

# AlphaRod<sup>®</sup> Reinforced Pin Sucker & Pony Rod

# **Dimensions:**

Nominal Size		11	000	DBC	MANAIC	114/0	DUD		
Rod	Pin	Units	DKD	DPS	VV VV S	LVVS	DOP	LSK	LSP
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:

Pony Rods Nominal Lengths:\*\*

25, 30 ft (7.62, 9.14 m) 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<sup>®</sup> 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<sup>®</sup> generation were specially designed to satisfy these operative conditions.

#### **Chemical Composition:**

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

Grade	С	Mn	Si	S	Р	Cr	Ni	Мо	Others
AlphaRod <sup>®</sup> 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 <sup>®</sup> 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 <sup>®</sup> HS	min 135 kpsi (min 931 MPa)	145 to 160 kpsi (1000 to 1103 MPa)	13% min	60% min	35 HRC
AlphaRod <sup>®</sup> 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:

	Rod Outer Diameter		
Grade	3/4"	7/8''	
AlphaRod <sup>®</sup> HS	51.3 klb (23.3 t)	70.3 klb (32 t)	
AlphaRod <sup>®</sup> 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:

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

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:

 $\sigma_e$  = 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=  $1.6 \times 10^{-5}$  . For international system= 16)

 $C_2$  = Constant (For imperial system= 0.1106. For international system= 7.68x10<sup>8</sup>)

# **Color Code:**

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

Grade	Color Code
AlphaRod <sup>®</sup> HS	Gold
AlphaRod <sup>®</sup> 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.

Table	1:	Goodma	an	coefficients.

Grade	А	В
AlphaRod <sup>®</sup> HS	2.7095	0.375
AlphaRod <sup>®</sup> CS	2.576	0.375

## Marking:



## Labeling:\*



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

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



**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 <sup>®</sup> CS
Length:	25 ft

\*Image for reference only.

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