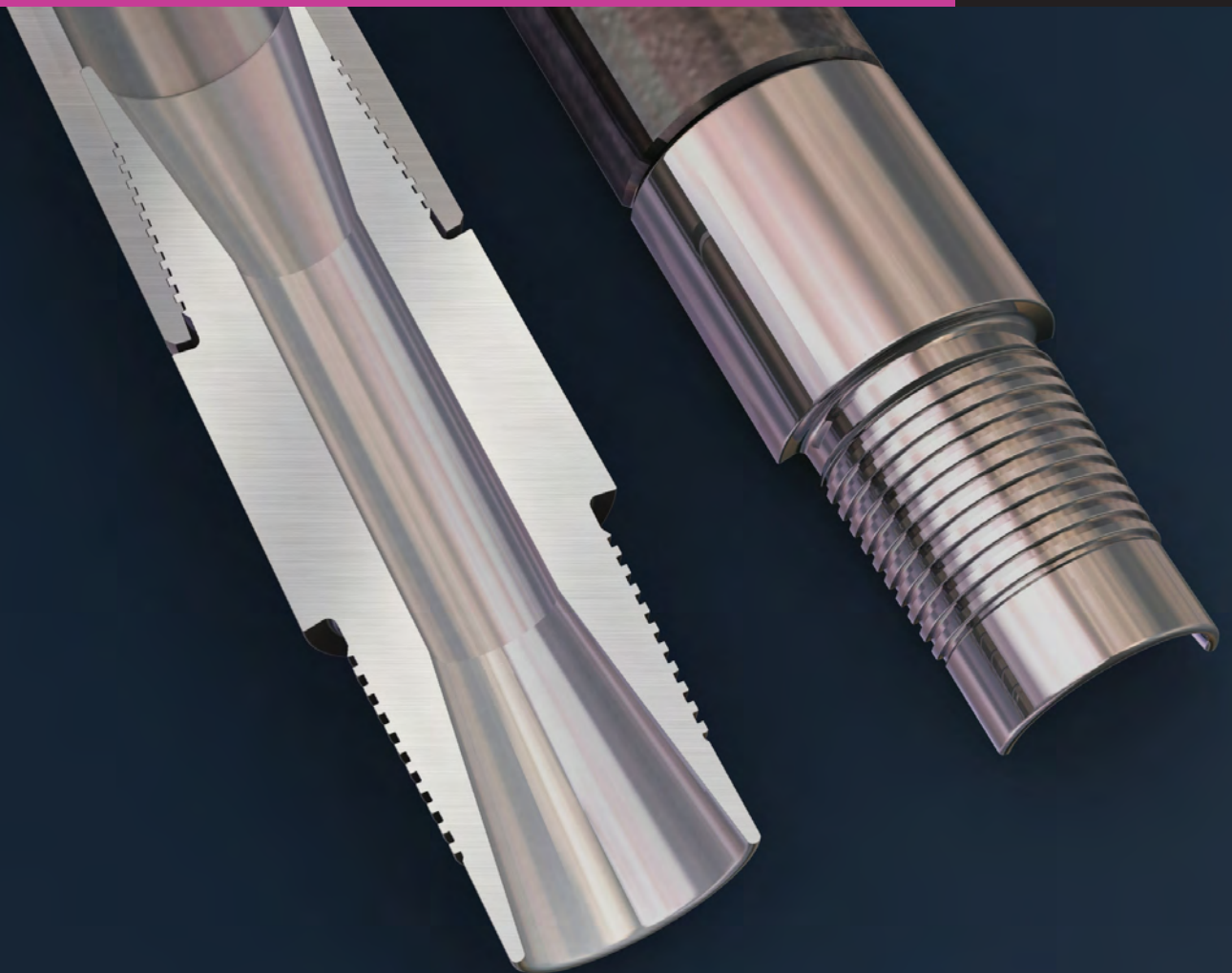




# PCPRod<sup>®</sup> Hollow Series for Progressive Cavity Pumping

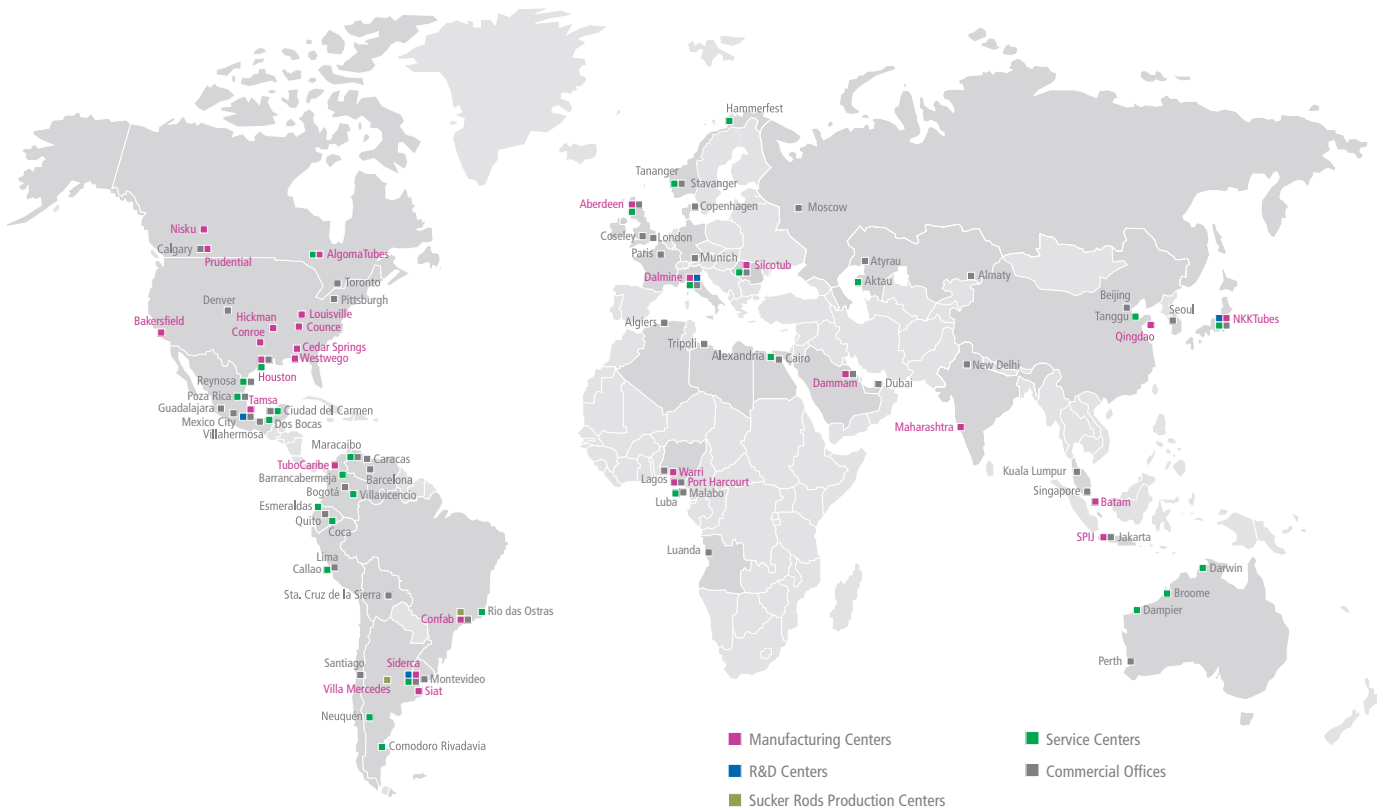


# Tenaris

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.



# PCPRod® Hollow Series for Progressive Cavity Pumping

Tenaris has developed the PCPRod® Series, a line of products specially designed for progressive cavity pumping (PCP) applications in the most demanding environments.

In PCP systems, a rotating screw-type pump is used and the rotating movement is then transmitted from the surface to the pump through a sucker rod string working mainly under torque stresses, causing the fluid contained in the cavity to flow upwards.

Tenaris's Research & Development team developed the PCPRod® Hollow Series, a technological breakthrough that not only increases the reliability of progressive cavity pumping (PCP) operations, but also reduces operating costs.

One of the alternatives that the hollow rod presents is the ability to inject diluents through the hollow rod for heavy and extra-heavy crude oil pumping or any other special application. This improves injection efficiency and reduces the complexity of the operation given the elimination of injection pipes and capillaries.



**HOLLOW SUCKER RODS**  
PCPRod® 1000, PCPRod®  
1500 and PCPRod® 2500.

# Main features

Enhanced operational reliability for PCP applications.

The seamless pipes used to manufacture the PCPRod® Series products combine a low-alloy Chromium-Molibdenum steel with a quenched and tempered heat treatment resulting in a refined microstructure with excellent mechanical properties: Yielding Stress 140 Ksi minimum and Ultimate tensile stress 147 Ksi minimum.

These rods have been developed to work under rotating loads in PCP. This product includes a pipe with box-box ends and a nipple connector that allows an external flush joint (with no variation of the diameter in the joint area), which minimizes turbulence and flow losses.

The flush connection significantly reduces friction between the tubing and the rod string. Therefore, premature wear failures are eliminated.

The range of products with PCPRod® thread includes three models of connections to work with torques up to 1,000; 1,500 and 2,500 lb.ft.

## OTHER CHARACTERISTICS

- PCPRod® tapered thread with 8 hpp trapezoidal thread profile and differentiated tapering between pin and box.
- Joint with torque shoulder.
- Diluents, corrosion inhibitors or other fluids can be added through a hollow joint.
- Temperature and pressure sensors can be lowered down the string.

## HANDLING AND INSTALLATION

For handling and transportation of PCPRod® Series, the same specifications for conventional sucker rods must be followed. Installation the well site is simple, as no special accessories are needed.

### Elevators

Conventional sucker rods elevators are used with a 1" x 2 feet pony rod and a crossover to adjust the PCPRod® Series end when elevating.

### Power Tong

The use of standard hydraulic pipe tongs with adapted clamps for an outer diameter of 1.66" or 1.9" is recommended. No special tools are required. For better performance, an electronic torque control device is suggested.

### Hanging Slips

Pneumatic slips are used for conventional pipes adapted to outer diameters of 1.66" or 1.9".

## Make-up torque for Hollow Rods

PRODUCT	Min. torque ft.lb	Opt. torque ft.lb	Max. torque ft.lb
PCPRod®1000	1100	1150	1200
PCPRod®1500	1500	1550	1600
PCPRod®2500	2500	2550	2600

## Technical Specifications

PRODUCT	Pipe outer Ø	Pipe thickness	Upset outer Ø	Max. working torque *	Metric weight without nipple	Length range	Joint min. int. Ø
PCPRod®1000	48.8 mm - 1.9"	6.7 mm - 0.26"	No upset	1,000 ft.lb	6.95 kg/m - 4.6 Lb/ft	8.5 to 9.75 m - 28 to 32 ft	20 mm - 0.79"
PCPRod®1500	48.8 mm - 1.9"	6.7 mm - 0.26"	No upset	1,500 ft.lb	6.95 kg/m - 4.6 Lb/ft	8.5 to 9.75 m - 28 to 32 ft	18 mm - 0.71"
PCPRod®2500	48.8 mm - 1.9"	6.7 mm - 0.26"	60 mm - 2.36"	2,500 ft.lb	6.95 kg/m - 4.6 Lb/ft	8.5 to 9.75 m - 28 to 32 ft	20 mm - 0.79"

\*Teneris recommends using a 0.9 safety factor to maximize fatigue resistance.

# Advantages of PCPRod® Hollow Series

Tenaris's PCPRod® Hollow Series increases the reliability of progressive cavity pumping (PCP) operations and offers several benefits at the rig.

- Reduces premature failures due to rod pin breakage caused by over torque during well operations, given its make-up procedure and connection design for torque applications.
- Reduces tubing wear failures due to the design of its flush and near flush joints.
- Reduces the backspin effect and enhances torque transmission (stick-slip effect).
- Increases the safety of rig personnel since it reduces accumulated turns in the string and therefore the possibility of backspin effects during workover operations.
- Increases the effectiveness of corrosion inhibition or any other diluents action while being injected through the hollow rod.
- Reduces handling problems, as its installation does not require special tools.

## INCREASED RELIABILITY FOR PROGRESSIVE CAVITY PUMPING OPERATIONS



### TECHNICAL SERVICE

Building upon its vast field experience in handling sucker rods, Tenaris offers a comprehensive range of services to meet its customers' operational needs. 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. Also, technical assistance is provided for well completion.



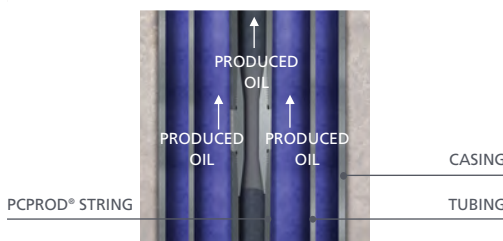
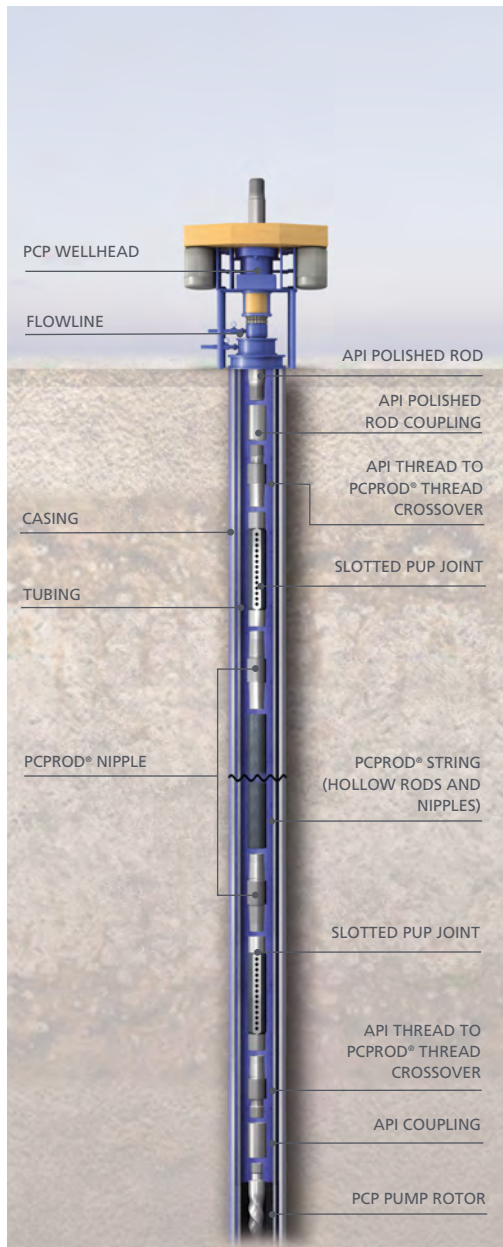
### ACCESSORIES

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

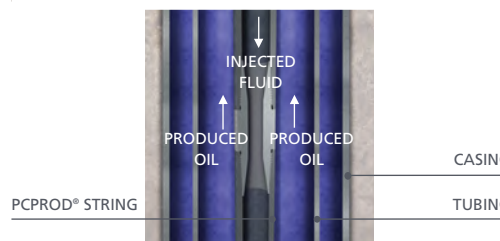
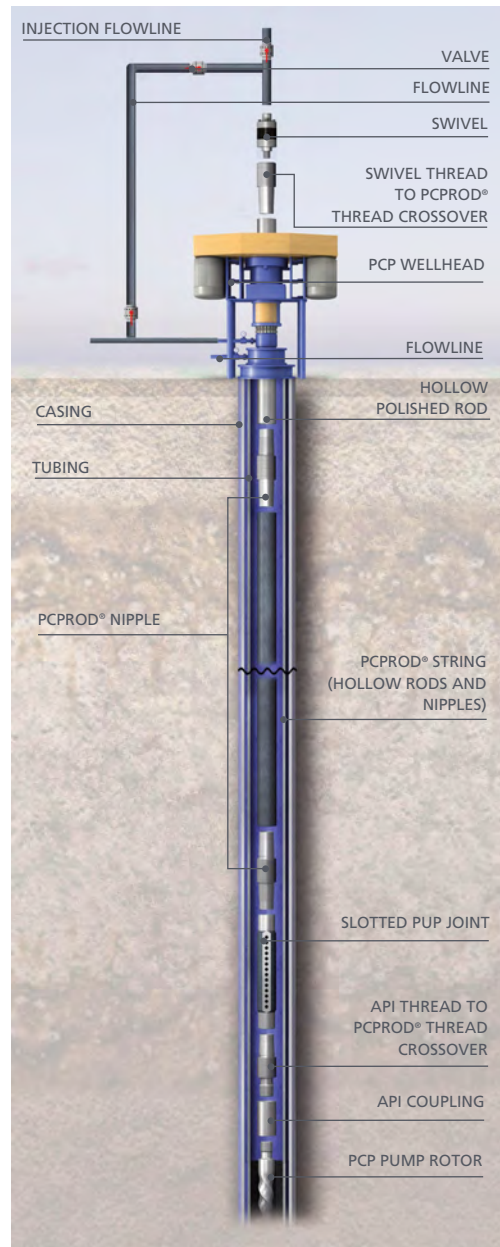
- Pup joints (pony rods) to adjust string length.
- Combination crossover between API conventional thread and PCPRod® Hollow thread.
- Polished and chromium-plated hollow rods.
- Rotating joints (swivels) for diluent injection.
- Slotted pup joints that allows fluid injection into the tubing at any depth.
- Safety-check valves.



OIL PRODUCTION THROUGH THE TUBING -  
HOLLOW ROD ANNULUS & THE INNER DIAMETER  
OF THE PCPROD® HOLLOW STRING



FLUID INJECTION





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