Structural Tubes for Offshore Applications

Tenaris

Tenaris around the world

Tenaris is a leading global manufacturer and supplier of steel pipe products and related services for the world's energy industry and other industrial applications.

Our customers include most of the world's leading oil and gas companies and our revenues amounted to US$ 7.1 billion in 2015.

- Manufacturing Centers
- R&D Centers
- Commercial Offices
- Service Centers

Employing around 21,700 people worldwide, we operate an integrated network of steel pipe manufacturing, research, finishing and service facilities with industrial operations in the Americas, Europe, the Middle East, Asia and Africa and a direct presence in most major oil and gas markets.

Reliable products for the most demanding offshore applications

PRODUCT HIGHLIGHTS

Tenaris produces a wide range of hot-rolled tubular products, in different steel grades, for use in structural offshore applications such as:

- jack up rigs (horizontal and diagonal bracing and span breakers for leg structures),
- jack up vessels (corner post tubes and diagonal bracing for heavy-lift offshore and maritime cranes, horizontal and diagonal bracing for leg structures),
- top side structures.

Thanks to a fully-integrated manufacturing process (from steelmaking to tube-rolling, heat treatments and quality controls), Tenaris can manage complex projects worldwide directly from its mills, guaranteeing tailor-made products and timely deliveries.

We work as a reliable partner to meet the needs of our customers and ensure a longer and safe product life, better mechanical properties and reductions in costs.

PROJECTS REFERENCE LIST

TENARIS Jack Up Leg Bracing Pipes Track Record (Equivalent Jack up Unit)

				Bracing pipes delivery per year to shipyard									
Designer	Steel Min YS	Rig Design	Shipyard Country	2005	2006	2007	2008	2009	2011	2012	2013	2014	2015
GUSTO MSC	690 Mpa	GUSTO MSC - CJ70	SINGAPORE				1		2	2		1	
		GUSTO MSC - CJ50	SINGAPORE		2	2							
			CHINA								1	6	
		GUSTO MSC- CJ46	CHINA									5	2
			SINGAPORE			2	2					2	
		GUSTO MSC-NG18000X	UAE									2	
		GUSTO MSC-NG2500X									2		
KPFELS	450 Mpa	Kpfels A&B Class	SINGAPORE	3	6				9	4	2		
	550 Mpa	Kpfels N Class					3						
BMC PACIFIC	590 Mpa	BMC PACIFIC 375/400	SINGAPORE	3	2	2	4	5	4	5	4	4	
F&G	520/580 Mpa	JU3000N	SINGAPORE							3	1		
		JU2000E							2				
			VIETNAM									1	
			TOT	6	10	6	10	5	17	14	10	21	2


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Certified Quality

Tenaris produces materials made by an approved process and tested in accordance with Det Norske Veritas Offshore Standard DNV-OS-B101 and American Bureau of Shipping Rules MODU Part 3 (Hull Construction and Equipment).

Tenaris is also able to guarantee conformity with CPR 305/2011 regulation and to apply the CE mark to the documentation accompanying its tubular products destined for structural applications.

APPLICABLE STANDARDS

BS EN 10225	Weldable structural steels for fixed offshore structures – Technical delivery conditions
API 5L	Specification for Line Pipe
DNV-OS-B101	DNV standard that provides principles, technical requirements and guidance for metallic materials to be used in the fabrication of offshore structures and equipment.
American Bureau of Shipping Rules 3.1.3 MODU	Rules for Building and Classing Mobile Offshore Drilling Units
EN 10210-1	Hot finished structural hollow sections of non-alloy and fine grain steels – Part 1: Technical delivery conditions
EN 10210-2	Hot finished structural hollow sections of non-alloy and fine grain steels – Part 2: Tolerances, dimensions and sectional properties

SUSTAINABILITY AND SAFETY

Tenaris's steel sites use mostly scrap as raw material. In Italy, more than 80% of total metallic charge is recycled, helping in the LEED design requirements. Steel used in a building can be recovered, melt and re-used as scrap for a new production cycle. Specific studies related to Lyfe Cycle Assessment standards (ISO 14040 and 14044) are on-going.
As part of the company's efforts to make its business more sustainable, Tenaris is engaged in a project for certifying by 2014 its Health, Safety and Environmental Management System. TenarisDalmine plants involved in structural pipes production already obtained ISO 14001 and OSHAS 18000 certifications.
TenarisDalmine production site and its power plant hold the UNI CEI EN ISO 50001:2011 certification from Lloyd's Register Quality Assurance. This certificate is a very innovative standard applied to medium and large companies recording significant energy consumption levels. It confirms that certified companies have a management system designed to safeguard energy, reduce consumption, and thus, minimize environmental impact.
This plant is the world's first tube manufacturer to obtain this certification and the fourth company in Italy.

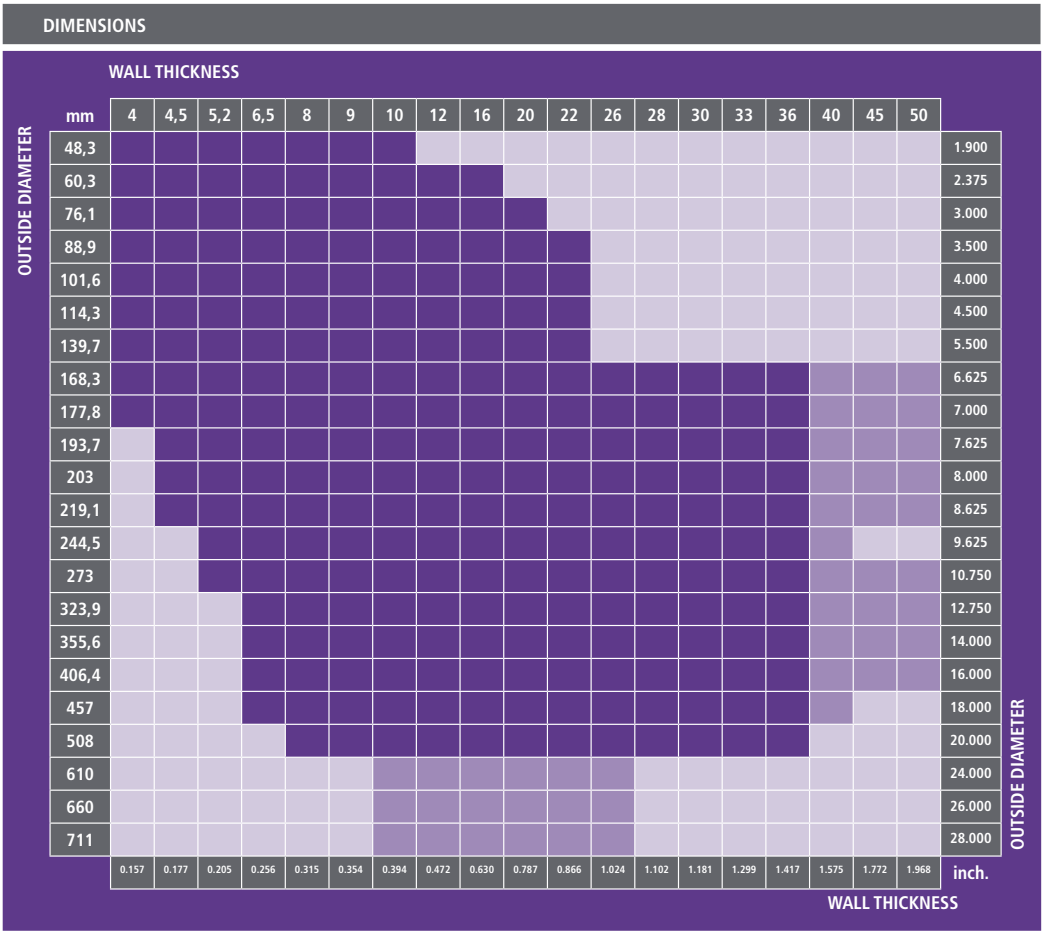
ABS and DNV Structurals Steel Grades feasible in Tenaris

ABS	DNV	Ys (Mpa)	Ts (Mpa)	E (%)	KCV at -40°C (J)	
		min			L	T
E	NV E	235	400 - 520	22	34	24
EH 32	NV E 32	315	440 - 570	21	31	22
EH 36	NV E 36	355	490 - 620	21	34	24
EH 40	NV E 40	390	510 - 650	20	39	26
EQ43	NV E420	420	530 - 680	18	42	28
EQ47	NV E460	460	570 - 720	17	46	31
EQ51	NV E500	500	610 - 770	16	50	33
EQ56	NV E550	550	670 - 830	16	55	37
EQ63	NV E620	620	720 - 890	15	62	41
EQ70	NV E690	690	770 -940	14	69	46

Other high performance steel grades are feasible upon request.

Dimensions

Dimensional Range of High Strength Q&T Steel grades



Dimension to be evaluted on request.

Tenaris

For further information
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For assistance please contact
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Research activities

Tenaris is responsible for developing and testing the tubular materials used in many of the world's most advanced oil and gas exploration, production and processing activities and in specialized mechanical applications. In our research, we explore the boundaries of material science and mechanical design to develop products to help our customers meet their needs.
Tenaris conducts ongoing research in the following areas:
• Advanced metallurgy
• Advanced computer modelling of processes and products
• Fracture mechanics and structural integrity
• Full-scale testing of tubular products and premium connections
• Advanced corrosion testing
• Nanotechnology
• Advanced non-destructive testing techniques and optical measurement devices
• Welding metallurgy and technology
Tenaris has a worldwide research and development network that employees around 200 scientists and engineers, more than half of whom have a master or doctorate degree.

WORLDWIDE CENTERS FOR PRODUCT RESEARCH AND DEVELOPMENT

Tenaris Research and Development center, Veracruz, Mexico 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.
Tenaris Research and Development center, Kawasaki, Japan The Kawasaki center specializes in high-chromium steel tubular products (i.e., Cr13 steel grade) for thermal applications.
Tenaris Research and Development center, Campana, Argentina Research at the Argentina center covers both products and processes. In terms of processes, researchers focus on steel making innovations, rolling, heat treatment, non-destructive testing and the tracking of tubular products.
Tenaris Research and Development center, Dalmine, Italy Research at this facility mainly focuses on two areas: hot rolling processes and product development for mechanical, structural 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.

COLLABORATION WITH EXTERNAL INSTITUTES

Tenaris actively works with recognized Italian research institutes and academic bodies, including Politecnico of Milan, University of Trento and the "Centro Sviluppo Materiali (CSM)" in Rome, on research projects related to weldability and fatigue characterization.

One of the most recent projects Tenaris has been participating in providing high strength steel TS 690 (on a proprietary specification) material for testings is the ATTEL project in collaboration with the University of Trento. It is a EU funded research, aimed to explore the use of high strength steel (HSS) circular hollow sections in buildings subject to earthquakes and fires, in order to understand the actual behaviour of HSS materials and to show the possible benefits with respect to mild steel.

ADVANCED RESEARCH ON FIRE RESISTANT STEEL

As use of steel becomes critical when used in territories subject to earthquake and fire, Tenaris has been setting up an extensive research program to set up a steel grade with enhanced fireresistance properties. Leveraging on the experience gained in the oil&gas and power generation sectors where products are able to withstand high pressures and temperatures, Tenaris carried out steel chemical characterization of its material.

WELDABILITY

In our R&D centers in Argentina, Mexico and Italy and in collaboration with the IIS (Italian Welding Institute), we are carrying out a joint program for the qualification of welding procedures for high strength structural steels and investigation on the effect of the welding parameters on the characteristics of the heat affected zone.

As a result, Tenaris has developed special steels and manufacturing process for each grade and tube dimension range, avoiding increasing cost in alloying elements that can have also a negative effect in weldability, due to an increase in carbon equivalent.