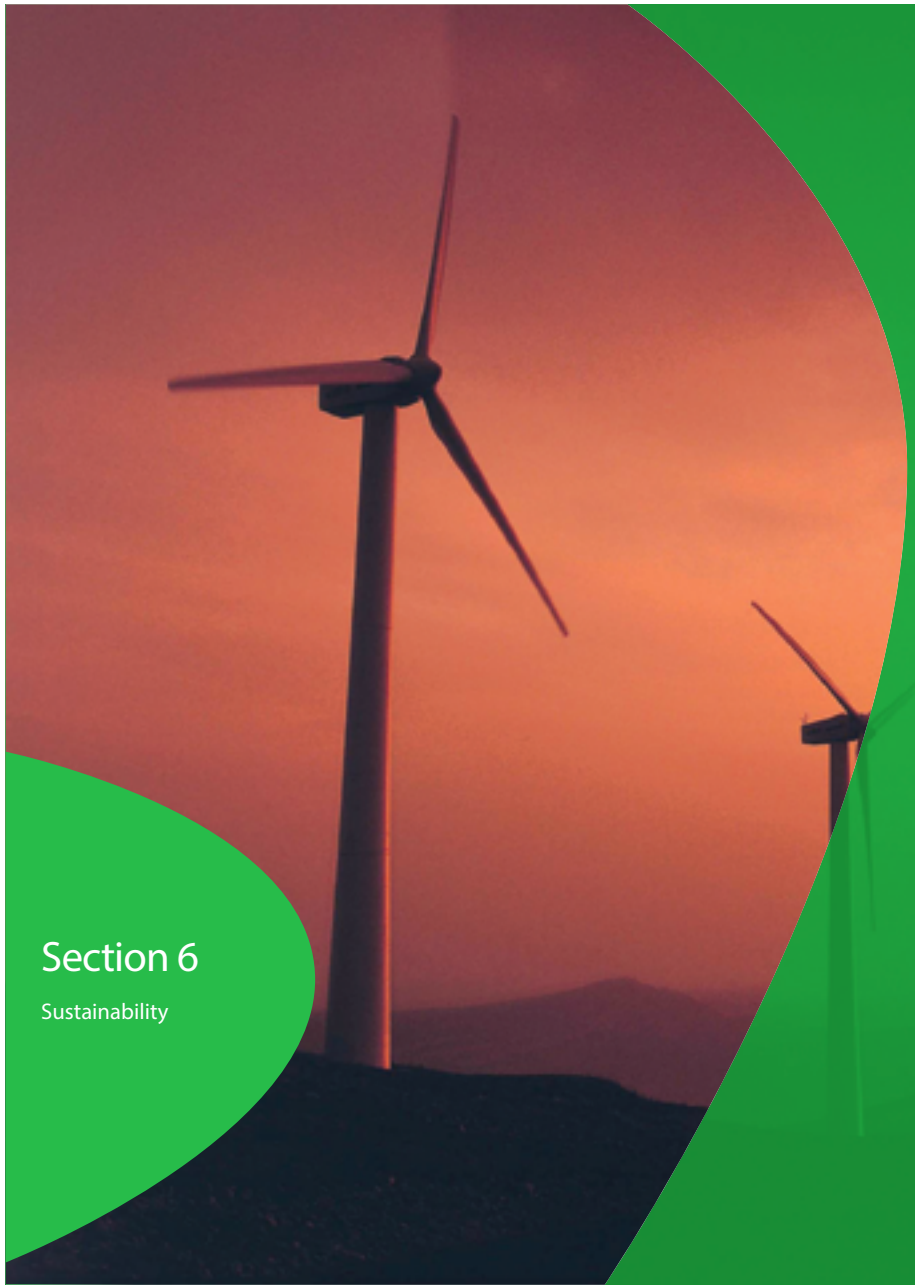
BES 6001

Responsible Sourcing

www.greenbooklive.com

Born and bred in the UK for a lower carbon footprint

Click here for enquiries: Technical Commercial



Section 6

Sustainability

Sustainability

- Hitting sustainability targets

Click arrow for section links

Click here for enquiries: **Technical** **Commercial**

Discover how Celsius® 420 can help you achieve better sustainability here

Hitting sustainability targets

Sustainability is at the very heart of what we do at Tata Steel. As one of the world's leading steel producers, we are dedicated to both managing our operations responsibly and to continuous improvement.

We take a collaborative approach to sustainable building, using the latest innovative techniques in hot-finished structural steel products. Steel itself offers a number of key advantages in terms of sustainability, not least the fact that it is the only material with a truly closed recycling loop, and can be used again and again without any loss of quality or strength.

Celsius® 420 takes sustainability even further. Manufactured locally in the UK, it is a fully recyclable, cradle to cradle product that provides a completely sustainable solution and offers a significantly lower carbon footprint than imported tubes. To find out more about the sustainability of steel **click here**

With stronger steel grades used in its manufacture and a yield strength of 420 megapascals, Celsius® 420 achieves up to a 17% weight saving, reducing the amount of material in use and contributing to a more sustainable application.


bsi.

Certificate of Registration

RESPONSIBLE SOURCING OF CONSTRUCTION PRODUCTS

Our integrated supply chain, with a reputation for sustainability and traceability, strengthens reassurance further, with no uncertainty about material source or composition. In addition, Celsius® 420 is backed by our BES 6001 certification, helping you achieve additional BREEAM points and supporting your sustainability goals.

For enquiries regarding BES 6001 please **click here**

Click here for enquiries: **Technical** **Commercial**

- Fully recyclable
- Lower carbon footprint
- Less material in use
- BES 6001 certification

Hitting sustainability targets

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bsi.

Certificate of Registration

RESPONSIBLE SOURCING OF CONSTRUCTION PRODUCTS

This is to certify that:

Tata Steel UK Limited
Swinden Technology Centre
Moorgate
Rotherham
S60 3AR
United Kingdom

Holds Certificate Number: BES 618851

and complies with the requirements of BES 6001 : Framework Standard for the Responsible Sourcing of Construction Products for the following scope: The Responsible Sourcing certification has been carried out under licence using BREs responsible Sourcing scheme methodology and underwriting process.

Product Group: Steel Products: Beellams, Plate, Hot, Panels and Profiles, Tubes, Metallic Coated Strip Products, Cement Building Products (Metals and profiles).

Performance Rating: Very Good

For and on behalf of BSI:

Gary Person, Chair, Certification Body Management Committee

Originally registered: 03/08/2014 Latest Issue: 05/08/2024 Expiry Date: 04/08/2029

Page: 1 of 2

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Click here for enquiries: **Technical** **Commercial**

Support

- 50 years of industry experience
- Design and specification guidance

Click arrow for section links

Section 7

Support

Click here for enquiries: **Technical** **Commercial**

50 years of industry experience

With our expertise at your disposal, all of our customers can benefit from Tata Steel's years of specialist experience, research and development.

We offer a comprehensive support service through detailed technical literature, a **technical hotline** and access to our experts for consultation at any phase in the design and construction process.

Our experienced Technical Advisory Team use their knowledge of hollow sections to advise at every stage of the development on all applications from design and specification through to completion and product supply.

Click here for enquiries: **Technical** **Commercial**

Design and specification guidance

To enable ease of design and specification the following tools are available:

Technical Guide

For the full list of properties please refer to our comprehensive technical guide.

Celsius® 420 Technical Guide

Tube Element Design Package

To assist engineers in the design of Celsius® 420 we have established a 'tubes element design package' with the SCI, enabling engineers to use Celsius® 420 to its full advantage.

Click here to access our Tube Element Design Package/Blue Book

BIM Models

BIM content is also available for the full range of Celsius® 420 products. This content includes data sheets and 3D models designed to provide accessible data based on open standards. The data can be exchanged between different software platforms, enabling their use anywhere in the world. The level of data can be customised by the user, meaning that the models can be optimised to suit your needs.

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Section 8

About us

About us

- About Tata Steel

Click arrow for section links

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Celsius®420

THE ULTIMATE HOT- FINISHED STRUCTURAL STEEL

About Tata Steel

The Tata Steel Group itself is a top 12 global steel producer, with manufacturing operations in 26 countries across four continents, around 80,000 employees and a turnover of US$24.81 billion in the year ending March 2014.

Tata Steel is Europe's second largest steel producer. Our comprehensive range of high quality products and services includes flat, long and construction products, supported by steel making sites in the Netherlands and the UK, a European-wide distribution and service centre network and downstream businesses ranging from tubes and building systems to plating.

Our European-based R&D function alone employs around 500 research and support staff. It is fully aligned with our customer-focused strategy of innovation and the development of new products, services and processes to help you achieve your goals, both now and in the future.

With a unique approach to business, we focus on market sectors to allow us to better recognise the individual needs of our customers. By understanding your business and goals, we can deliver steel products and services that give you the advantage, whether that's enhancing your product performance, improving your efficiency, accessing new markets or creating more sustainable solutions.

Contact us:

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Technical enquiries:
technicalcelsius420@tatasteel.com

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www.tatasteelconstruction.com