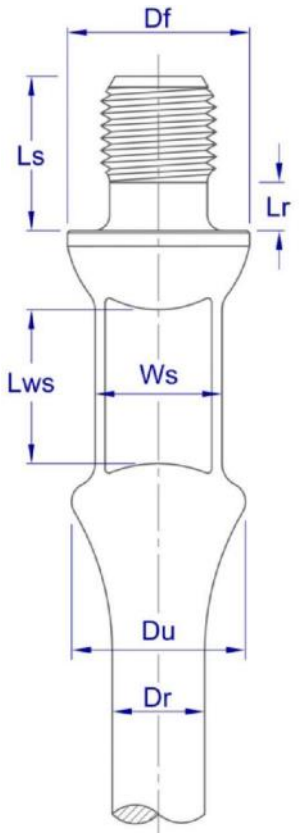
API Sucker & Pony Rod

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 Rod	Units	Dr	Df	Ws	Lws (min)	DU	Lr	Ls
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:

Different steel grades are available, depending on the type of load and the corrosion level in the wells. All these materials comply with API 11B.

Grades C, K and D carbon are only available under special request.

Chemical Composition:

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

Grade	C	Mn	Si	S	P	Cr	Ni	Mo	Others
C	0.30-0.36	1.30-1.60	0.20-0.40	0.035 max	0.035 max	0.20 max	0.15 max	0.05 max	V: 0.15 max
K	0.18-0.25	0.70-0.90	0.15-0.35	0.035 max	0.035 max	0.30 max	1.65-2.00	0.20-0.30	-
D Carbon	0.30-0.36	1.30-1.60	0.20-0.40	0.035 max	0.035 max	0.20 max	0.15 max	0.05 max	V: 0.15 max
D Alloy	0.40-0.45	0.75-1.00	0.15-0.35	0.025 max	0.025 max	0.80-1.10	0.25 max	0.15-0.25	-
D Special	0.29-0.37	0.70-0.95	0.15-0.35	0.025 max	0.025 max	0.80-1.10	1.65-2.00	0.20-0.30	V: 0.04-0.08
D Special KD	0.20-0.25	0.80-1.00	0.15-0.35	0.025 max	0.025 max	0.70-0.90	1.15-1.50	0.25-0.30	V: 0.03-0.07

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
C	min 60 kpsi (min 414 MPa)	90 to 115 kpsi (621 to 793 MPa)	13% min	40% min	-
K	min 60 kpsi (min 414 MPa)	90 to 115 kpsi (621 to 793 MPa)	13% min	40% min	-
D Carbon	min 85 kpsi (min 586 MPa)	115 to 140 kpsi (793 to 965 MPa)	10% min	40% min	-
D Alloy	min 95 kpsi (min 655 MPa)	120 to 140 kpsi (827 to 965 MPa)	10 % min	45% min	27 HRC
D Special	min 100 kpsi (min 689 MPa)	125 to 140 kpsi (862 to 965 MPa)	10 % min	45% min	28 HRC
D Special KD	min 85 kpsi (min 586 MPa)	115 to 140 kpsi (793 to 965 MPa)	10% min	45% min	25 HRC

Performance Data:

Maximum Pulling Force:

	Rod Outer Diameter				
Grade	5/8"	3/4"	7/8"	1"	1 1/8"
C	14.8 klb (6.7 Ton)	21.2 klb (9.6 Ton)	28.9 klb (13.1 Ton)	37.7 klb (17.1 Ton)	47.8 klb (21.7 Ton)
K	14.8 klb (6.7 Ton)	21.2 klb (9.6 Ton)	28.9 klb (13.1 Ton)	37.7 klb (17.1 Ton)	47.8 klb (21.7 Ton)
D Carbon	20.9 klb (9.5 Ton)	30 klb (13.6 Ton)	40.8 klb (18.5 Ton)	53.4 klb (24.2 Ton)	67.7 klb (30.7 Ton)
D Alloy	23.4 klb (10.6 Ton)	33.5 klb (15.2 Ton)	45.6 klb (20.7 Ton)	59.7 klb (27.1 Ton)	75.6 klb (34.3 Ton)
D Special	24.5 klb (11.1 Ton)	35.3 klb (16 Ton)	48.1 klb (21.8 Ton)	62.8 klb (28.5 Ton)	79.4 klb (36 Ton)
D Special KD	20.9 klb (9.5 Ton)	30 klb (13.6 Ton)	40.8 klb (18.5 Ton)	53.4 klb (24.2 Ton)	67.7 klb (30.7 Ton)

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
C	4	0.5625
K	4	0.5625
D Carbon	4	0.5625
D Alloy	4	0.5625
D Special	4	0.5625
D Special KD	4	0.5625

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:

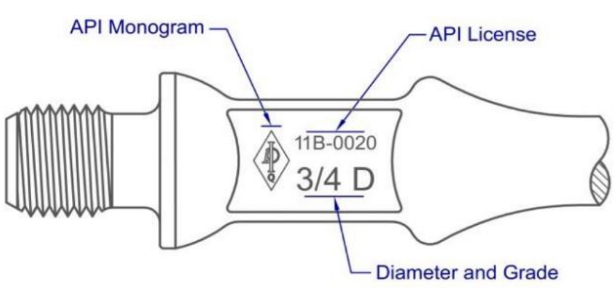
Grade	Color Code
C	White
K	Blue
D Carbon	Brown
D Alloy	Yellow
D Special	Orange
D Special KD	Orange

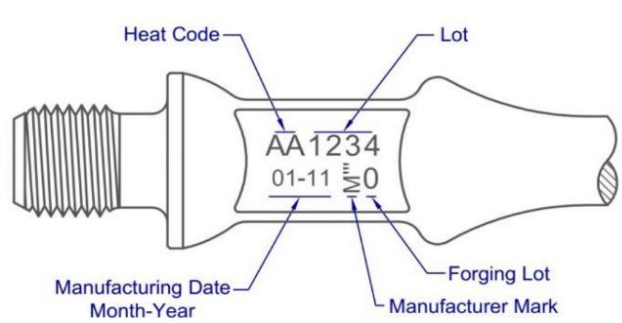
*Displayed colors are for guidance only.

Non Destructive Testing:

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

Marking:





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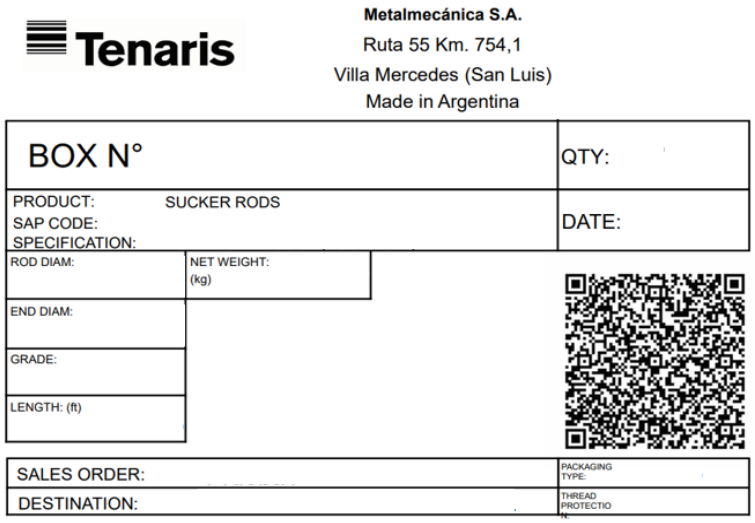

*Image for reference only.

Ordering Information:

When placing an order please attach the following information:

PDS:	SRAPI
Product Family:	Sucker Rod (or Pony Rod)
Diameter:	1''
Grade:	D Special KD
Length:	25 ft

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