

PUBLIC Exhibit 2-03 B

NORRIS SUCKER RODS

- Sucker Rod Comparison Guide

Quality Rods and the confidence to compare.

All types of steel are not created equal with regards to performance on a long term basis. Rods of the same API Class will not always perform equally well in service. It is important to select the best material suited for a specific application.

API Class—Manufacturer Type (AISI Series)

API Class	Norris	Upco	John Crane	Tenaris	Weatherford®
C	30 (C-1536)	C (C-1536)	-	C (1530M)	C (1536SR)
					S60 (1029M)
K	40 (A-4623-M)	K (A-4623-M)	-	K (4621M)	K (4623SR)
					S59 (4617M)
D Carbon	54 (C-1541-M)	CD (C-1541-M)	-	DC (1530M)	MD (1541MV)
					S67 (1029M)
D Alloy	78 (A-4142-M)	AD (A-4142-M)	Q79 (4120M)	DA (4142M)	D (4142SR)
D Special	75 (A-4330-M)	KD (A-4320-M)	Q87 (3130M)	DS (4330M)	KD (4720SR)
	90 (A-4320-M)			KD (4320M)	S87 (3130M)
Non-API Special Service High Strength	96 (A-4138-M)	HS (A-4138-M)	Q88 (3130M)	Plus (1530M)	S88 (3130M)
				MMS (4138M)	T66/XD (4138M)
	97 (A-4330-M)	HX (A-4330-M)		UHS (4330M)	HD (4332SRX)
					EL® (Special)

Manufacturer	Type	AISI Series	Aluminum (Al)	Carbon (C)	Chromium (Cr)	Copper (Cu)	Manganese (Mn)	Molybdenum (Mo)	Nickel (Ni)	Phosphorous (P)	Silicon (Si)	Niobium (Nb)	
API Class C													
Norris	30	C-1536	-	0.34/0.39	0.20 max	0.35 max	1.15/1.35	0.06 max	0.25 max	0.040 max	0.15/0.35	-	
Upco	C	C-1536	-	0.34/0.39	0.20 max	0.35 max	1.15/1.35	0.06 max	0.25 max	0.040 max	0.15/0.35	-	
John Crane	-	-	-	-	-	-	-	-	-	-	-	-	
Tenaris ⁴	C	1530M	0.01/0.04	0.31/0.36	0.20 max	0.25 max	1.40/1.60	0.05 max	0.15 max	0.025 max	0.25/0.40	-	
Weatherford ^{®4}	C	1536SR	-	0.30/0.37	0.25 max	0.35 max	1.20/1.50	0.05 max	0.20 max	0.04 max	0.20/0.30	-	
Weatherford ^{®4}	S60	1029M	-	0.22/0.29	0.20 max	0.35 max	1.00/1.32	0.05 max	0.15 max	0.025 max	0.15/0.30	-	
API Class K													
Norris	40	A-4623-M	-	0.20/0.25	0.20 max	0.35 max	0.60/0.80	0.15/0.25	1.65/1.85	0.035 max	0.15/0.35	-	
Upco	K	A-4623-M	-	0.20/0.25	0.20 max	0.35 max	0.60/0.80	0.15/0.25	1.65/1.85	0.035 max	0.15/0.35	-	
John Crane	-	-	-	-	-	-	-	-	-	-	-	-	
Tenaris ⁴	K	4621M	0.01/0.04	0.18/0.25	0.30 max	0.25 max	0.70/1.00	0.20/0.30	1.65/2.00	0.025 max	0.15/0.30	-	
Weatherford ^{®4}	K	4623SR	-	0.20/0.25	0.25 max	-	0.75/1.00	0.20/0.30	1.65/2.00	0.035 max	0.20/0.35	-	
Weatherford ^{®4}	S59	4617M	-	0.14/0.21	-	-	0.55/0.75	0.20/0.30	1.65/2.00	0.025 max	0.15/0.35	-	
API Class D Carbon													
Norris	54	C-1541-M	-	0.40/0.44	0.20 max	0.35 max	1.40/1.60	0.06 max	0.25 max	0.040 max	0.15/0.35	-	
Upco	CD	C-1541-M	-	0.40/0.44	0.20 max	0.35 max	1.40/1.60	0.06 max	0.25 max	0.040 max	0.15/0.35	-	
John Crane	-	-	-	-	-	-	-	-	-	-	-	-	
Tenaris ⁴	DC	1530M	0.25 max	0.31/0.36	0.20 max	0.25 max	1.40/1.60	0.05 max	0.15 max	0.025 max	0.25/0.40	-	
Weatherford ^{®4}	MD	1541MV	-	0.40/0.44	0.25 max	-	1.35/1.55	0.05 max	0.25 max	0.035 max	0.15/0.30	-	
Weatherford ^{®4}	S67	1029M	-	0.22/0.29	0.20 max	0.35 max	1.00/1.32	0.05 max	0.15 max	0.025 max	0.15/0.30	-	
API Class D Alloy													
Norris	78	A-4142-M	-	0.38/0.43	0.90/1.10	0.35 max	0.80/1.00	0.15/0.25	0.25 max	0.035 max	0.15/0.35	-	
Upco	AD	A-4142-M	-	0.38/0.43	0.90/1.10	0.35 max	0.80/1.00	0.15/0.25	0.25 max	0.035 max	0.15/0.35	-	
John Crane ^{3,4}	Q79	4120M	-	0.17/0.24	0.80/1.10	-	0.40/0.70	0.15/0.25	0.50 max	0.025 max	0.17/0.37	-	
Tenaris ⁴	DA	4142M	0.01/0.04	0.40/0.45	0.80/1.10	0.25 max	0.75/1.00	0.15/0.25	0.25 max	0.025 max	0.15/0.35	-	
Weatherford ^{®4}	D	4142SR	-	0.40/0.45	0.80/1.10	-	0.75/1.00	0.15/0.25	0.25 max	0.035 max	0.15/0.30	-	
API Class D Special													
Norris	75	A-4330-M	-	0.30/0.34	0.80/1.00	0.35 max	0.80/1.00	0.20/0.30	1.65/1.85	0.035 max	0.15/0.35	-	
	90	A-4320-M	-	0.19/0.24	0.70/0.90	0.35 max	0.80/1.00	0.20/0.30	1.15/1.35	0.025 max	0.15/0.35	-	
Upco	KD	A-4320-M	-	0.19/0.24	0.70/0.90	0.35 max	0.80/1.00	0.20/0.30	1.15/1.35	0.025 max	0.15/0.35	-	
John Crane ^{3,4}	Q87	3130M	-	0.22/0.29	0.42/0.65	-	0.71/1.00	0.01/0.06	0.72/1.00	0.025 max	0.15/0.35	-	
Tenaris ⁴	DS	4330M	0.01/0.06	0.29/0.37	0.80/1.10	0.25 max	0.70/0.95	0.20/0.30	1.65/2.00	0.025 max	0.15/0.35	-	
Tenaris ⁴	KD	4320M	0.25 max	0.18/0.25	0.70/0.90	0.25 max	0.80/1.00	0.20/0.30	1.15/1.50	0.025 max	0.15/0.35	-	
Weatherford ^{®4}	KD	4720SR	-	0.19/0.23	0.80/1.05	-	0.85/1.05	0.22/0.30	0.90/1.20	0.035 max	0.15/0.35	-	
Weatherford ^{®4}	S87	3130M	-	0.22/0.29	0.41/0.65	0.35 max	0.71/1.00	0.05 max	0.70/1.00	0.025 max	0.15/0.35	-	
Non-API Special Service High Strength													
Norris	96	A-4138M	-	0.38/0.42	0.55/0.85	0.35 max	1.1/1.4	0.25/0.35	0.30 max	0.035 max	0.20/0.35	-	
	97	A-4330-M	-	0.30/0.34	0.80/1.00	0.35 max	0.80/1.00	0.20/0.30	1.65/1.85	0.035 max	0.15/0.35	-	
Upco	HS	A-4138-M	-	0.38/0.42	0.55/0.85	0.35 max	1.1/1.4	0.25/0.35	0.30 max	0.035 max	0.20/0.35	-	
	HX	A-4330-M	-	0.30/0.34	0.80/1.00	0.35 max	0.80/1.00	0.20/0.30	1.65/1.85	0.035 max	0.15/0.35	-	
John Crane ^{3,4}	Q88	3130M	-	0.22/0.29	0.42/0.65	-	0.71/1.00	0.01/0.06	0.72/1.00	0.025 max	0.15/0.35	-	
Tenaris ⁴	Plus	1530M	0.01/0.04	0.31/0.36	0.20 max	0.25 max	1.40/1.60	0.05 max	0.15 max	0.025 max	0.25/0.40	-	
Tenaris ⁴	MMS	4138M	0.01/0.07	0.36/0.43	0.50/0.90	0.25 max	1.10/1.40	0.25/0.50	0.30 max	0.025 max	0.20/0.40	0.02/0.05	
Tenaris ⁴	UHS	4330M	0.01/0.06	0.29/0.37	0.80/1.10	0.25 max	0.70/0.95	0.20/0.30	1.65/2.00	0.025 max	0.15/0.35		
Weatherford ^{®4}	S88	3130M	-	0.22/0.29	0.41/0.65	0.35 max	0.71/1.00	0.05 max	0.70/1.00	0.025 max	0.15/0.35		
Weatherford ^{®4}	T66/XD	4138M	-	0.38/0.42	0.55/0.85	0.35 max	1.00/1.30	0.24/0.32	0.30 max	0.035 max	0.20/0.35		
Weatherford ^{®4}	HD	4332SRX		0.30/0.35	0.65/0.85	-	0.90/1.10	0.13/0.25	1.65/2.00	0.035 max	0.15/0.35		
Weatherford ^{®4}	EL [®]	Special	-	0.38/0.42	0.55/0.85	0.35 max	1.00/1.30	0.24/0.32	0.30 max	0.035 max	0.20/0.35		

* n/a = not available at time of publication

1. Tensile Strength and Yield Strength values are the only steel sucker rod and pony rod physical requirements of API Specification 11B. All other physical properties are expected values only and may deviate from the listed values shown.

	Sulfur (S)	Vanadium (V)	Tensile ¹		Yield ¹		Elongation (8", %)	Reduction in Area (%)	Hardness ² (HRC)	Heat Treatment
			ksi	MPa	ksi	MPa				
	0.040 max	0.05/0.07	90/115	621/793	60 min	414 min	15 min	45 min	(9)/23	Normalized & Tempered
	0.040 max	0.05/0.07	90/115	621/793	60 min	414 min	14 min	45 min	(9) 22	Normalized & Tempered
	-	-	-	-	-	-	-	-	-	-
	0.025 max	0.10/0.15	90/115	620/793	60 min	414 min	n/a	n/a	n/a	Normalized & Tempered
	0.040 max	-	90/115	620/793	60 min	414 min	18 min	50 min	(9)/22	Normalized
	0.040 max	-	100/115	689/793	90/105	620/723	13 min	55 min	(15)/22	Quenched & Tempered
	0.035 max	0.05/0.07	90/115	621/793	60 min	414 min	16 min	55 min	(9)/23	Normalized & Tempered
	0.035 max	0.05/0.07	90/115	621/793	60 min	414 min	16 min	40 min	(9)/22	Normalized & Tempered
	-	-	-	-	-	-	-	-	-	-
	0.025 max	-	90/115	620/793	60 min	414 min	n/a	n/a	n/a	Normalized
	0.040 max	-	90/115	620/793	60 min	414 min	16 min	60 min	(9)/22	Normalized & Tempered
	0.035 max	-	100/115	689/793	90/105	620/723	13 min	55 min	(15)/22	Quenched & Tempered
	0.040 max	0.07/0.09	115/140	793/965	85 min	586 min	15 min	50 min	22/30	Normalized & Tempered
	0.040 max	0.07/0.09	115/140	793/965	85 min	586 min	10 min	40 min	22/30	Normalized & Tempered
	-	-	-	-	-	-	-	-	-	-
	0.025 max	0.10/0.15	115/140	793/965	85 min	586 min	n/a	n/a	n/a	Normalized & Forced Cooling
	0.040 max	-	115/140	793/965	85 min	655 min	14 min	45 min	22/30	Normalized & Tempered
	0.040 max	-	120/140	827/965	110 min	759 min	11 min	55 min	24/30	Quenched & Tempered
	0.035 max	0.030/0.045	120/140	827/965	100 min	689 min	10 min	45 min	23/30	Normalized & Tempered
	0.035 max	0.030/0.045	120/140	827/965	100 min	689 min	10 min	40 min	23/30	Normalized & Tempered
	0.025 max	-	125/140	861/965	115 min	793 min	12 min	55 min	24/30	Quenched & Tempered
	0.025 max	-	120/140	827/965	85 min	586 min	n/a	n/a	n/a	Normalized & Tempered
	0.040 max	-	115/140	793/965	100 min	689 min	10 min	45 min	22/30	Normalized & Tempered
	0.040 max	0.07/0.09	125/140	861/965	100 min	689 min	10 min	45 min	25/30	Normalized & Tempered
	0.025 max	0.07/0.09	115/140	793/965	85 min	586 min	10 min	45 min	23/31	Normalized & Tempered
	0.025 max	0.07/0.09	120/140	827/965	95 min	655 min	10 min	40 min	23/30	Normalized & Tempered
	0.035 max	-	125/140	861/965	115 min	793 min	12 min	55 min	24/30	Quenched & Tempered
	0.025 max	0.035/0.100	125/140	862/965	85 min	586 min	n/a	n/a	n/a	Normalized & Tempered
	0.025 max	0.03/0.07	115/140	793/965	85 min	586 min	n/a	n/a	n/a	Normalized & Tempered
	0.040 max	-	115/140	793/965	95 min	655 min	14 min	45 min	22/30	Normalized & Tempered
	0.035 max	-	125/140	862/965	115 min	793 min	12 min	55 min	25/30	Quenched & Tempered
	0.035 max	0.07/0.09	140/150	965/1034	115 min	793 min	10 min	45 min	30/33	Normalized & Tempered
	0.040 max	0.07/0.09	140/150	965/1034	115 min	793 min	10 min	45 min	30/33	Normalized & Tempered
	0.035 max	0.07/0.09	140/150	965/1034	115 min	793 min	8 min	30 min	30/33	Normalized & Tempered
	0.040 max	0.07/0.09	140/150	965/1034	115 min	793 min	8 min	30 min	30/33	Normalized & Tempered
	0.035 max	-	140/155	965/1068	125 min	861 min	10 min	50 min	28/34	Normalized & Tempered
	0.025 max	0.10/0.15	140/160	965/1103	115 min	793 min	n/a	n/a	n/a	Normalized & Surface Quenched
	0.025 max	0.04/0.07	135/155	931/1068	115 min	793 min	n/a	n/a	n/a	Normalized & Tempered
	0.025 max	0.035/0.100	140/160	965/1103	115 min	793 min	n/a	n/a	n/a	Normalized & Tempered
	0.035 max	-	140/155	965/1068	130 min	896 min	11 min	50 min	30/33	Quenched & Tempered
	0.040 max	0.08/0.11	140/150	965/1034	115 min	793 min	10 min	40 min	30/34	Normalized & Tempered
	0.040 max	0.08/0.10	140/150	965/1034	115 min	793 min	10 min	40 min	30/34	Normalized & Tempered
	0.040 max	0.08/0.11	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Induction Case Hardened

2. HRC Numerals (in brackets) are values not ordinarily used.
3. HRC values have been converted from Brinell scale
4. MPa values have been converted from ksi.



norrisrods.com

Tulsa, Oklahoma

P: (800) 767-7637



albertaoiltool.com

Edmonton, Alberta

P: (780) 434-8566