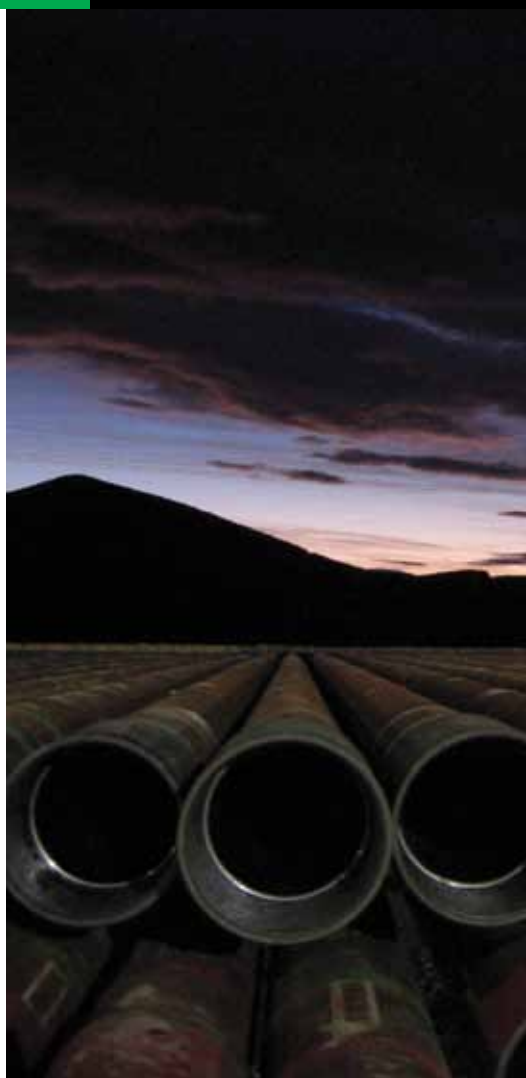
Tenaris

Offshore and Onshore Pipeline Solutions



The Tenaris Difference

Over the years, Tenaris has become an industry tubular products and services leader by being reliable. Producers know they can count on Tenaris to develop, manufacture, and deliver the most efficient and cost-effective solutions for their challenges no matter where they are in the world.

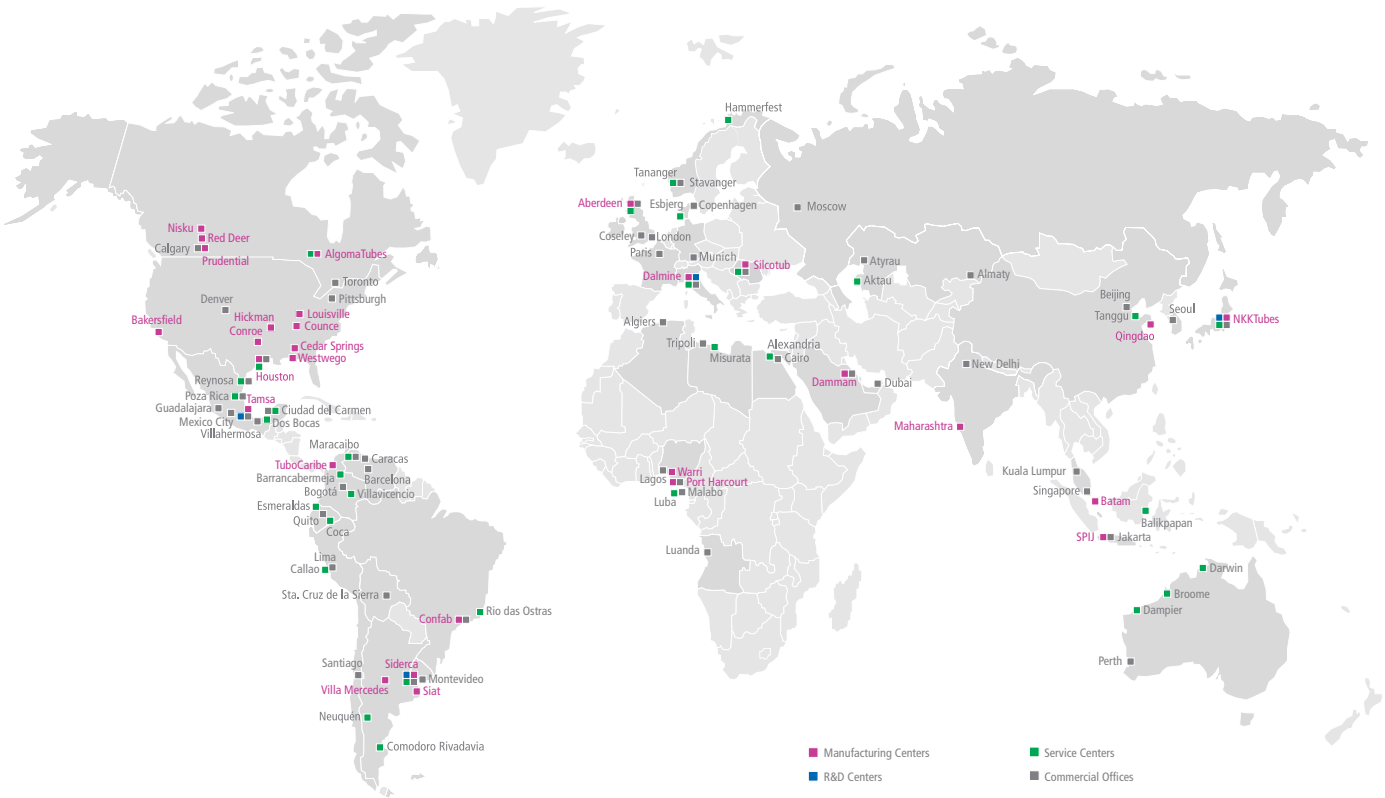
Tenaris

Tubular Products and Services for Today and Tomorrow

Continuing global oil and gas demand is driving operators to extend their exploration efforts into deeper offshore waters and tap difficult-to-produce land reservoirs.

To satisfy this demand, offshore operators need advanced technology solutions to challenges such as sour service, high-temperature/high-pressure (HT/HP) environments, and long-distance tiebacks in deep and ultra-deep water. Meanwhile, onshore operators seek new versions of heavy wall line pipe and pipe protection solutions that provide more effective concrete coatings.

Today, these operators are turning to Tenaris for their onshore and offshore technology solutions. Tenaris has earned an industry leadership reputation for anticipating future operator needs, conducting exceptional research and development, manufacturing high-quality products, offering valuable technical and commercial product sales assistance, and hosting specialized workshops that support operators as they plan future projects.



Pipeline Solutions for Today's Challenges

Currently, Tenaris provides complete tubular solutions packages for the most demanding operator challenges. Solutions include:

- **Steel catenary, hybrid risers and top tension risers.** The circulation of fluids from the seafloor to the surface is critical to any offshore production operation. Regardless of the riser type and configuration, Tenaris helps operators overcome their riser challenges by utilizing its experience in matching customers' high performance specifications and assisting with the selection of the most advantageous materials. Tenaris provides single- and dual-cased top tension risers, single-line or multi-bore hybrid risers, and any configuration of steel catenary risers.

- **Export lines and flowlines.** Tenaris export lines and flowlines can withstand extreme deepsea environments, as well as the demanding installation methods associated with J-lay and reeling. Tenaris offers some of the most advanced, custom-made, heavy wall tubular products available in the industry.

- **Hot induction bends.** In addition to employing the traditional method of achieving hot induction bends, Tenaris offers the off-line full Quench & Temper method for high specification products. Extensive research by Tenaris has revealed that this method produces more homogenous bend properties which, in turn, lead to better performance for the most demanding offshore projects, such as HP/HT fields, Arctic and Arctic-like environments, ultra-deepwater fields and sour environments.

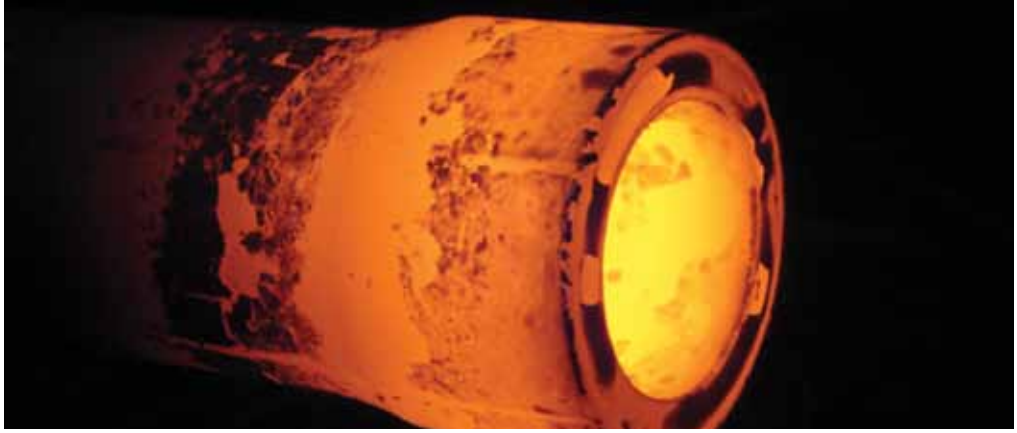
- **Tubular components for subsea applications.** Tenaris provides tubular components such as pipe for jumpers, bends, clad pipe and clad bends to support seafloor applications that rely on a remote site or a host facility for utility and well control services. Packages can be customized to meet project specifications.

- **Tubular components for structural applications.** Tenaris provides structural pipes for highly critical offshore applications such as platforms and jack-up rigs. Pipes are provided in weldable high grades and in lengths customized to customer needs.

- **Coiled line pipe.** Tenaris offers a broad range of coiled line pipe for downhole and subsea applications. A unique manufacturing process is employed that allows the production of line pipe in continuous lengths. All line pipe is supplied in coil form, and strings range from 2 km to 7 km in length depending on the diameter. After the pipe is manufactured, an external corrosion coating is applied, usually a three-layer system (FBE plus copolymer adhesive plus HDPE or PP top coat) along with an improved cleanliness integrity to NAS 8, 7 or 6 levels.

- **Laser Ends Measurement Service.** Using laser optical displacement sensors that measure the distance between the sensor's measuring head and the surface of the tube, the Tenaris Laser Ends Measurement System can perform a complete dimensional assessment of pipe ends to enable a more efficient alignment and to minimize the Hi/Lo differential prior to welding. Depending on customer requirements, the system can cover outside diameter, inside diameter and wall thickness.

- **Coating, double-joint, anode pads and anode installation services.** Tenaris offers coating, double-joint pipe, anode and anode pad installation for deep and ultra-deepwater projects. These services reduce welding time on site and provide excellent protection for the pipe during its operating life. In addition, the services are done at the mill prior to reaching the project site which reduces labor in the field by virtually one-half.



Anticipating the Future Needs of our Customers

Another differentiator that distinguishes Tenaris is an ability to anticipate and then begin research and development on products for the future. As operators embrace new and more complex projects both onshore and offshore, Tenaris continues to devote its resources to finding innovative solutions that will meet operators' challenges on these projects. This is accomplished through ongoing research and development of tubular technologies that are safe, technologically sound and economically viable.

Additionally, all four of Tenaris' R&D centers, along with other internationally recognized universities and laboratories around the world, participate in collaborative programs with customers and key industry players to conduct research and advance data on product technology that is aligned with anticipated future industry needs.

Joint Industry Programs (JIPs)

Often, when the industry faces common challenges, the best way of solving them is for industry, academia and government players to join forces in serious collaborative efforts called Joint Industry Programs (JIPs). In the past, Tenaris has participated in numerous JIPs and continues to use this technique to help develop future products that the industry requires.

For example, Tenaris' new 100 Ksi steel grade was developed, in part, through a JIP collaborative effort. At the JIP, operators indicated that steels with a yield strength of 100,000 psi would be needed for constructing the top tension risers for future offshore deepwater projects.

Working with the JIP, Tenaris engineers were able to develop the 100 Ksi tubular steel grade, an extremely high specification tubular steel with a yield strength of 100,000 psi and a reduced pipe wall thickness for lower overall tube weight.

Cooperative Programs with Universities and Academia

Tenaris' global network of R&D centers and manufacturing facilities collaborates with more than 60 universities and research institutions worldwide on cooperative programs that focus on basic and applied research. This combination of internal and external expertise provides avenues that lead to the development of value-added products and improved production processes that directly contribute to our customers' success.

A Global Research and Development Network

Much of Tenaris' increased level of performance can be attributed to dedicated efforts to continually increase the quality and range of its products by working with customers and analyzing new trends in the sectors where they operate. Often, this dedication requires exhaustive product research and development, as well as an ability to foresee and then develop products that will fill future operator needs.

One of the distinctions that enable Tenaris to rise above its competitors is its worldwide research and development network. This network is a fundamental component in Tenaris' approach to differentiation. By acquiring great knowledge of engineering sciences and tubular properties and then combining it with a base of experience gained through working side-by-side with its customers, Tenaris has been able to establish itself as an exceptional provider in the pipeline services marketplace.

Globally, around 200 scientists and engineers, more than half of whom have a master's or doctorate degree, work in these R&D centers. Their dedication to continuous improvement and product innovation has already proven invaluable on complex customer exploration and production projects, and high-performance mechanical and structural applications.

Worldwide Centers for Product Research and Development

TenarisTamsa center, Veracruz, Mexico

The Veracruz center focuses mainly on line pipe and the creation of new products for energy industry tubular goods applications. Research work is centered on the advancement of innovative welding technology and the qualification of premium connections, as well as improving metallurgy and materials, process development, and fracture mechanics studies. Its full-scale testing laboratory utilizes some of the most sophisticated equipment worldwide for testing pipes and threads.

- Metallurgy and materials research.
  By proactively conducting continuous research on oil and gas metallurgical technology and working closely with operators, Tenaris has been able to determine the types of metals and materials that will be needed to achieve the high-specification levels of performance operators say they will need for their anticipated future projects.

- Welding technology innovation.
  The development of improved welding techniques enables and facilitates the welding of newly developed steel grades and supports improvements in innovative techniques such as double joint welding.

- Fracture mechanics studies.
  To ensure that future pipe materials exhibits a sufficiently high Charpy V-notch impact value to arrest a propagating fracture, Tenaris uses fracture mechanics studies to evaluate the structural integrity of its future tubular components.

- Process development optimization.
  Tenaris continually strives to optimize the manufacturing processes it uses in order to ensure that it will be capable of manufacturing the products needed for future oil and gas tubular goods applications. One of the tools that is employed in this effort is Finite Element Analysis (FEA). FEA enables metallurgists and manufacturing engineers to obtain a detailed visualization of where structures bend or twist and indicates the distribution of stresses and displacements. This, in turn, enables engineers to design and manufacture tubular goods that exhibit higher performance characteristics.

- Full-scale laboratory testing.
  Full-scale performance testing complements FEA and is a critical step to fully verify critical performance features such as galling resistance and sealability performance. This test validates the reliability of a product's structural design and performance through testing that simulates the specific conditions in the oil field where it will be used. Such testing also provides for the qualification of premium connections and the fatigue testing of steel catenary risers, top tension risers and flowlines being developed for use in future pipeline applications.

Tenaris NKKT center, Kawasaki, Japan

The Kawasaki center specializes in high-chromium steel tubular products (i.e., Cr13 steel grade) for diverse applications. Full-scale testing of premium connections is performed, along with the design and development of corrosion-resistant alloys, sour service materials and drill pipe.

Tenaris Dalmine center, Italy

Research at this facility mainly focuses on two areas: hot rolling processes and product development for mechanical and thermal applications. The center conducts its own independent research and also collaborates with external research institutes on either extensive basic or highly specialized areas of research.

Tenaris Research and Development center, Campana, Argentina

Research at the Argentina center covers both products and processes. In terms of processes, researchers focus on steelmaking innovations, rolling, heat treatment, non-destructive testing and the tracking of tubular products. The center also provides scientific and technological research support in such diverse areas and disciplines as metallurgy, steelmaking, chemistry, applied physics, structural integrity, mechanical design, materials and coatings. Investigations are conducted using state-of-the-art methodologies and tools including the extensive use of modeling techniques such as FEA and full-scale product testing.

Tenaris Offshore and Onshore Tubular Solutions

Tenaris delivers a wide range of seamless and welded tubes for onshore line pipe to be used in the most demanding conditions. From the surface to the sea floor, Tenaris offers tubular solutions for almost any offshore challenge. This offering includes riser pipes, export and flow lines, subsea system components, coiled line pipe, stainless steel tubes for umbilicals, and accessories.


Steel Catenary Risers
Work Over Riser
Jumpers


Hot Induction Bends
Top Tension Risers
Flowlines, Anticorrosion and
Thermal Insulation Coating
0 ft.
3,000 ft.
6,000 ft.
9,000 ft.

A Proven Track Record

Tenaris has established an enviable field-proven track record by providing high-specification products for some of the largest projects ever attempted both onshore and in deep and ultra-deep offshore waters.

OFFSHORE PROJECTS

Project	End User	Location	Products Supplied	Depth	
				Feet	Meters
Independence	Anadarko	Gulf of Mexico	Seamless pipe for SCRs, infield lines, hot inductions bends	9,039	2,739
Cascade & Chinook	Petrobras	Gulf of Mexico	Outer and inner pipe for pipe in pipe, gas export lines, anticorrosion and insulation coating, hot induction bends, seamless pipe for hybrid risers, laser end measurement	8,250	2,500
Tupi	Petrobras	Brazil	Welded pipe for export lines	6,955	2,120
Thunder Horse	BP	Gulf of Mexico	Seamless pipe for flowlines and SCR's, anticorrosive coating, hot induction bends	6,036	1,829
Cesar Tonga	Anadarko	Gulf of Mexico	Outer and inner pipe for pipe in pipe, hot induction bends	4,729	1,433
Greater Plutonio	BP	Angola	Seamless pipe for infield lines, double joint, anticorrosive coating, hot induction bends, laser end measurement	4,593	1,400
AKPO	Total	Nigeria	Seamless pipe for export lines, SCR's, flowlines and oil offloading lines	4,511	1,375
Gorgon	Chevron	Australia	Seamless pipe for flowlines, infield lines, hot induction bends, laser end measurement	4,429	1,350
Kizomba A, B, C & D	ExxonMobil	Angola	Outer and inner pipe for pipe in pipe, seamless pipe for TTR's, infield lines, anticorrosive coating, hot induction bends, laser end measurement	4,425	1,349
Gumusut	Shell	Malaysia	Seamless pipe for flowlines, SCR's and exports lines, upset pipes for WOR's, hot induction bends	3,937	1,200
Pazflor	Total	Angola	Outer and inner pipe for pipe in pipe, mother pipes for bends, jumpers, buckle arrestors, double joint, anticorrosive coating	3,937	1,200
Sul - Norte Capixaba	Petrobras	Brazil	Welded pipe for export lines	3,937	1,200
Bonga	Shell	Nigeria	Seamless pipe for flowlines and SCR's, anticorrosive coating, hot inductions bends, buckle arrestors, J-lay collars	3,599	1,097
Usan	Total	Nigeria	Outer and inner pipe for pipe in pipe, seamless pipe for hybrid risers, hot induction bends	3,248	990
West Delta Deep Marine	Burullus	Egypt	Seamless pipe for flowlines, anticorrosive coating and hot induction bends	2,789	850
Vega	Statoil	Norway	Seamless pipe for flowlines, upset pipes for workover risers	1,246	380
Marulk	Statoil	Norway	Outer pipe for pipe in pipe	1,198	365
Snorre	Statoil	Norway	Seamless pipe for TTR's	1,198	365
Heera	ONGC	India	Seamless pipe for flowlines	164	50
Kupe	Origin	New zeland	Seamless pipe for flowlines, anticorrosive coating	115	35

ONSHORE PROJECTS

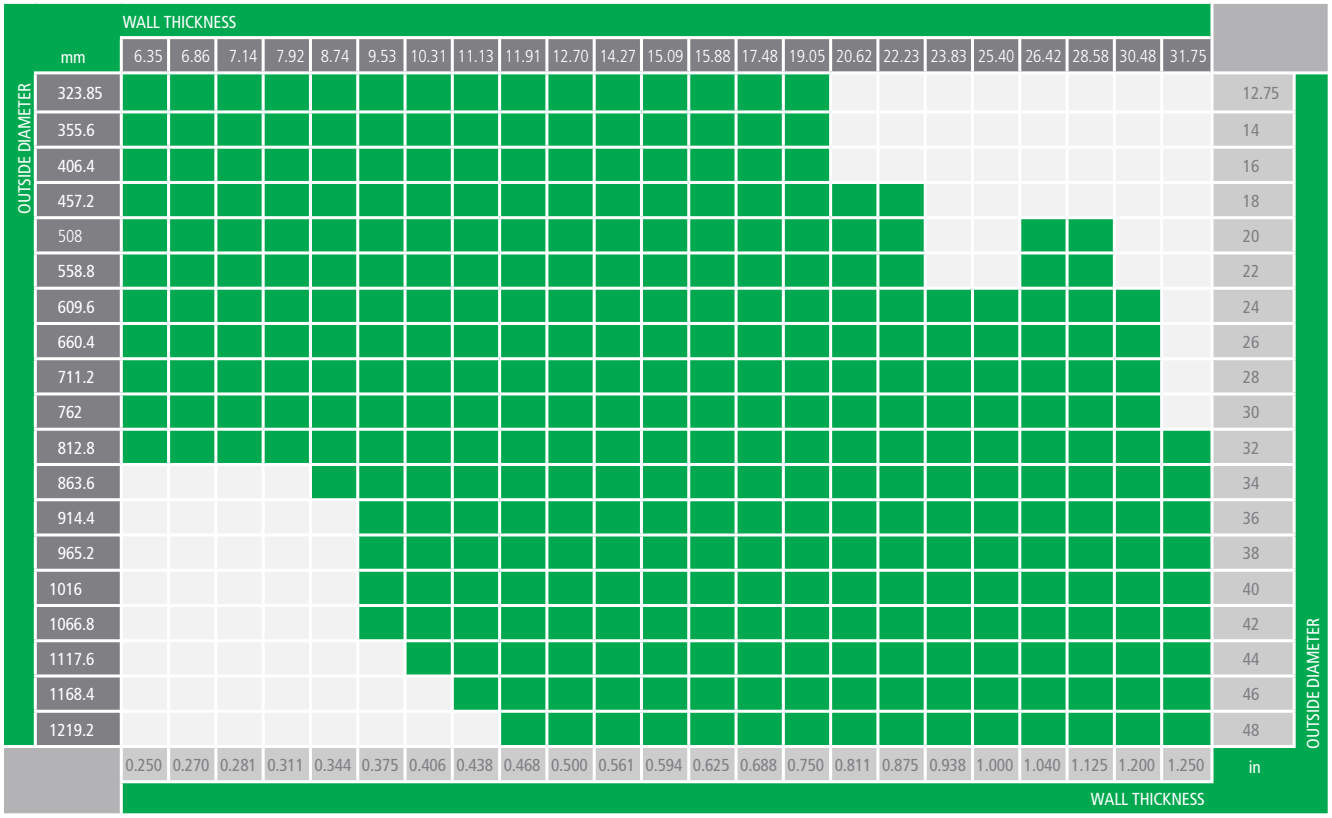
Project	End User	Location	Products Supplied	Quantity	
				Km	Miles
SAS	ADNOC	Middle East	Seamless pipe	442	275
Gassi Touil	Sonatrach	Noth Africa	Seampless pipe, anticorrosive coating	122	76
Rajasthan	Cairb	Middle East	Seamless pipe	262	163
El Merk	Sonatrach	Noth Africa	Seampless pipe, anticorrosive coating	252	157
Karachaganak Phase II	Karachaganak	Caspian Sea	Seamless pipe, anticorrosive and insulation coating	132	82
Gbaran	Shell	Nigeria	Seamless pipe	225	140
PNG LNG	ExxonMobil	Papua New Guinea	seamless pipe, hot induction bends	166	103
Soyo	Total	Angola	Seamless pipe, anticorrosive coating, hot induction bends	121	75

Product Range and Properties

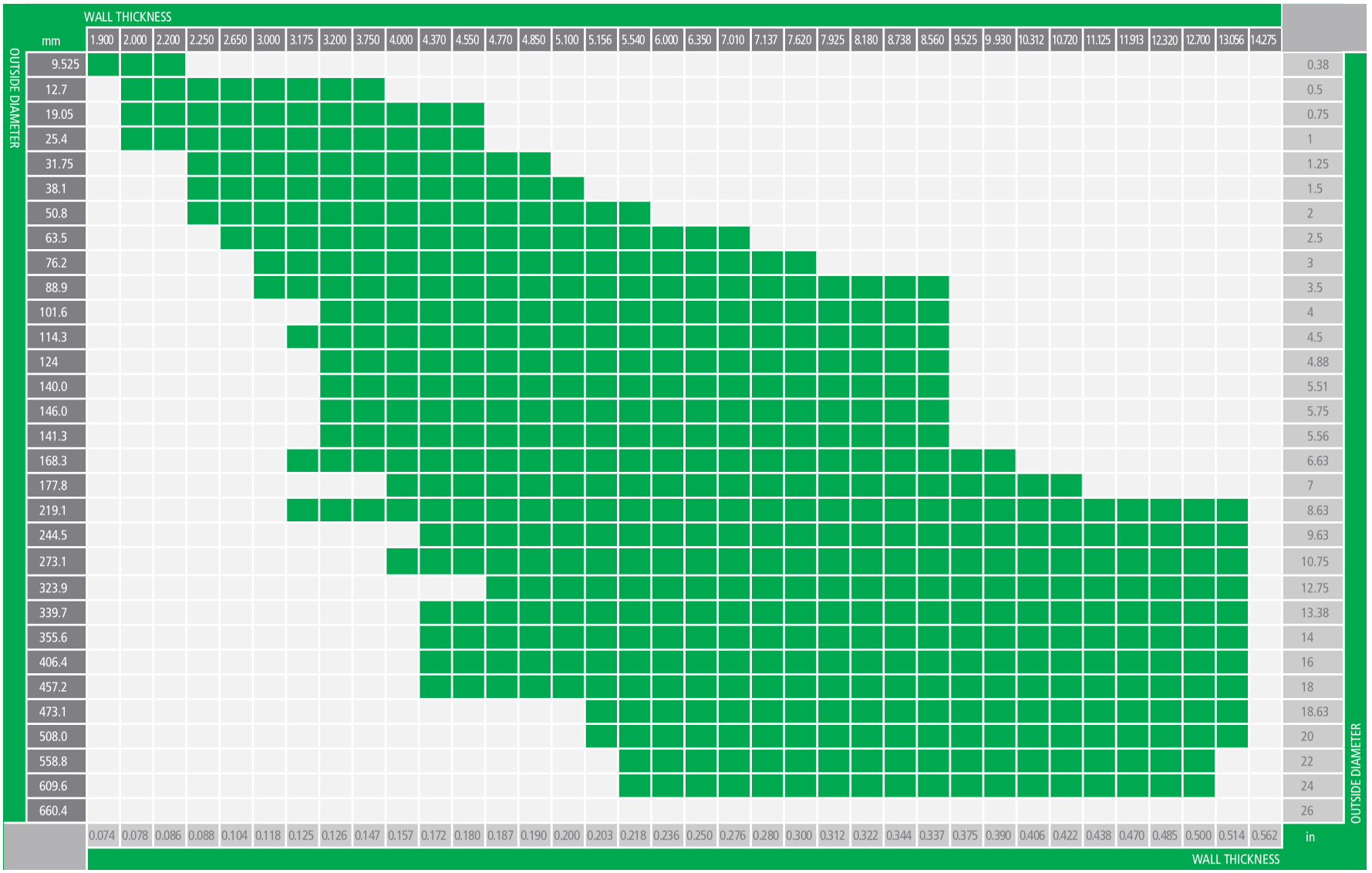
Tenaris manufactures a complete range of seamless and welded pipes for applications under the most demanding conditions and services.

Products are manufactured in accordance with particular project specifications and National or International Standards such as: API 5L, API 5LCP, DNV OS F101, ISO 3183, ISO 15590 and EN 10208.

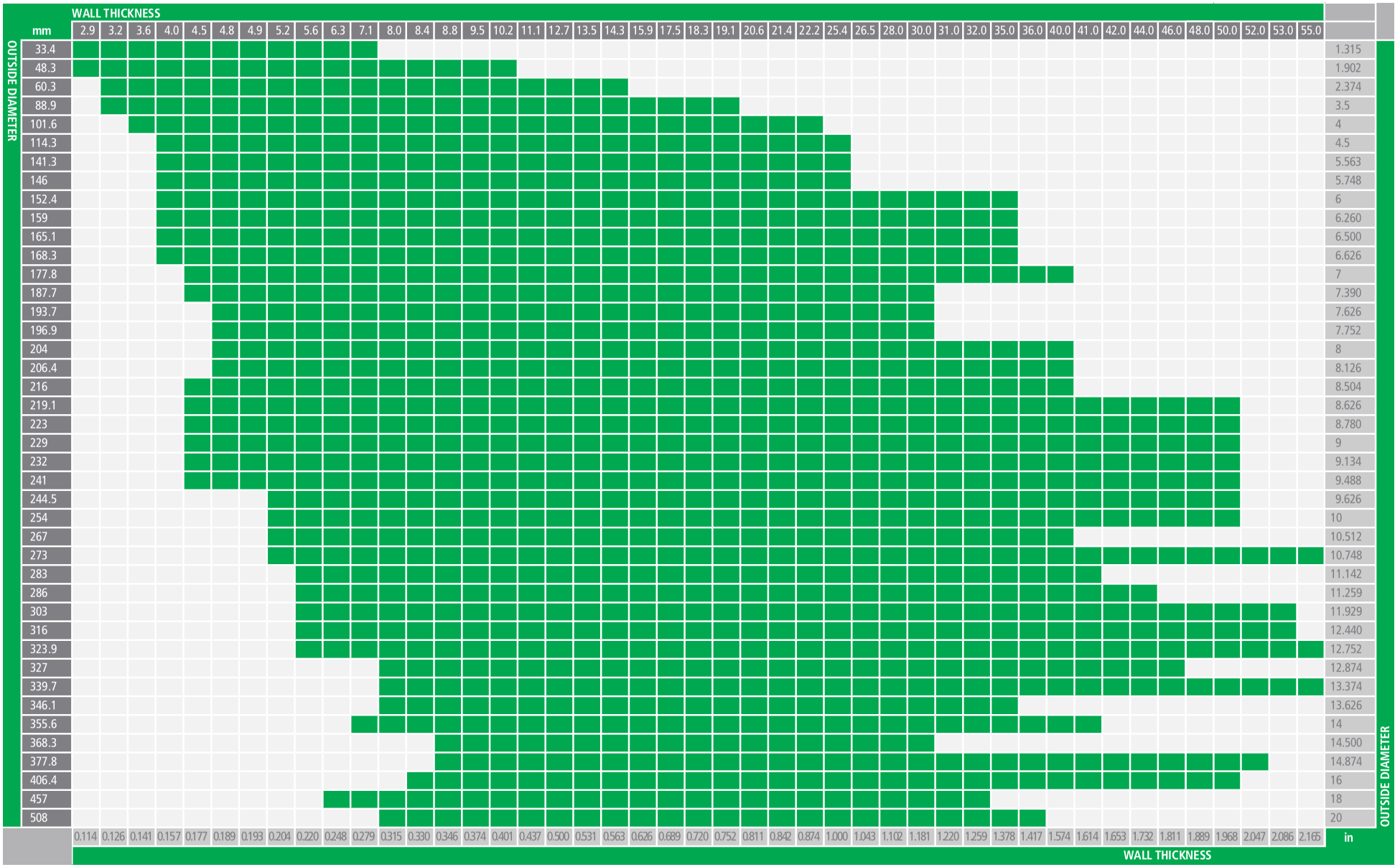
LONGITUDINAL SUBMERGED ARC WELDING DIMENSIONAL RANGE



HIGH FREQUENCY INDUCTION/HIGH FREQUENCY CURRENT ELECTRIC RESISTANCE WELDING DIMENSIONAL RANGE



SEAMLESS DIMENSIONAL RANGE



Seamless Pipe Line Projects
Typical Requirements

SEAMLESS PIPE LINE PROJECTS TYPICAL REQUIREMENTS

PROPERTIES[6]			C-Mn STEEL GRADES X60 TO X70					C-Mn STEEL GRADE X80[5]
			OFFSHORE SERVICE[3]	ARTIC SERVICE	HP/HT SERVICE	GAS SERVICE	SOUR SERVICE	
Steel Design	Carbon Equivalent (IIW)[1]	≤ 1" (25.4 mm)	0.41	0.41	0.41	0.41	0.39	0.45
		> 1" (25.4 mm)	0.43	0.43	0.43	0.43	0.42	
	Carbon Equivalent (Pcm)[1]	≤ 1" (25.4 mm)	0.22	0.22	0.22	0.22	0.21	0.24
		> 1" (25.4 mm)	0.23	0.23	0.23	0.23	0.22	
	P (% max)		0.018	0.018	0.018	0.018	0.015	0.018
	S (% max)		0.008	0.005	0.005	0.005	0.003	0.005
	Nb+V+Ti (% max)		0.12	0.12	0.12	0.12	0.12	0.12
Mechanical Properties	RT Min YS		As applicable					
	RT Min TS		As applicable					
	HT Min YS				2			
	Actual Values RT YS & RT TS variation (Mpa)		100	120	120	120	120	130
	Y/T (max)		0.87 - 0.90	0.90	0.90	0.90	0.90	0.93
	Hardness (max single reading Hv10)		248	260	260	260	248	280
	Minimum Average Toughness (Joules) at -20°C		100	100 at - 50°C	100	100	100	100
	CTOD (mm) at -20°C		0.20					
Corrosion Resistance	Tests as per NACE TM0284 & as per ASTM G39						As applicable	
	(Sln NACE TM 0177)							
Non Destructive Inspection		L & T Defects	5% of Nominal WT					
		(Notch Depth)						
		Laminations	1000				500	1000
		max area (mm^2)						
Dimensional Tolerances			As applicable[4]					

Symbols:
RT Room Temperature, HP High Pressure, HT High Temperature, YS Yield Strength, TS Tensile Strength, CTOD Crack Tip Opening Displacement, L&T Longitudinal & Transverse, FPBT Four Point Bend Tests

Notes:
1. As applicable according to C content and specific requirements.
2. YS derating values at maximum design temperature as per DNV OS F101 Section 5 Figure 5-1.
3. In case of Reel-Laying RT Min YS and RT Min TS are guaranteed after Laboratory or Full-scale Installation Simulation Tests.
4. In case of Offshore Service restricted ID end Tolerances can be supplied after calibration or machining.
5. Cr13 Weldable is also available and requirements shall be analyzed on case by case basis.
6. Depending on Specific Project Requirements offered values may change.
7. 100 ksi Weldable up to 1" is also available and requirements shall be analyzed on case by case basis.
8. Tenaris can produce customized seamless pipes according to customer requerimients.

Adding Value to Every Pipeline Project

Tenaris adds value to every solution it provides for its customers through minimized risk, innovative engineering and manufacturing processes, and by using its full-scale facilities to fully test and qualify products before they are placed in service.

By providing products and services that feature both technical and commercial reliability, Tenaris has built a reputation as the industry's "go to" company for obtaining pipeline solutions for the toughest challenges.

With manufacturing facilities in 15 countries, R&D centers in four countries, the availability of an extensive Internet website, and a Tenaris Service and Distribution Network that assists customers in more than 30 countries, Tenaris provides an unmatched worldwide industrial and customer support system.

Tenaris' customers also receive added value through managed manufacturing flows that allow the company to simultaneously produce steel pipes of consistent quality for a customer project from several different strategically located mills. This managed process reduces the manufacturing time and ensures that orders are filled on time and on budget.

Reduced total cost of ownership (TCO) is another added value customers receive. Because deepwater offshore operations and complex onshore projects involve tremendous costs, recapturing these costs can positively impact an operator's bottom line. Therefore, Tenaris provides complete supply chain management that simplifies logistics, creates flexibility and ensures a streamlined approach to lower operator TCO and create a seamless process from purchase to delivery.

If your current or future plans involve deepwater, ultra-deepwater, or complex onshore projects, Tenaris can help you meet any challenge you encounter by offering complete tubular packages and solutions that deliver the ultimate in performance and reliability during the life of the project.

You can learn more about Tenaris' onshore and offshore solutions by visiting the company website at www.tenaris.com or by emailing a request for information to pipeline@tenaris.com. A representative will be glad to show you how Tenaris can make a difference on your next project.

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Tenaris Marketing Communications