

**TATA STEEL**



## **Hollow sections**

For structural and mechanical application





# WHY HOLLOW SECTIONS?

Steel hollow sections are the most versatile and efficient form for construction and mechanical applications. Many of the strongest and most impressive structures in the world today would not have been possible without hollow sections.

The tubular form is inherently strong and efficient. It gives buildings a better strength-to-weight ratio than those using comparable steel, concrete or timber products. In construction, this strength-to-weight ratio reduces material usage and allows for greater spans. This results in lightweight, airy structures that are aesthetically pleasing within our communities and environments.



Hollow sections have a wide and diverse application. For example, hollow sections have been used in iconic structures such as the London Eye, Emirates Stadium and space-frame structure of the world record-breaking JCB Dieselmax. Also, they are ideal for everyday applications such as vehicle trailers, fences and handrails.



# THE RIGHT PRODUCT FOR EVERY APPLICATION



Tata Steel is one of the world's leading producers of welded steel tube. We have been producing hot finished and cold formed hollow sections for more than 50 years. We have helped many customers to achieve a specific aesthetic or performance using steel.



## Celsius® 355 NH

### The Ultimate Structural Hollow Section

**Celsius® 355** is a hot finished product offering you a wide range of benefits. Made exclusively from normalised, fine grain steel, **Celsius® 355** is fully stress-relieved with uniform mechanical properties. This makes it ideal for demanding structural and mechanical applications - delivering reliable performance, even at lower temperatures. Where looks matter, tight corner profiles, consistent dimensions and superior surface finish are hallmarks of **Celsius® 355**. It is also easy to fabricate, weld and manipulate to save you processing time and cost. For added customer confidence, **Celsius® 355** is traceable, batch-tested and supplied with full test certification.

## Hybox® 355

### Multi-purpose Structural Hollow Section

**Hybox® 355** is a cold formed, high grade, multi-purpose structural hollow section. It is perfect for projects where you require guaranteed minimum strength and mechanical properties. It can be used in a wide range of structural and engineering applications, including all those where specific properties and compliance with design codes are required.

## Strongbox® 235

### General Purpose Hollow Section

**Strongbox® 235** is a cold formed, low grade hollow section suitable for a wide range of general purpose applications including light, non-critical structures. **Strongbox® 235** is quality-assured and is manufactured in Western Europe.

### Choosing the right Tata Steel product for each application

#### Celsius® 355 NH

#### Hybox® 355

#### Strongbox® 235

Choosing the right Tata Steel product for each application	Celsius® 355 NH	Hybox® 355	Strongbox® 235
Fully compliant with the European Standard EN10210: S355NH (Hot Finished)	✓		
Fully compliant with the European Standard EN10210: S355J2H (Hot Finished)	✓		
Fully compliant with the European Standard EN10219: S355J2H (Cold Formed)		✓	
Fully compliant with the European Standard EN10219: S235JRH (Cold Formed)			✓
Fully compliant with the American Standard ASTM A501 – Grade B (Hot Finished)	✓		
Suitable for galvanising	✓	✓	✓
Manufactured in Western Europe	✓	✓	✓
Available as square, rectangular and circular hollow sections	✓	✓	✓
Clearly marked for quality assurance	✓	✓	✓
Fully-killed steel for better formability and weldability	✓	✓	✓
Sustainable product solution and 100 per cent recyclable	✓	✓	✓
Certified for batch traceability	✓	✓	
Suitable for performance applications where properties must be relied upon	✓	✓	
Minimum yield of 355 MPa	✓	✓	
Better energy absorbed at lower temperatures (-20°C @ 40J)	✓		
Suitable for low temperature applications (-20°C @ 27J)	✓	✓	
Suitable for structural and mechanical applications	✓	✓	
Compliant with the CPD through CE Marking	✓	✓	
Compliant with European design standards	✓	✓	
Full technical support available	✓	✓	
Tight corner radii for aesthetic appeal and higher geometric properties	✓		
Stress-relieved for optimum performance and total confidence in service	✓		
Confidence of design and fabrication without concern for fatigue	✓		
Available as elliptical hollow sections	✓		
Hot finished and able to perform in the most arduous conditions	✓		
Lower CEV 0.43	✓		

# SUSTAINABILITY

The essential properties of steel make it a sustainable choice for a wide range of applications. Steel is strong, durable, versatile, reusable and, most importantly, it is 100 per cent recyclable.

Sustainability is not just about delivering environmental benefits; it is about reducing social and economic impacts too.

Our tubular steel sections are available in a wide range of circular, rectangular, square and elliptical forms. They give greater flexibility in use and higher strength-to-weight ratio than conventional sections. This enhances efficiency and reduces cost.

In construction, hollow sections create lightweight and visually attractive structures that benefit communities and environments. Steel buildings are inherently adaptable and can be easily extended. Steel is lighter in weight than other construction materials. This enables extensions to be built to existing buildings without overloading their foundations. Structures can be unbolted, reconnected, modified, repaired, reused and recycled.

Steel itself generates very little waste and, what there is, can be fully recycled. Steel construction is dry, dust-free, comparatively quiet and requires relatively small volumes of materials to be delivered to site. In turn, it reduces site construction times, minimising the impact on surrounding communities.



## Benefits of using steel

The steel industry provides a stable working environment for many workers compared to other employment sectors.



Tata Steel recycles more than three million tonnes of steel scrap each year in the UK, saving CO<sub>2</sub> emissions equivalent to those produced by almost a million households. Tata Steel has also reduced steel-making CO<sub>2</sub> emissions by 50 per cent over the past 40 years.



Structural steelwork is reusable meaning today's specified steel is unlikely to ever become waste.



The aesthetic nature that steel has in various structures and buildings helps to create bright and airy environments for people to live and work in. The beauty of steel is that it doesn't degrade over time either. So, whatever you use it for, it won't look tired and outdated with age.



Steel has a high strength-to-weight ratio, meaning that less material is required. This reduces cost and makes steel one of the cheapest construction options.



Steel construction is quick which contributes to low labour costs and quicker lead times on projects or work. The result of this is a faster return on investment.



Steel is 100 per cent recyclable and retains its value and properties for life.



The use of steel normally results in less disruption to the local community by way of noise pollution and vehicle movements. It also produces zero waste. Steel can also be easily demounted and rebuilt without creating a dusty demolition and environmental impact.



All new steel is made with a significant recycled content.

# 100%

Steel is 100 per cent recyclable and retains its value and properties for life.

# OUR EXPERTISE IS AT YOUR DISPOSAL

Steel tube is a relatively easy and particularly versatile material to work with. All customers who need help and advice can, however, 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 stage in the design and construction process.

Our experienced Technical Advisory Team use their knowledge of hollow sections to advise at all stages of the development of a structure, from design and specification through to build and product supply.

We have assisted in many projects, from the iconic to the everyday. We use qualified structural engineers and we perform software checks on welded joints for all structural hollow section connections. It does not stop there. We are investing in research and education into the use of hollow sections in construction and engineering as a key part of the technical association, CIDECT. Using this experience, we can enable our product to be converted to strong, efficient and aesthetically pleasing structures.





# MANUFACTURING

Tata Steel is one of the world's leading producers of welded steel tube. From a variety of wall thicknesses and steel grades, we manufacture one of the widest ranges of steel hollow sections available.

Tata Steel benefits from being a fully integrated steelmaker. We manufacture our own steel coil and convert it into tube via a number of tube-forming and finishing processes. This allows full visibility of the entire steelmaking process, ensuring complete traceability throughout the manufacturing chain.

For more than 50 years now, we have been recognised as the pioneers behind steel hollow section production, with the knowledge and expertise that no other organisation can match. At each of our UK and Netherlands mills, we harness these years of experience and innovation to manufacture our hot and cold welded hollow sections.

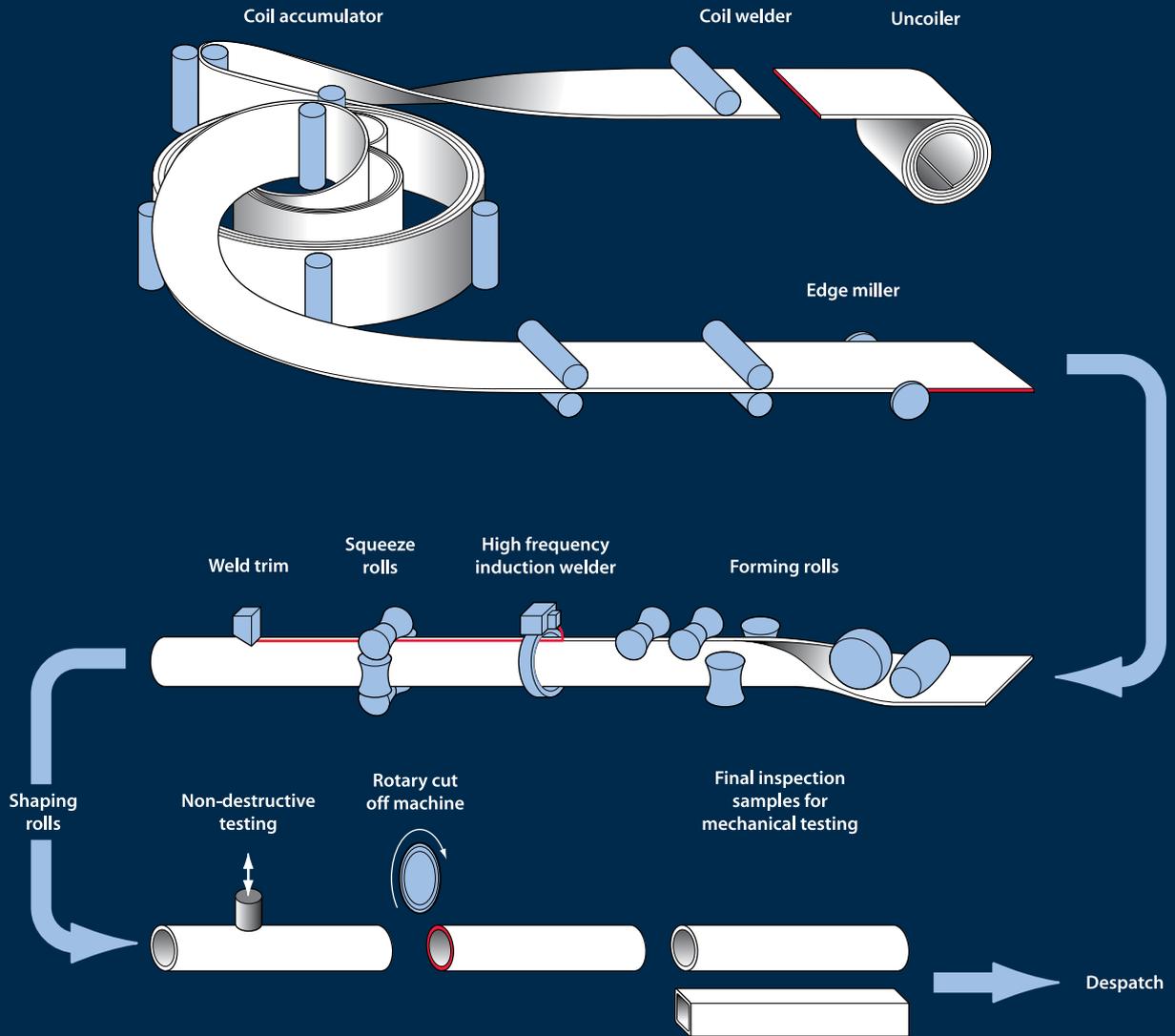
Stringent internal quality and performance testing regimes ensure that our delivered hollow section is to the highest standard. Each manufacturing site is accredited with ISO 14001 and European standards, ensuring products that are justifiably trusted for their reliable quality and performance.

The manufacturing processes of hot finished and cold formed hollow sections are very different. Hot finished hollow sections are formed at normalising temperature (approx 900°C) and are produced in accordance with standard EN10210-1. Cold formed hollow sections are formed at ambient temperature and are produced in accordance with standard EN10219-1. This results in several key

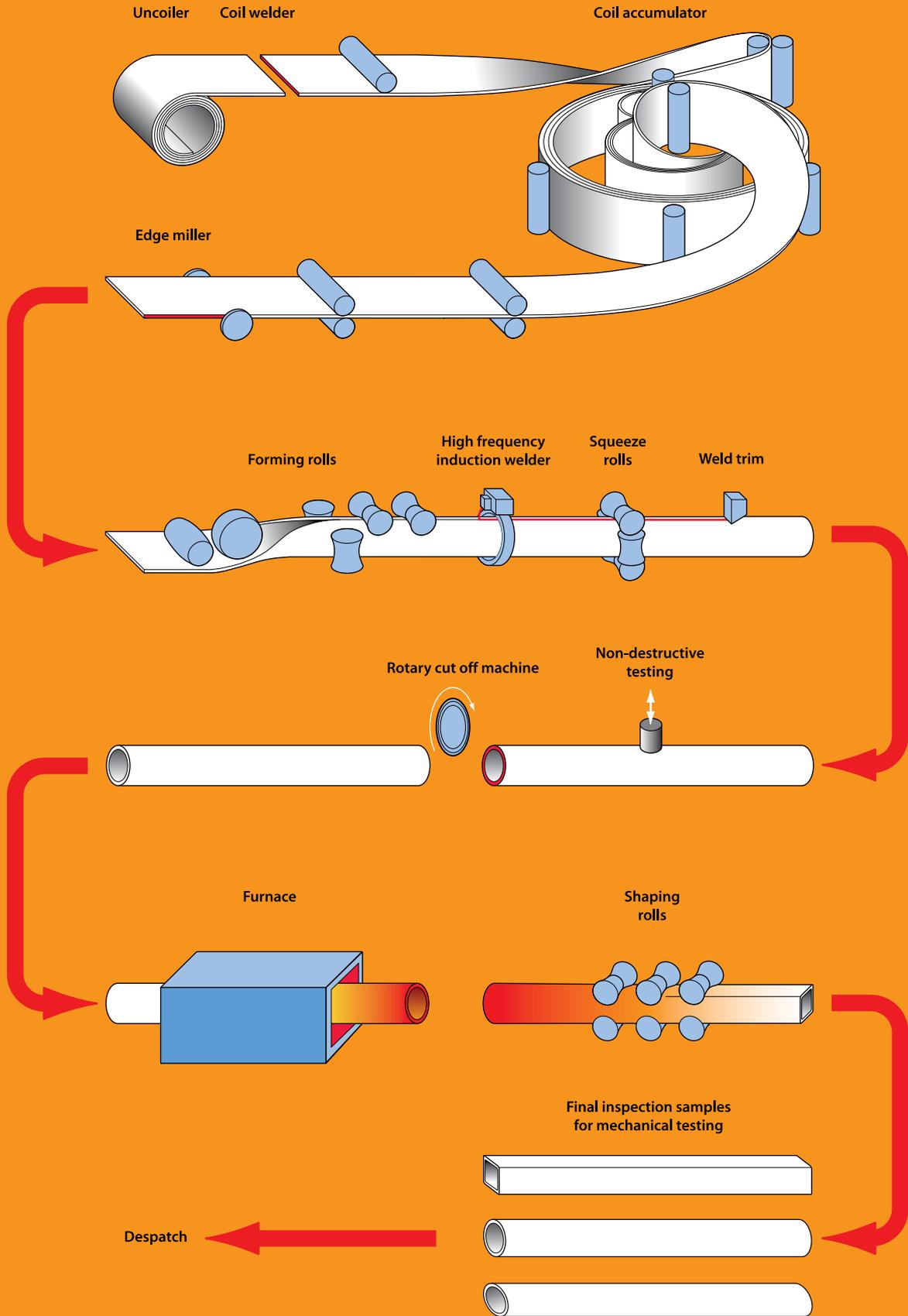
differences. The main difference is that hot finished hollow sections pass through a furnace and have a much tighter corner profile as a result of the metal flow during the forming process (EN10210-2). Cold formed, on the other hand, exhibit a high degree of cold working in the corner regions during the forming process. This means that they could be susceptible to corner cracking if manufactured with tight radius corners. The standard EN10219-2 stipulates, therefore, larger radii to allow for this.



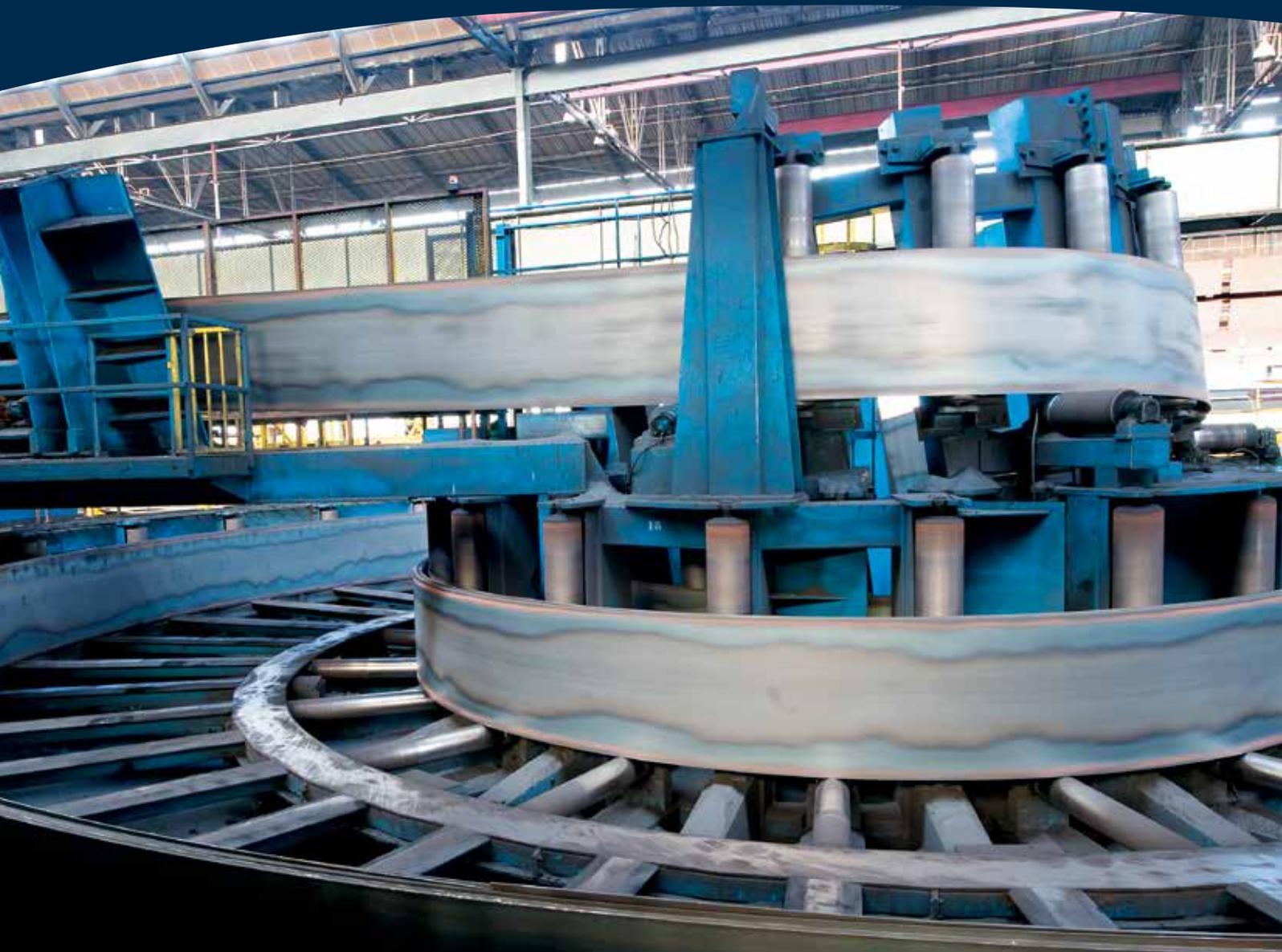
# Cold Process Route



Hot Process Route



For more than 50 years now, we have been recognised as the pioneers behind steel hollow section production, with the knowledge and expertise that no other organisation can match.



[www.tatasteel.com](http://www.tatasteel.com)

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**Tata Steel**

PO Box 101  
Weldon Road  
Corby  
Northants  
NN17 5UA  
United Kingdom

T: +44 (0)1536 402121

F: +44 (0)1536 404111

[marketing@tatasteel.com](mailto:marketing@tatasteel.com)

English Language TST01:500:UK:09/2013