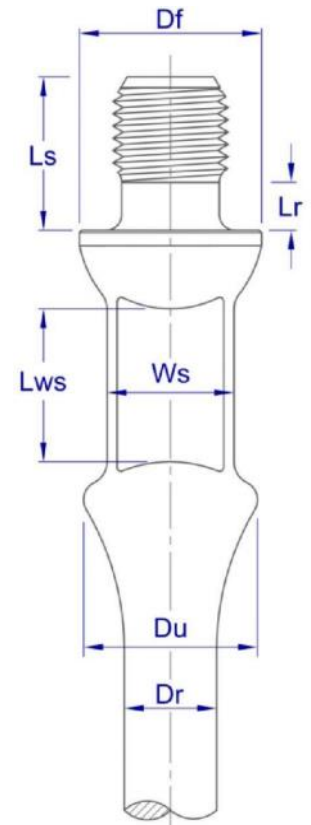


# AlphaRod® Sucker & Pony Rod

## 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	Dr	Df	Ws	Lws (min)	DU	Lr	Ls
Rod								
5/8"	in	0.63	1.25	0.88	1.25	1.22	0.52	1.25
		+0.007 -0.014	+0.005 -0.01	± 0.031		+0.005 -0.125	+0.031 -0	+0.63 -0
	mm	15.88	31.75	22.23	31.75	30.96	13.11	31.75
		+0.18 -0.36	+0.13 -0.25	±0.79		+0.13 -3.18	+0.79 -0	+1.59 -0
3/4"	in	0.75	1.50	1.00	1.25	1.41	0.59	1.44
		+0.008 -0.016	+0.005 -0.01	± 0.031		+0.005 -0.125	+0.031 -0	+0.63 -0
	mm	19.05	38.10	25.40	31.75	35.72	15.09	36.51
		+0.2 -0.41	+0.13 -0.25	±0.79		+0.13 -3.18	+0.79 -0	+1.59 -0
7/8"	in	0.88	1.63	1.00	1.25	1.50	0.67	1.63
		+0.008 -0.016	+0.005 -0.01	± 0.031		+0.005 -0.125	+0.031 -0	+0.63 -0
	mm	22.23	41.28	25.40	31.75	38.10	17.07	41.28
		+0.2 -0.41	+0.13 -0.25	±0.79		+0.13 -3.18	+0.79 -0	+1.59 -0
1"	in	1.00	2.00	1.31	1.50	1.91	0.80	1.88
		+0.009 -0.018	+0.005 -0.01	± 0.031		+0.005 -0.187	+0.031 -0	+0.63 -0
	mm	25.40	50.80	33.34	38.10	48.42	20.24	47.63
		+0.23 -0.46	+0.13 -0.25	±0.79		+0.13 -4.76	+0.79 -0	+1.59 -0
1 1/8"	in	1.13	2.25	1.50	1.63	2.19	0.88	2.13
		+0.01 -0.02	+0.015 -0.015	± 0.031		+0.005 -0.187	+0.031 -0	+0.63 -0
	mm	28.58	57.15	38.10	41.28	55.56	22.23	53.98
		+0.25 -0.51	+0.38 -0.38	±0.79		+0.13 -4.76	+0.79 -0	+1.59 -0



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				
	5/8"	3/4"	7/8"	1"	1 1/8"
AlphaRod® HS	34.4 klb (15.6 Ton)	47.6 klb (21.6 Ton)	65 klb (29.5 Ton)	84.8 klb (38.8 Ton)	107.4 (48.7 Ton)
AlphaRod® CS	26.9 klb (12.2 Ton)	38.8 klb (17.6 Ton)	52.9 klb (24 Ton)	69 klb (31.3 Ton)	87.5 klb (39.7 Ton)

## **Beam Pumping: Maximum allowable tensile stress**

It is recommended that the modified Goodman stress diagram or the simplified formula listed below 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<sub>a</sub> = Maximum allowable stress (psi or Mpa)

S<sub>min</sub> = Minimum calculated or measured stress (psi or Mpa)

S<sub>max</sub> = 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<sub>e</sub> = 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<sub>1</sub> = Constant (For imperial system= 1.6x10<sup>-5</sup>. For international system= 16)

C<sub>2</sub> = Constant (For imperial system= 0.1106. For international system= 7.68x10<sup>8</sup>)

## **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:

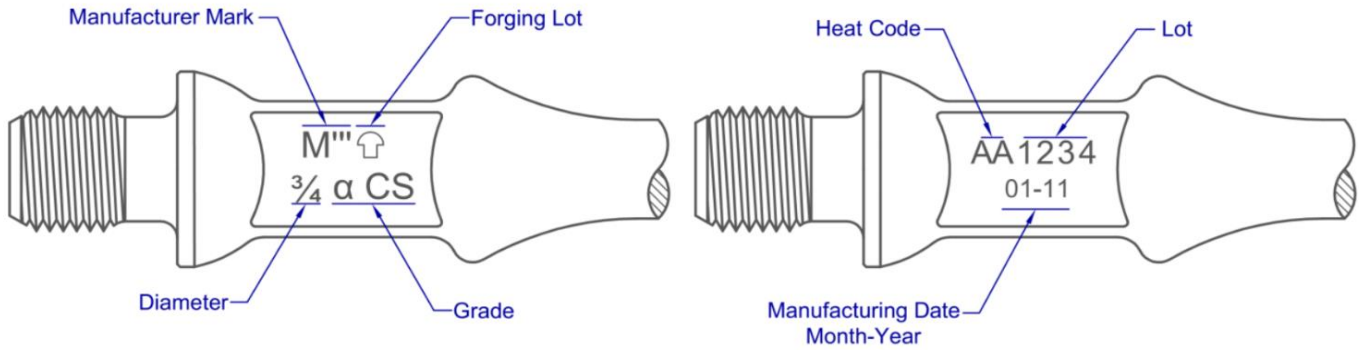
Grade	Color Code
AlphaRod® HS	Gold
AlphaRod® CS	Silver

\*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

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