

TATA STEEL



Offshore Pipeline Packages

Your partner in the global search for energy





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YOUR PARTNER IN OFFSHORE PIPELINE SOLUTIONS

Capitalising on decades of experience, our expert knowledge of steel and our global capabilities, we will work together with you to provide the optimum offshore pipeline solution, whatever your requirements.

As leaders in the deepwater linepipe market, we have worked extensively and closely with our customers on complex and often time critical projects, delivering products that are proving themselves in the world's harshest environments.

Today, our high performance product portfolio includes welded linepipe, pipe-in-pipe, ancillaries and special coatings for deepwater and high temperature applications. This wide product range enables us to fulfill all your linepipe requirements therefore reducing your contract complexity.

By working with us you can be assured of optimal pipeline properties. Fit up and lay rates can both be dramatically improved due to the superior tolerance control delivered by our quality pipe manufacturing processes.

As part of a global network with a well-established reputation for providing value in steel we work with in-country sub-contractors to deliver local content. Our network of offices provides local knowledge and support in oil and gas producing territories around the world.

We are committed to working in partnership with our customers and industry experts in the continuing quest to deliver high-performance products that lead the way in the recovery of hydrocarbons. Our product solutions enable you to develop deepwater and high pressure, high temperature well resources that would otherwise be uneconomical.

Our products are proving themselves in the world's harshest environments

WE PUT
TECHNOLOGY
TO WORK
ON BEHALF OF
OUR CUSTOMERS.



THE GLOBAL SEARCH FOR ENERGY

We understand the pressures facing today's pipeline operators and contractors. We employ expertise and innovation to meet challenges head-on and to deliver solutions for a wide array of demanding operational scenarios.

Challenge

As the worldwide demand for energy continues to grow, there is increasing pressure to exploit hydrocarbons in ever more remote and harsh environments. Both operating and capital expenditure are on the increase as attention focuses on deepwater and remote fields. Linepipe performance and reliability have become a critical cost factor. Pipeline operators and contractors are turning to proven suppliers to work with them in partnership as they tackle current and future challenges.

Technology

Extreme challenges demand strong solutions. Our unique capability in thick-walled linepipe ensures that Tata Steel is an ideal partner for deepwater projects. We are applying an array of process and material technologies to extend our capabilities and to enhance linepipe performance to meet emerging needs. Collapse resistance, flow assurance and corrosion management are high on the agenda for the continuing development of our wide range of pipeline solutions.

Innovation

We are leading the way in the supply of innovative pipeline solutions.

Our pipe-in-pipe products already operate in some of the most challenging subsea applications and environments. Innovations include a hybrid insulation pipe-in-pipe system for improved strength and thermal performance, delivering assured flow rates in high temperature applications. Our proven range of external coatings is being expanded to exploit advances in multi-layer foam coat technology, offering an even wider range of thermal insulation level options to our customers.

We have also developed a cost effective, metallurgically-bonded clad linepipe that is highly corrosion-resistant ensuring long service even when transporting sour gas over large distances or within riser systems.



PRODUCTS THAT PERFORM



Our products are proving themselves in tough environments. Strength, reliability and innovation are the hallmarks of our pipeline solutions.



Our pipeline products have been developed to perform in a wide range of demanding application scenarios. From recovery in deep water and remote fields to the transportation of highly corrosive resources, our pipeline offers a comprehensive choice of solutions to meet specific and exacting requirements. Our products are installed and delivering in numerous locations including the UK Continental Shelf, the Gulf of Mexico and West Africa.

Advantages

Our unique capability in thick-walled pipe – combined with our trademark tight tolerances – means our linepipe offers significant advantages to today's pioneering operators. These include easy fit-up and faster lay rates, improved collapse performance and fatigue resistance in the harshest conditions.

Our fundamental product strengths are augmented by the innovative application of materials technology for enhanced flow assurance and corrosion management. Special coatings, pipe-in-pipe solutions and metallurgically-bonded clad linepipe can be supplied to meet discreet requirements or as part of a complete operating system.

Our technical expertise and industry knowledge mean we are perfectly placed to procure and manage a wide range of pipeline-related components and systems that complement our own production capabilities. By contracting us as your single source of pipeline product packages you can benefit from contract efficiencies and reduced contract risk.

Full details of the sizes, properties and performance capability of our wide range of products is available at www.tatasteelenergy.com

Our pipeline products can reduce project installation costs through short lay times and faster fit up

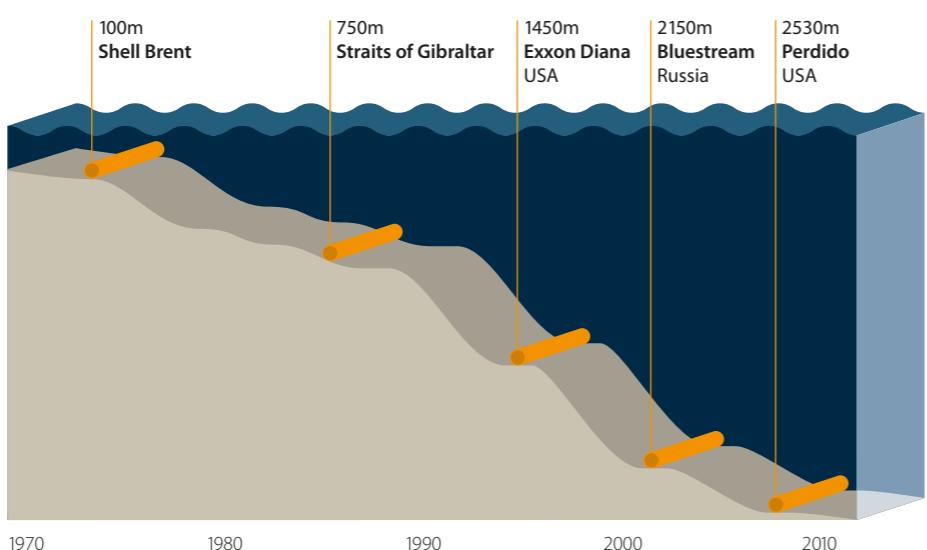
Tata Steel – Pipeline Solutions

Application	Solution	Description
Deepwater / ultra-deepwater	Collapse resistant linepipe	We have a solid track record in the production of thick-walled Double Submerged Arc Welded (DSAW) linepipe, even in smaller diameters. Our capability is combined with a thorough understanding of the mechanisms driving deepwater collapse. Through optimising the wall thickness tolerance and ovality of our linepipe we enable our customers to reduce the wall thickness of their pipeline design, lowering the submerged weight of the pipeline and reducing fit up and welding costs during pipelay.
Internal corrosion management	Sour-resistant steels Metallurgically-bonded clad pipe	We have extensive experience and expertise in the selection and utilisation of sour-resistant steel for pipelines transporting highly corrosive hydrocarbon products. Our metallurgically-bonded clad linepipe is formed from carbon steel and Corrosion-Resistant Alloy (CRA) metallurgically-bonded plate to provide a highly corrosion-resistant internal pipe surface without the expense of a solid CRA pipe. This product can be economically manufactured in large quantities making it ideal for the longer lengths required for offshore developments and riser systems.
External corrosion management	3-layer polyolefin and fusion-bonded epoxy (FBE) coatings Sacrificial anodes	We offer a range of external coatings including FBE (with corrosion resistance from -40°C to 85°C) and 3-layer polyethylene or polypropylene (with temperature resistance up to 110°C). We can apply these coatings at our mill site through our joint venture operation. Alternatively, we can manage the coating service through one of our many partners worldwide. As part of our supply management service, we can provide a wide range of anodes and anode attachment pads.
High pressure, high temperature (HPHT) fields / flow assurance	Pipe-in-pipe Wet insulation – PP foam	Our experience in pipe-in-pipe enables us to work closely with clients to optimise solutions for the transportation of multi-phase oil and gas at the highest temperatures and pressures. Our product range covers polyurethane (PU) foam insulation; a hybrid PU and Nanogel solution; and, for the highest temperatures, Hydrotherm®. Our composite Hydrotherm® system can also take S-Lay technology to deeper waters. For applications where lower insulation properties are required, we offer a 4-layer polypropylene system for maintaining flow assurance.
Oil offloading lines / steel catenary risers	Fatigue-resistant linepipe	We offer a reliable and proven steel alternative to the traditional, high-cost flexible pipe solution for oil offloading lines and steel catenary risers. Our excellent pipe end tolerances allow close fit-up of pipes to reduce susceptibility to fatigue at the welded joint. Electronic measuring, monitoring and identification systems enable pipe segregation and matching for optimal pipe mating. We can also manage pipe segregation at our pipe storage yard.
Enhanced recovery	HFI linepipe	Where injection lines are required for enhanced recovery, we offer High Frequency Induction (HFI) welded products with much reduced lead times compared to traditional alternatives.
Remote fields and long tiebacks	Weldable linepipe Pipe-in-pipe	We use high quality, low carbon equivalent, low residuals coil and plate feedstock. These chemistries, combined with exacting tolerances, optimise weldability rates to reduce project time and costs. Our pipe-in-pipe systems provide a high degree of thermal integrity – ensuring minimal heat losses over long tiebacks. We exercise close control over assembly and half-shell tolerances for the achievement of faster lay rates.
Offshore (varying scenarios)	DSAW and HFI linepipe	We have worldwide experience of subsea pipelines operating in a variety of conditions and water depths. We can offer excellent low and high temperature pipe properties together with our renowned, tight dimensional properties – reducing costs and lay times. Our steel linepipe includes both DSAW and HFI welded. Our pipeline solutions include a range of coating options and the supply management of bends, anodes and other ancillaries.



PROCESSES THAT DELIVER

Our manufacturing operations are geared to the production of a wide range of high-performance, proven linepipe – enabling customers to optimise their pipeline developments.

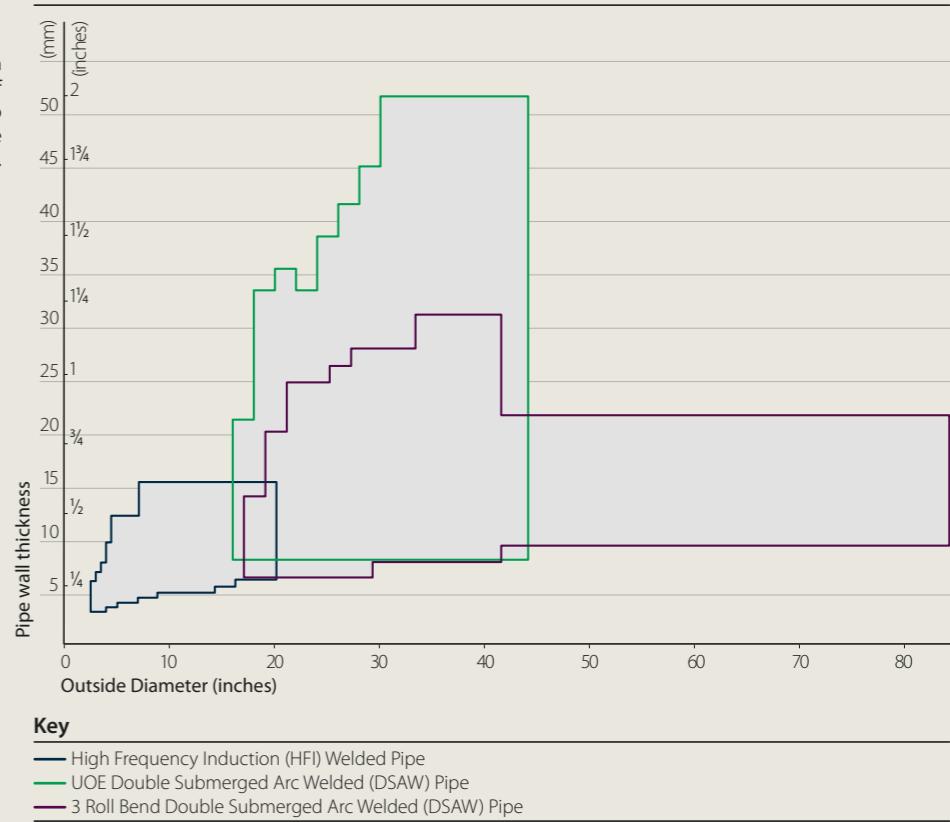


Proven and flexible
Our world-leading mills, producing both Double Submerged Arc Welded (DSAW) and High Frequency Induction (HFI) welded linepipe, occupy sites at Hartlepool in the north-east of England and Corby in central England. Our DSAW mills boast the world's most powerful crimp and 'O' press. Our HFI mill employs the most powerful HFI welder in the world (1800kW). We operate multi-process production routes, with specialist coating and pipe-in-pipe facilities co-located with our mills to ensure speed, efficiency, flexibility and control, enabling us to meet the needs of your project, however complex and time critical.

Performance benefits
We combine expert knowledge of steel chemistry with advanced processes to deliver products with outstanding performance characteristics including strength and fatigue-resistance. We have impressed customers worldwide with our ability to achieve excellent pipe form and dimensional tolerances. This enables accurate pipeline system design – eliminating waste and reducing costs.

Our proven capability in a comprehensive range of linepipe sizes enables us to service even the most extensive and complex of projects.

Wall thickness versus outside diameter capability by manufacturing process



Continuing investment
We are committed to the continuous improvement of our processes in order to enhance our products and maintain the quality of our manufacturing capabilities. More than £25 million has been invested over the last five years to keep all of our mills at the leading edge of pipe-making technology. There have been several extensive upgrades to our HFI mill and recent improvements at our DSAW mills have included enhancements to tack welding machines and our crimp press for faster throughput. New plate edge milling and bevelling machines are enabling pipe welding to the highest standard.

Stringent testing
Among the millions of pounds that we have invested in recent years, a significant proportion has been spent on ensuring that our product testing facilities are second to none. We have installed pioneering 28-probe non-destructive testing systems to provide complete confidence in weld integrity. Ultrasonic examination of the seam weld, transverse weld tensile testing and x-radiography of the weld are undertaken to complement a battery of other tests and inspections for plate, welds and finished pipes. These include hydraulic and hydrostatic testing and magnetic particle inspection for your complete product assurance.

OUR PRODUCTS IN ACTION

Our pipeline solutions are in service all over the world. Offering outstanding performance and reliability, our product range can be deployed with confidence.



Deepwater pipelines in the USA

Challenge

The deep waters of the Gulf of Mexico demand exceptional collapse performance. As operators push the boundaries of exploration to access greater depths, the performance and reliability of the linepipe becomes a critical consideration.

Solution

Expertise in thick-walled pipe has meant that we were able to rise to the challenge posed by deep water and rugged seabeds. We supplied the Banjo Seahawk Coflexip project for Williams with 69km of our 18 inch outside diameter (OD) linepipe which was reel laid at depths of 6.000 feet – making it the largest diameter and heaviest walled DSAW pipe ever to be reeled in the world. Since this achievement we have supplied pipe for an extensive list of challenging, deepwater projects in the same region including Devil's Tower, Tahiti and Blindfaith. More recently we supplied 312km of linepipe for the Perdido Norte project – one of the deepest pipelines in the world.

Sour service in Indonesia

Challenge

Total E & P Indonesia planned to extract extremely sour resources from the Sisi and Nubi offshore fields. They needed a linepipe supplier with proven experience of sour service pipelines.

Solution

Our thick-walled DSAW linepipe for sour service had been proven on numerous projects including the supply of 50km of 22 inch and 26 inch thick-walled material to Total E & P Indonesia. As part of our service to supply complete solutions, we also managed the supply of mother pipe and procurement of hot induction bends, reducing contract complexity for our customer. The key success factor on the project was the blend and application of steel and linepipe technology to produce optimum sour resistance. The pipeline was brought into service to take gas from the offshore fields to the largest liquid natural gas (LNG) liquefaction plant in the world at Bontang on Kalimantan Island.

Flow assurance in the North Sea

Challenge

The recovery of high temperature oil and gas from the North Sea has demanded exceptional pipe-in-pipe performance. The BP Rhum field, Talisman Tweedsmuir and Shell Starling developments all required production lines with excellent overall heat transfer coefficients (U value) of less than $1\text{W/m}^2\text{K}$. Rapid lay rates were also demanded to ensure economical installation.

Solution

We have supplied more than 200km of pipe-in-pipe, operating at temperatures up to 125°C . The pipeline systems used inner and outer carbon steel pipes, the inner pipes often with CRA liners. The joints were insulated using polyurethane foam, the accuracy of assembly (end concentricity and stickout length) allowed lay rates of up to 1km per day. Through the management of approved sub-contractors we were able to reduce supply chain risk and complexity, supplying pipe materials, coating and pipe-in-pipe assembly. The completed pipe-in-pipe joints were loaded out from our deepwater port at Hartlepool on a 24 hour basis straight to the S-Lay vessel.

Oil offloading in West Africa

Challenge

Our customers in West Africa were seeking a cost-effective alternative to flexible pipe for oil offloading purposes. Fatigue resistance was an essential requirement. Oil offloading lines from the floating platform to the buoy and steel catenary risers have stringent fatigue requirements as wave motion can initiate fatigue failures at welded junctions.

Solution

In Angola, we were the first company to supply permanently suspended carbon steel linepipe for oil offloading lines – for the Kizomba A project. The excellent fit-up achieved through our tight dimensional control meant our linepipe met the exacting fatigue requirements. The precision of our process, coupled with strict pipe monitoring and identification, enabled the sorting, batching and matching of linepipe – allowing the client to use the optimum mating sequence for the pipe thus reducing the risk of failure due to fatigue. We have also supplied rigid steel linepipe in place of flexibles for the Agbami, Erha and Kizomba B oil offloading projects – providing our customers with schedule advantages, cost savings and design benefits.

Rapid field development in the North Sea

Challenge

High oil and gas prices mean national and independent operators are seeking to bring developments into production faster. On the Tullow Horne and Wren development, project schedules were at risk due to the lead times for a $2\frac{7}{8}\text{ inch}$ chemical injection line.

Solution

We responded with a 'quick to market' small diameter linepipe from our HFI mill in Corby. This product was designed into the development, allowing the rest of the project to proceed on schedule. Through our knowledge of the offshore sector and the steel industry we were able to ensure that the offering met the customer's requirements with a product that was available to the tightest of timescales. Since supplying the Tullow Horne and Wren development we have completed similar projects for Newfield Petroleum and Shell NAM.

Concrete weight coating in Angola

Challenge

The successful recovery of resources from emerging hydrocarbon 'hotspots' can rely heavily on the establishment of strong, in-country partnerships. Our work with the Cabinda Gulf Oil Company (a Chevron affiliate) in Angola was a case in point.

Solution

As part of our agreement to supply linepipe, we contracted Socotherm Angola Lda to operate the first concrete weight coating facility in Luanda. Staffed by local people, the facility was designed to cater for 4 to 48 inch (outside diameter) pipes. In addition to boosting the local economy, this new facility will have a major influence on the growing potential for deepwater and ultradeepwater projects whilst also allowing us to respond quickly to the requirements of our customers in West Africa. With more projects located offshore, at ever increasing water depths, concerns about infrastructure development and security issues continue to highlight the need for companies such as ours that are willing and able to collaborate and co-operate with local business leaders and communities.

EVERY STEP OF THE WAY



From front end engineering, through production, delivery and support, our team is there to take the load, share the risk and save you time.

Our customer support service offers:

- full range of logistic support
- inspection
- technical support
- precise order of delivery
- offloading and stacking

Our people are knowledgeable and offer solid support and advice borne from significant experience of the steel, coatings and hydrocarbons industries. We work in careful, considered partnership with our customers, sharing our expertise and delivering solutions on time and to budget. We encourage customers to make full use of our experienced personnel who will plan and co-ordinate all aspects of delivery from supply of our mill products through to the procurement of sourced items and the provision of support.

We offer a broad service – embracing all aspects of logistic support – but we tailor our efforts to match client requirements. Our flexible approach is matched by the flexibility of our production facilities, where optional processes, from heat treatment to the application of special coatings, can be accommodated. Through our joint venture, BSR Pipeline Services, we can offer our own on-site coating service or undertake coating locally to customer projects. We work with operators, lay contractors and pipeline engineers to supply single item purchases through to complex, integrated solutions, removing supply chain complexities.

Global access

Our Hartlepool pipe mills and coating facility are located close to deep water ports, providing ready access to all parts of the world.

The Tata Steel network of over 50 offices worldwide also helps to smooth the way through provision of valuable local knowledge and assistance. Major offshore hubs in London, Houston, Singapore, Perth and Dubai provide a secure environment for the direction and control of our global supply chain management operations.

Depth and breadth

Pipeline from Tata Steel offers a range of proven products and complete systems to all sectors of the energy industry. In addition to the linepipe and ancillaries developed for offshore and harsh operating conditions, we have significant experience in the provision of linepipe for the onshore gas and water industries. We also supply an extensive selection of process pipe and Oil Country Tubular Goods (OCTG). Full details of these products and associated services can be obtained by contacting our sales team on energyprojects@tatasteel.com



FOCUS ON THE FUTURE

As the pressure mounts to recover energy resources, you can rely on us to stay focused on success through innovation.



Proven Processes

We continue to expand our industry knowledge, exploit our experience and invest in technology to ensure that our pipeline solutions are geared to current and future needs.

We are committed to contributing to the ongoing success of our clients' pipeline operations through:

Pioneering Products

We are a world-leader in the supply of DSAW deepwater pipelines, high integrity HFI pipe and innovative solutions for field exploitation.

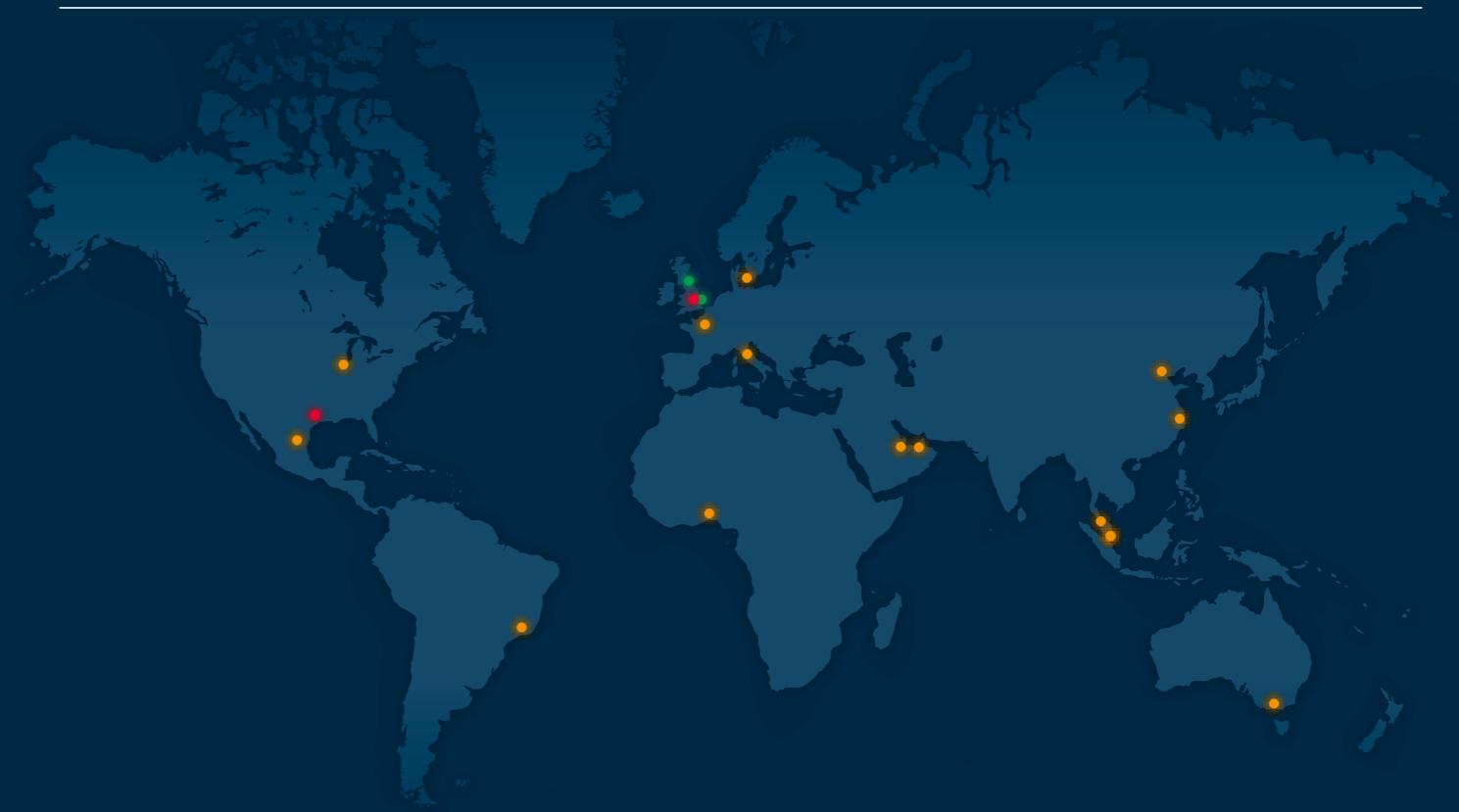
Our production processes are second to none and our extensive track record includes some of the most technically challenging offshore projects in the world.

Productive Partnerships

Our experience tells us that complex pipeline projects can only be realised efficiently and economically through working in partnership. We aim to work closely with our customers as they explore new markets and expand pipeline operations in increasingly challenging environments.

Our global network of overseas offices gives you access to our expertise and experience, locally

Locations worldwide demonstrate the global reach of Tata Steel



- Main sales office

Houston, USA
Corby, UK

- Sales office

Monterrey, Mexico
Rio de Janeiro, Brazil
Chicago, USA
Lagos, Nigeria

- Manufacturing location

Hartlepool, UK
Corby, UK
Copenhagen, Denmark
Paris, France
Milan, Italy
Dubai, UAE
Abu Dhabi, UAE
Kuala Lumpur, Malaysia
Singapore
Beijing, China
Shanghai, China
Melbourne, Australia

www.tatasteel.com

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