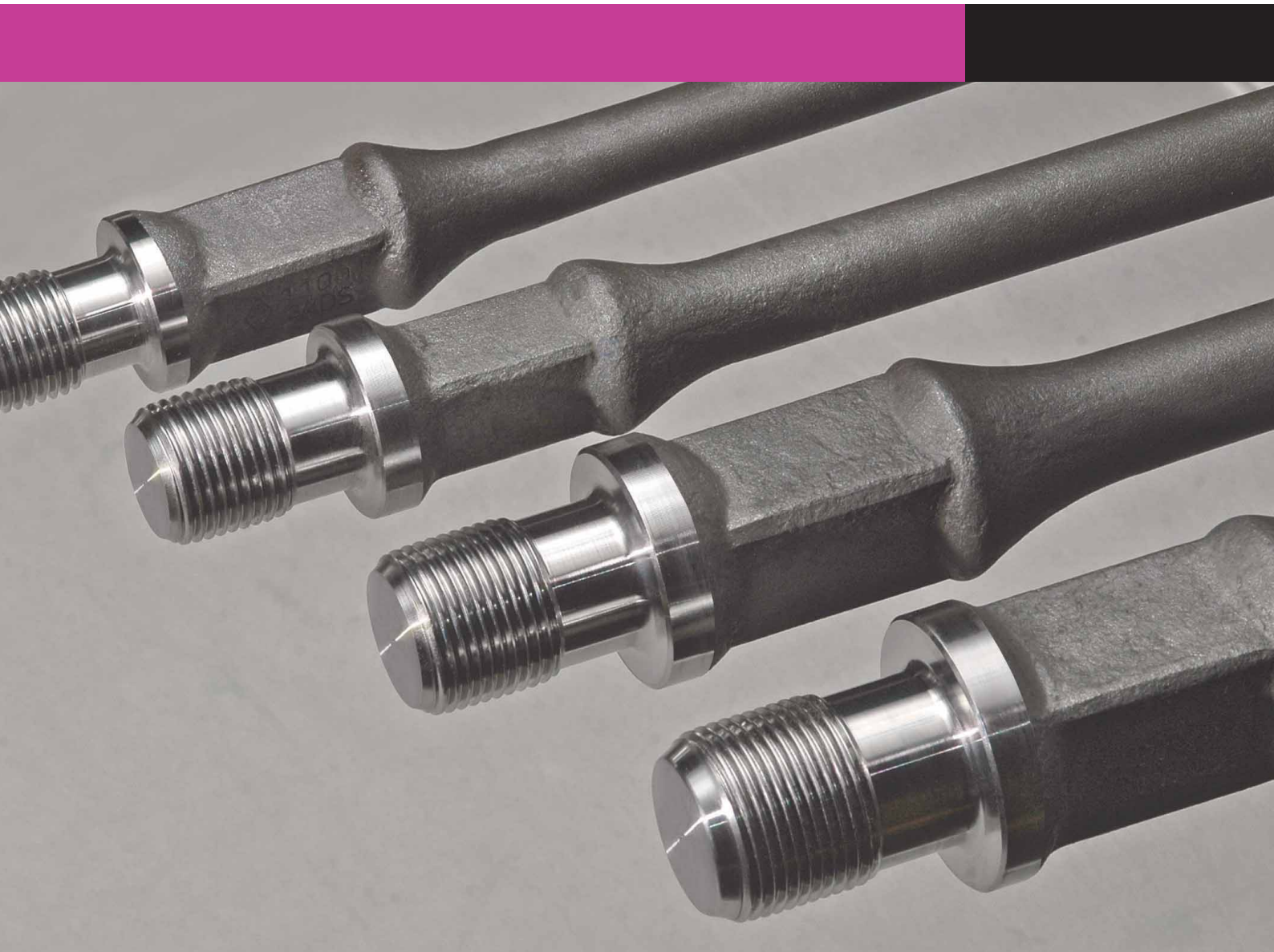


# Sucker Rods General Catalogue

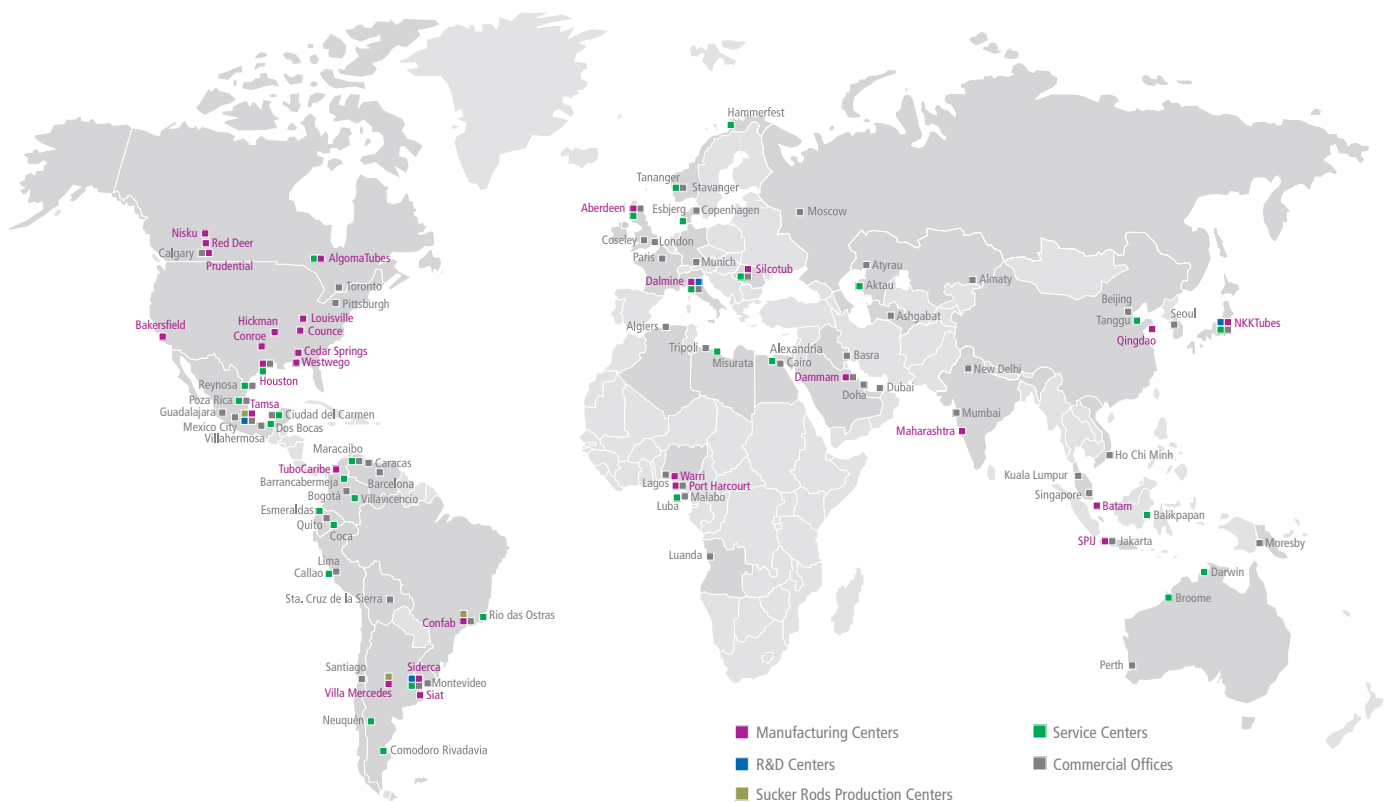


# Tenaris

Tenaris is a leading supplier of tubes and related services for the world's energy industry and certain other industrial applications. Our mission is to deliver value to our customers through product development, manufacturing excellence, and supply chain management. We minimize risk for our customers and help them reduce costs, increase flexibility and improve time-to-market.

Tenaris employees around the world are committed to continuous improvement by sharing knowledge across a single global organization.

Through our integrated global network of manufacturing, R&D and service facilities, we work with our customers to meet their needs for the timely supply of high performance products in increasingly complex operating environments.



# Products and services

At Tenaris, sucker rods are produced in a fully integrated way.

From the production of steel as raw material to the manufacturing of sucker rods, the entire process takes place in Tenaris's manufacturing centers. Within these plants, Tenaris produces the BlueRod™ premium sucker rods for Beam Pumping, the HoloRod™ Series and X-Torque rods for Progressive Cavity Pumping and the entire line of API sucker rods. They efficiently respond to extreme conditions such as high loads, corrosive environments and applications where tubing-rod friction control is required.

The solutions offered cover from application engineering designs and failure analysis to handling procedures and installation in wells.

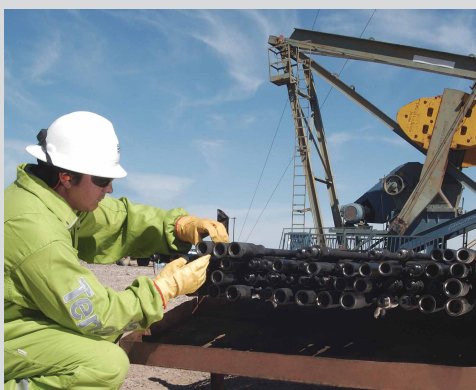
Products are manufactured according to API 11B Standards in Villa Mercedes facilities, San Luis, Argentina and in Pindamonhangaba, Brazil. The quality system bears ISO 9001:2000 and API Q1 certifications. API products are monogrammed under 11B-0020 and 11B-0067 licenses in the plants.

To answer our customers' request, we have inaugurated a new mill in Veracruz, Mexico that allows us to increase sucker rods capacity and provide more flexible production times.

Along with the products, associated services are offered through a team of professionals who provide specialized technical assistance during field operations.

With our permanent commitment to add value through services, we provide our customers with just-in-time delivery of the full range of products, stock management of new and used materials, delivery and inspection at well, and the recovery of used material by means of a wide network strategically located around the world.

## A COMPREHENSIVE RANGE OF SERVICES



Experienced field engineers are on hand to assess our customers' operations in the field in order to improve all aspects related to the sucker rod string:

- Training in sucker rods handling and strings set-up.
- Rod string design optimization.
- Just-in-time delivery.
- Technical assistance during field operations.
- Integral analysis of field interventions and diagnosis (material optimization service).

# API Rods

Available for both beam and progressive cavity pumping.

Tenaris delivers API sucker rods ranging from 5/8” to 1 1/8”, with lengths of 25 or 30 feet, manufactured according to a rigorous quality assurance system that complies with ISO 9001:2000 and API Q1 standards.

Different steel grades are available, depending on the type of load and the corrosion level in the wells.

## GRADE C

Designed for wells with low and medium loads, non-corrosive or effectively inhibited. Manufactured in 1530 Mod. steel.

## GRADE K

Designed for low and medium loads in corrosive wells where inhibition is recommended. Manufactured in AISI 4621 Mod. steel.

## GRADE D CARBON

Designed for non-corrosive or effectively inhibited wells with moderate loads. Manufactured in 1530 Mod. Micro alloy steel.\*

## GRADE D ALLOY

Designed for moderate to high loads in non-corrosive or effectively inhibited wells. Manufactured in AISI 4142 steel.

## GRADE KD

Designed for corrosive wells where inhibiting is recommended, with moderate loads. Manufactured in AISI 4320 Mod. steel.

## GRADE D SPECIAL

Designed for corrosive wells with high and moderate loads where inhibition is recommended. Manufactured in AISI 4330 Mod. steel.

\*ENQUIRE ON SPECIAL CONDITIONS. ONLY UNDER SPECIAL REQUEST.

## Mechanical properties and chemical composition

	API GRADES						PROPRIETARY GRADES		
	GRADE C	GRADE K	GRADE D				HIGH STRENGTH RODS		
	C	K	D CARBON	D ALLOY	KD	D SPECIAL	PLUS	UHS - NR	MMS - NR
<b>Steel</b>	1530 M	4621 M	1530 M	4142 M	4320 M	4330 M	1530 M	4330 M	4138 M
<b>C</b>	0.31-0.36	0.18-0.25	0.31-0.36	0.40-0.45	0.18-0.25	0.29-0.37	0.31-0.36	0.29-0.37	0.36-0.43
<b>Mn</b>	1.40-1.60	0.70-1.00	1.40-1.60	0.75-1.00	0.80-1.00	0.70-0.95	1.40-1.60	0.70-0.95	1.10-1.40
<b>S</b>	0.025 Mx.	0.025 Mx.	0.025 Mx.	0.025 Mx.	0.025 Mx.	0.025 Mx.	0.025 Mx.	0.025 Mx.	0.025 Mx.
<b>P</b>	0.025 Mx.	0.025 Mx.	0.025 Mx.	0.025 Mx.	0.025 Mx.	0.025 Mx.	0.025 Mx.	0.025 Mx.	0.025 Mx.
<b>Si</b>	0.25-0.40	0.15-0.30	0.25-0.40	0.15-0.35	0.15-0.35	0.15-0.35	0.25-0.40	0.15-0.35	0.20-0.40
<b>Ni</b>	0.15 Mx	1.65-2.00	0.15 Mx	0.25 Mx	1.15-1.50	1.65-2.00	0.15 Mx	1.65-2.00	0.30 Mx
<b>Cr</b>	0.2 Mx	0.3 Mx	0.2 Mx	0.80-1.10	0.70-0.90	0.80-1.10	0.2 Mx	0.80-1.10	0.50-0.90
<b>Mo</b>	0.05 Mx	0.20-0.30	0.05 Mx	0.15-0.25	0.20-0.30	0.20-0.30	0.05 Mx	0.20-0.30	0.25-0.50
<b>V</b>	0.10-0.15	–	0.10-0.15	–	0.03-0.07	0.035-0.100	0.10-0.15	0.035-0.100	0.04-0.07
<b>Nb</b>	–	–	–	–	–	–	–	–	0.020-0.050
<b>Al</b>	0.01-0.04	0.01-0.04	0.01-0.04	0.01-0.04	0.01-0.05	0.01-0.06	0.01-0.04	0.01-0.06	0.01-0.07
<b>Cu</b>	0.25 Mx	0.25 Mx	0.25 Mx	0.25 Mx	0.25 Mx	0.25 Mx	0.25 Mx	0.25 Mx	0.25 Mx
<b>MECHANICAL PROPERTIES</b>									
<b>YS (Ksi)</b>	60 Min.	60 Min.	85 Min.	100*	85 Min.	100*	115 Min.	115 Min.	115 Min.
<b>UTS (Ksi)</b>	90-115	90-115	115-140	120-140	115-140	125-140	140-160	140-160	138-155
<b>HEAT TREATMENT</b>									
	Normalized	Normalized	Normalized	Normalized	Normalized	Normalized	Normalized	Normalized	Normalized
	Tempered		Forced cooling	Tempered	Tempered	Tempered	Surf quenched	Tempered	Tempered

The values appearing in this brochure are reference values and Tenaris reserves the right to modify them, according to internal specifications without prior notice.

\* Typical value. Tenaris guarantees an 85 ksi minimum yield strength as specified in API 11B Specs.

# High Strength Rods

Specially manufactured for high-flow wells.

Tenaris manufactures high strength sucker rods from quality steel bars to be used in high-flow wells. They are produced in rod body diameters which range from 5/8" to 1 1/2".

Tenaris products meet the most stringent requirements for greater mechanical strength, thus ensuring quality performance in deep wells with very high loads. There are three options that vary depending on the chemical composition and heat treatment:

## ULTRA HIGH STRENGTH (UHS) ROD

Manufactured in AISI 4330 Mod. alloy steel, with nickel-chrome and molybdenum. Heat treatment: normalized and tempered. Recommended for non-corrosive wells with very high loads.

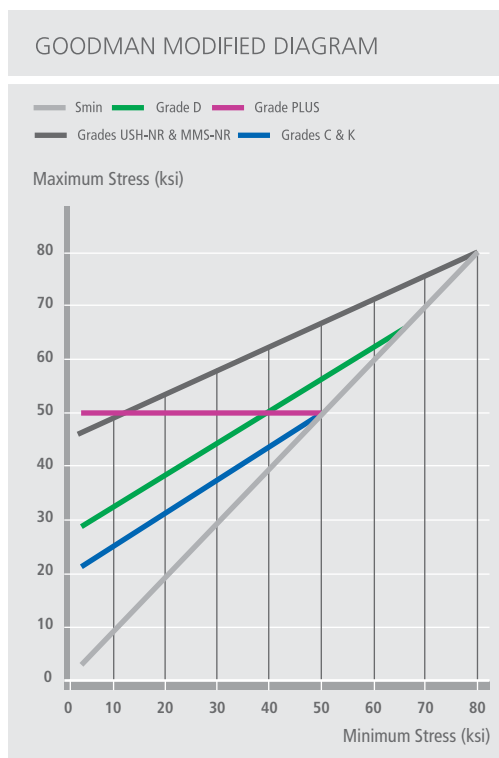
## HIGH RESISTANCE CRITICAL SERVICE (MMS-NR)

Manufactured in specially developed AISI 4138 Mod. steel to provide the required high mechanical strength, reducing susceptibility

to Hydrogen-induced embrittlement (SSC - Sulphide Stress Cracking) when compared with AISI 4330 steel. It is produced from a chromium-molybdenum alloy steel that contains no nickel. Heat treatment: normalized and tempered. Recommended for services in deep wells with high loads. Inhibiting is suggested in order to improve its performance.

## PLUS ROD

Manufactured in AISI 1530 Mod. Its external surface is quenched whereas the core remains un-tempered. The external martensitic layer creates a permanent state of compression in the surface of the rod, which results in high resistance to fatigue. Recommended for services in deep wells with high flow rates effectively inhibited.



FULL SCALE TESTING LAB  
Campana, Argentina.

# Accessories

Tenaris offers a wide range of high quality products to complete the rod string and increase its lifespan and performance.

## PONY RODS

In compliance with the same quality requirements applicable to the rods, pony rods measuring 2, 4, 6, 8, 10 and 12 feet are available for each steel grade and rod body diameter. Other lengths are also manufactured in accordance with customers' specifications.

## SINKER BARS

Used to maintain an optimized string design in beam pumping applications and to avoid premature failures in the installation. Very effective for reducing failures in rod body, pins and coupling, which occur due to the effect of compression and buckling in the string. Sinker bars are manufactured in diameters from 1 1/4" to 1 3/4" in steel grades according to API standard.

## COUPLINGS

Tenaris offers a complete line of couplings for sucker rods, polished rods, subcouplings as well as guided couplings. They are available in reduced slim hole (SH) diameters as well as normal full size (FS) for both API (T and Spray Metal) and high strength versions (UHS).

### Spray Metal Couplings

Spray Metal is a superficial hardening process in which a nickel, chrome, boron and silicon based powder is applied on the base metal and later melted, resulting in a hard, dense and uniform surface with a very low friction coefficient and high corrosion resistance. The Spray Metal (SM) version is available for both conventional and polished rods in slim hole (SH) and full size (FS) diameters.

### Guided Couplings

Tenaris produces guided couplings for beam pumping and progressive cavity pumping (PCP). They can be injected with material to work under high or low temperatures.

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## COUPLINGS

Manufactured from seamless steel pipes produced by Tenaris.

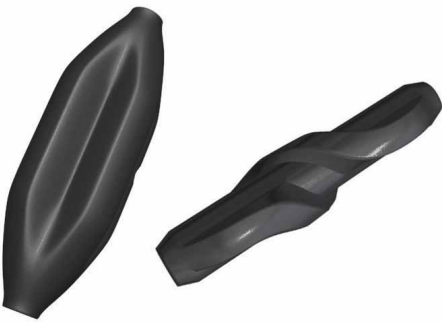


### POLISHED RODS

Low and medium alloy steel polished rods with an excellent surface finish to ensure the proper seal in the stuffing box, produced under API standards for lengths up to 36 ft. Polished, chromed and metalized options available.

### ROD GUIDES

Tenaris has a wide range of rod guides and materials for both beam pumping and Progressive Cavity Pumping. Rod guides are molded directly on the rod body, becoming a true protection for the tubing and for the rod itself. Available in different materials for varied fluid conditions as well as for high and low bottom-hole temperatures.



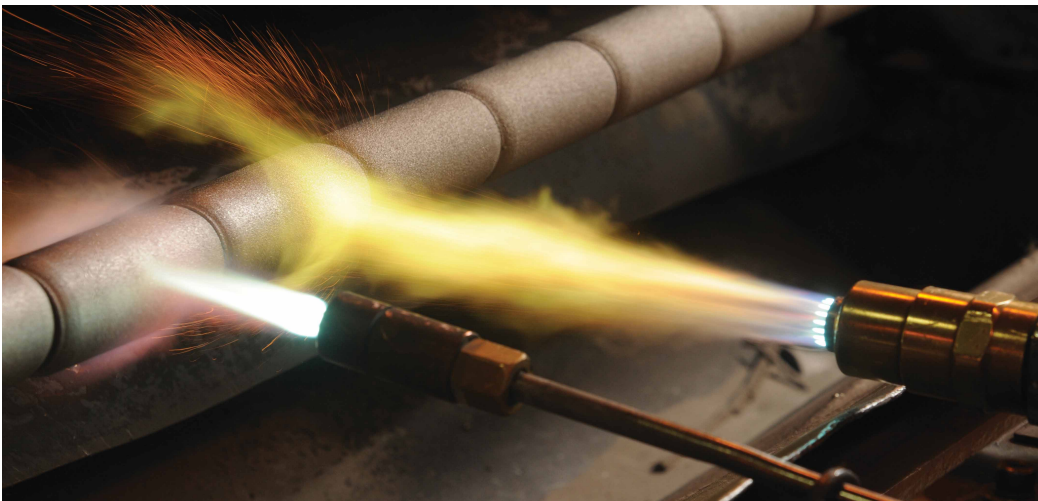
### ROD GUIDES

Molded directly on the rod body, guides offer true protection for the tubing.



### POLISHED RODS

For corrosive services, stainless steels in the AISI 304 and 316 series are available.



### SPRAY METAL PROCESS

Available for conventional and polished rods in slim hole and full size diameters.



#### **SUCKER RODS**

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