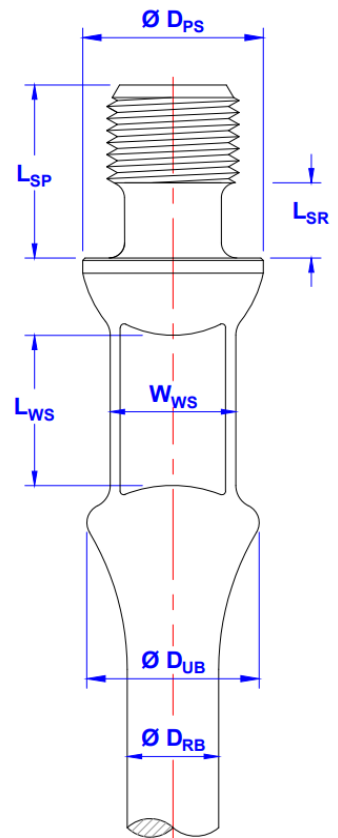


AlphaRod® Sucker & Pony Rod

Dimensions:

Available for both beam and progressive cavity pumping, Tenaris delivers sucker rods manufactured according to a rigorous quality assurance system that complies with ISO 9001 and API Q1 standards.

Nominal Size	Units	DRB	DPS	WWS	LWS	DUB	LSR	LSP
Rod								
5/8"	max. in (mm)	0.632 (16.05)	1.255 (31.88)	0.906 (23.01)	-	1.224 (31.08)	0.547 (13.90)	1.313 (33.34)
	min. in (mm)	0.611 (15.52)	1.240 (31.62)	0.844 (21.44)	1.250 (31.75)	1.094 (27.78)	0.516 (13.11)	1.250 (31.75)
3/4"	max. in (mm)	0.758 (19.25)	1.505 (38.23)	1.031 (26.19)	-	1.411 (35.85)	0.625 (15.88)	1.500 (38.10)
	min. in (mm)	0.734 (18.64)	1.490 (37.85)	0.969 (24.61)	1.250 (31.75)	1.281 (32.54)	0.594 (15.09)	1.438 (36.51)
7/8"	max. in (mm)	0.883 (22.43)	1.630 (41.40)	1.031 (26.19)	-	1.505 (38.23)	0.703 (17.86)	1.688 (42.86)
	min. in (mm)	0.859 (21.82)	1.615 (41.02)	0.969 (24.61)	1.250 (31.75)	1.375 (34.93)	0.672 (17.07)	1.625 (41.28)
1"	max. in (mm)	0.883 (25.63)	2.005 (50.93)	1.344 (34.14)	-	1.911 (48.55)	0.828 (21.04)	1.938 (49.21)
	min. in (mm)	0.982 (24.94)	1.990 (50.55)	1.282 (32.56)	1.500 (38.10)	1.719 (43.66)	0.797 (20.24)	1.875 (47.63)
1 1/8"	max. in (mm)	1.135 (28.83)	2.265 (57.53)	1.531 (38.89)	-	2.193 (55.69)	0.906 (23.02)	2.188 (55.56)
	min. in (mm)	1.105 (28.07)	2.235 (56.77)	1.469 (37.31)	1.625 (41.28)	2.000 (50.50)	0.875 (22.23)	2.215 (53.98)



Sucker Rods Nominal Lengths: 25, 30 ft (7.62, 9.14 m)

Pony Rods Nominal Lengths: 2, 4, 6, 8, 10, 12 ft (0.61, 1.22, 1.83, 2.44, 3.05, 3.66 m)

*Other lengths might be available upon request.

Steel Grades:

The AlphaRod® series was created to overcome more demanding requirements and offer a solution to fatigue and corrosion-fatigue problems. During oil production sucker rods face operative productions that get tougher by the day. Mature conventional wells and non-conventional wells expose sucker rods in such ways that lead to an increase in premature fails. The new steel grades of the AlphaRod® generation were specially designed to satisfy these operative conditions.

Chemical Composition:

Typical chemical compositions (wt%) listed in the following table.

Grade	C	Mn	Si	S	P	Cr	Ni	Mo	Others
AlphaRod® HS	0.25	0.55	0.25	0.01 max	0.02 max	0.95	0.30 max	0.30 min	B: 0.01 max, Ti: 0.1 max, Nb: 0.1 max
AlphaRod® CS	0.25	0.55	0.25	0.01 max	0.02 max	0.95	0.30 max	0.30 min	B: 0.01 max, Ti: 0.1 max, Nb: 0.1 max

Mechanical Properties:

Mechanical properties are listed in the following table.

Grade	Yield Strength (0.2% offset)	Ultimate Tensile Stress	Elongation (8")	Reduction of area	Hardness
AlphaRod® HS	min 135 kpsi (min 931 MPa)	145 to 160 kpsi (1000 to 1103 MPa)	11% min	60% min	35 HRC
AlphaRod® CS	min 110 kpsi (min 758 MPa)	118 to 133 kpsi (814 to 917 MPa)	12% min	60% min	26 HRC

Performance Data:

Maximum Pulling Force:

Grade	Rod Outer Diameter				
	5/8"	3/4"	7/8"	1"	1 1/8"
AlphaRod® HS	35.6 klb (16.2 t)	51.3 klb (23.3 t)	70.3 klb (32 t)	91.9 klb (41.8 t)	116.4 klb (52.9 t)
AlphaRod® CS	29 klb (13.2 t)	41.8 klb (19 t)	57.3 klb (26 t)	74.8 klb (34 t)	94.8 klb (43.1 t)

To prevent tensile failures, the weight indicator pull on a "like new" condition rod string should not exceed 90% of the yield strength of the smallest diameter sucker rod, based on its known size and grade. Maximum pulling force values herein informed were calculated based on the 90% of the specified minimum yield strength at the smallest section of a given rod.

Beam Pumping: Maximum allowable tensile stress

It is recommended that the modified Goodman stress diagram or the simplified formula listed bellow are used in the determination of the allowable range of stress applied to a sucker rod.

$$S_a = \frac{UTS}{A} + B * S_{min} * SF$$

Applied tensions can be compared to the maximum allowable using the Goodman formula:

$$Goodman\% = \frac{S_{max} - S_{min}}{S_a - S_{min}} * 100$$

Table 1: Goodman coefficients.

Grade	A	B
AlphaRod® HS	2.7095	0.375
AlphaRod® CS	2.576	0.375

Where:

S_a = Maximum allowable stress (psi or Mpa)

S_{min} = Minimum calculated or measured stress (psi or Mpa)

S_{max} = Maximum calculated or measured stress (psi or Mpa)

UTS = Minimum ultimate tensile strength (psi or Mpa)

SF = Service factor. For corrosive environments, a value of 0.9 is recommended

Coefficients A and B are listed on Table 1.

Progressive Cavity Pumping: Effective Stress

The effective rod stress in PCP applications can be calculated using the von Mises equation:

$$\sigma_e = \sqrt{\frac{(C_1 * L^2)}{\pi^2 * D^4} + \frac{C_2 * T^2}{\pi^2 * D^6}}$$

Where:

σ_e = Effective stress (kpsi or Mpa)

L = Total axial load (lbf or N)

T = Total torque (lbf. ft or N. m)

D = Rod's body diameter (in or mm)

C₁ = Constant (For imperial system= 1.6x10⁻⁵ . For international system= 16)

C₂ = Constant (For imperial system= 0.1106. For international system= 7.68x10⁻⁸)

Other Technical Data:

Impact test (Charpy V-Notch, standard 10x10 specimen) typical values at room temperature:

- 180 Joules for CS grade.
- 150 Joules for HS grade.

Microstructure: Min 90% martensitic transformation is verified by hardness testing to all HT lots.

Color Code:

Rod's ends are painted according to the following table:

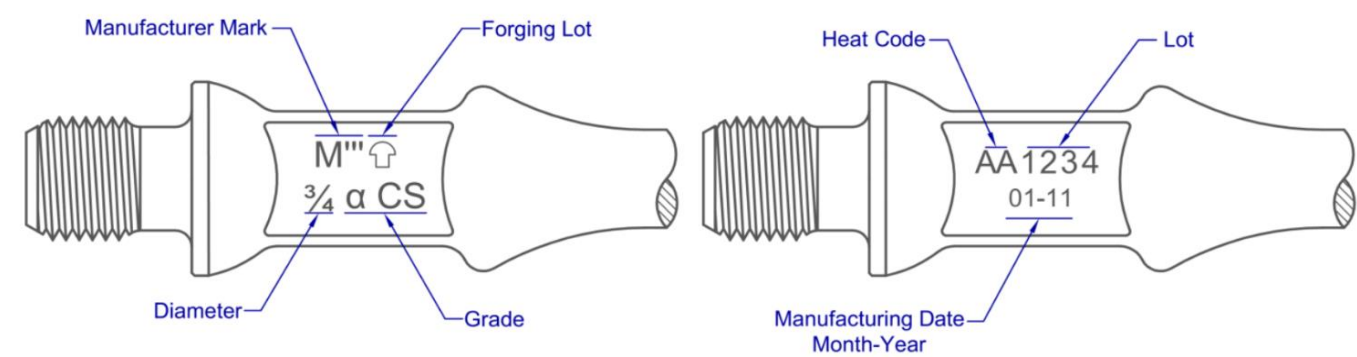
Grade	Color Code
AlphaRod® HS	Gold
AlphaRod® CS	Silver

*Displayed colors are for guidance only.

Non Destructive Testing:

All raw material is carefully inspected using electromagnetic and/or ultrasonic methods to ensure the soundness of the final product.

Marking:



Labeling:*

Metalmecánica S.A.
Ruta 55 Km. 754,1
Villa Mercedes (San Luis)
Made in Argentina

BOX N°		QTY:
PRODUCT: SUCKER RODS		DATE:
SAP CODE:		
SPECIFICATION:		
ROD DIAM:	NET WEIGHT: (kg)	
END DIAM:		
GRADE:		
LENGTH: (ft)		
SALES ORDER:		PACKAGING TYPE:
DESTINATION:		THREAD PROTECTIO

*Image for reference only.

Ordering Information:

When placing an order please attach the following information:

- PDS:

SRAR
- Product Family:

Sucker Rod (or Pony Rod)
- Diameter:

1"
- Grade:

AlphaRod® CS
- Length:

25 ft

Tenaris has issued this document for general information only, and the information in this document is not intended to constitute professional or any other type of advice or recommendation and is provided on an "as is" basis. No warranty is given. Tenaris has not independently verified any information –if any- provided by the user in connection with, or for the purpose of, the information contained hereunder. The use of the information is at user's own risk and Tenaris does not assume any responsibility or liability of any kind for any loss, damage or injury resulting from, or in connection with any information contained hereunder or any use thereof. The information in this document is subject to change or modification without notice. Tenaris's products and services are subject to Tenaris's standard terms and conditions or otherwise to the terms resulting from the respective contracts of sale or services, as the case may be. Unless specifically agreed under such contract of sale or services, if Tenaris is required to provide any warranty or assume any liability in connection with the information contained here under, any such warranty or liability shall be subject to the execution of a separate written agreement between petitioner and Tenaris. For more complete information please contact a Tenaris's representative or visit our website at www.tenaris.com. All rights reserved. ©Tenaris 2025