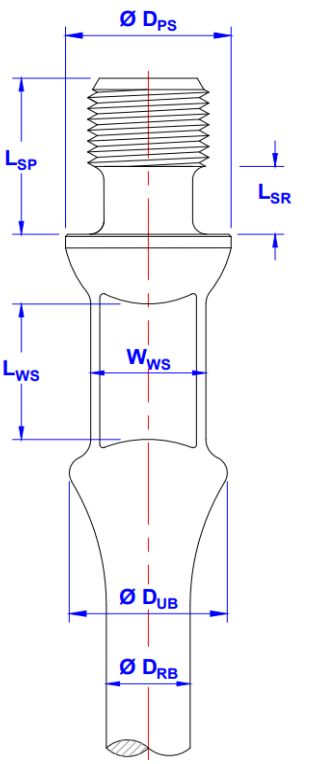
Tenaris

Sucker Rod String: Sucker & Pony Rod
PDS: SRRPAR
Short Name: R09
Effective Date: 14/03/2025
Previous Revision: 23/12/2024

AlphaRod® Reinforced Pin Sucker & Pony Rod

Dimensions:

Nominal Size		Units	DRB	DPS	WWS	LWS	DUB	LSR	LSP
Rod	Pin								
3/4''	7/8''	max. in (mm)	0.758 (19.25)	1.630 (41.41)	1.031 (26.19)	-	1.502 (38.16)	0.703 (17.86)	2.415 (61.35)
		min. in (mm)	0.734 (18.64)	1.615 (41.03)	0.969 (24.61)	1.250 (31.75)	1.378 (35.01)	0.672 (17.07)	1.625 (41.28)
7/8''	1''	max. in (mm)	0.883 (22.43)	2.005 (50.93)	1.141 (28.99)	-	1.555 (39.50)	0.828 (21.03)	2.665 (67.70)
		min. in (mm)	0.859 (21.82)	1.990 (50.55)	1.079 (27.41)	1.250 (31.75)	1.378 (35.00)	0.797 (20.24)	1.875 (47.63)



*Dimensions according to API 11B.

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	0.01 max	0.95	0.30 max	0.45	B: 0.01 max, Ti: 0.1 max, Nb: 0.1 max
AlphaRod® CS	0.25	0.55	0.25	0.01 max	0.01 max	0.95	0.30 max	0.45	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)	13% min	60% min	35 HRC
AlphaRod® CS	min 110 kpsi (min 758 MPa)	118 to 133 kpsi (814 to 917 MPa)	14% min	70% min	26 HRC

Performance Data:
Maximum Pulling Force:

Grade	Rod Outer Diameter	
	3/4''	7/8''
AlphaRod® HS	51.3 klb (23.3 t)	70.3 klb (32 t)
AlphaRod® CS	41.8 klb (19 t)	57.3 klb (26 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)

C_1 = Constant (For imperial system= $1.6x10^{-5}$. For international system= 16)

C_2 = Constant (For imperial system= 0.1106. For international system= $7.68x10^{8}$)

Color Code:

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

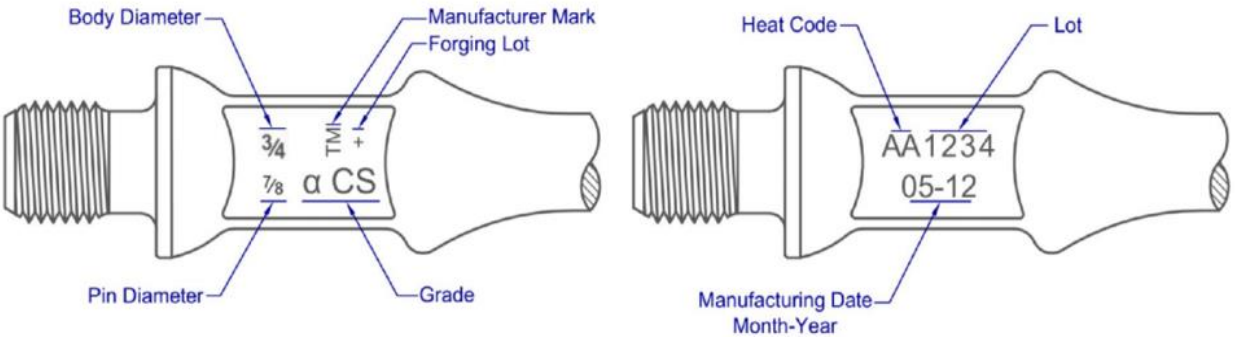
Grade	Color Code
AlphaRod® HS	Gold
AlphaRod® CS	Silver

*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:*

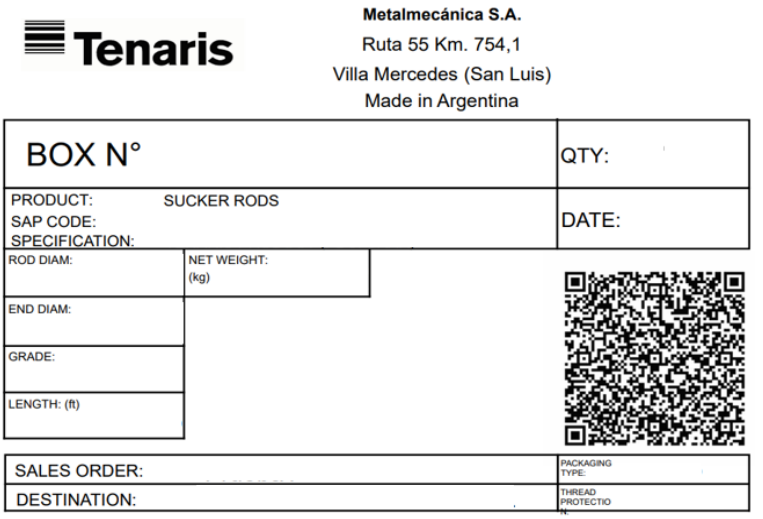


*Image for reference only.

Ordering Information:

When placing an order please attach the following information:

PDS:	SRRPAR
Product Family:	Sucker Rod (or Pony Rod)
Body Diameter:	3/4''
Pin Diameter:	7/8''
Grade:	AlphaRod® CS
Length:	25 ft