



**ALBERTA
OIL TOOL**

A **DOVER** COMPANY

Sucker Rods & Drive Rods®



Specifications

Steel Sucker Rods & Drive Rods®

Alberta Oil Tool (AOT) Steel Sucker Rods and Drive Rods® are manufactured from micro-alloyed, modified special quality hot rolled carbon or alloy steel. Bar and sucker rod dimensions and tolerances conform to API Spec 11B, latest edition, and AISI Steel Products Manual. Sucker rods are available in 5/8" (15.88 mm), 3/4" (19.05 mm), 7/8" (22.23 mm), 1" (25.40 mm) and 1 1/8" (28.58 mm). Drive Rods® for Progressing Cavity Pump application are available in 1" (25.40 mm), 1 1/4" (31.75 mm), and 1 1/2" (38.10 mm) body diameter and in 25' (7.62 m) lengths.

All rods are straightened and inspected by Eddy Current for surface defects. Both ends are upset by automatic high-speed hot forging. Rods are full length normalized to relieve residual stresses, air-quenched, and tempered to refine and homogenize grain structure, and surface shot-blasted to remove any remaining heat treat scale. All rods are also shotpeened to improve fatigue life. Upset pin blanks are machined and dimensions gauged. Pin threads are cold-formed to strengthen the thread from fatigue. An inhibitor-lubricant is applied to each pin and thread protector installed. An oil soluble coating protects AOT rods from atmospheric corrosion in storage. All rods are bundled to prevent handling damage during transportation to the well location. Quality control inspections are performed at each step of the manufacturing process.

AOT Type	54	78	75	96	97
AISI Grade	C-1541-VM	A-4142M	A-4330-M	A-4138-M	A-4330-M
API Grade	D	D	D	SPECIAL	SPECIAL
	RANGE	RANGE	RANGE	RANGE	RANGE
Carbon	.40/.44	.38/.43	.30/.34	.38/.42	.30/.34
Manganese	1.40/1.60	.80/1.00	.80/1.00	1.10/1.40	.80/1.00
Phosphorus	.040 Mx.	.035 Mx.	.035 Mx.	.035 Mx.	.035 Mx.
Sulfur	.040 Mx.	.035 Mx.	.040 Mx.	.035 Mx.	.040 Mx.
Silicon	.15/.35	.15/.35	.15/.35	.20/.35	.15/.35
Copper	.35 Mx.	.35 Mx.	.35 Mx.	.35 Mx.	.35 Mx.
Nickel	.25 Mx.	.25 Mx.	1.65/1.85	.30 Mx.	1.65/1.85
Chromium	.20 Mx.	.90/1.10	.80/1.00	.55/.85 Mx.	.80/1.00
Molybdenum	.06 Mx.	.15/.25	.20/.30	.25/.35	.20/.30
Vandium	.07/.09	.030/.045	.07/.09	.045/.065	.07/.09
Columbium (Niobium)	-	-	-	.027/.043	-

*All specifications are subject to change without notice.
API Grades C and K information available upon request.*

Rod Pin Size	Nominal Diameter of Pin
5/8"	15/16"
3/4"	1-1/16"
7/8"	1-3/16"
1"	1-3/8"
1 1/8"	1-9/16"

*Drive Rod® is a registered trademark
of Alberta Oil Tool.*

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Sucker Rod Selection Guide

Alberta Oil Tool manufactures the following types of Sucker Rods, Progressing Cavity Pump Drive Rods® & Pony Rods to meet any pumping condition. API grades C and K information available upon request.

- **Type 54 API Grade D (Carbon)** - AISI C-1541-VM Carbon-Manganese Alloy Steel. Designed for medium to heavy loads at any depth in non-corrosive well fluids. This grade can be utilized in both reciprocating and Progressing Cavity Pump (PCP) applications.
- **Type 78 API Grade D (Alloy)** - AISI A-4142-M Chromium-Molybdenum Alloy Steel. Designed for heavy rod loads at any depth in mild to medium corrosive well fluids that are effectively inhibited against corrosion attack. This grade has been alloyed and effectively heat-treated to resist corrosion and fatigue. Type 78 rods are recommended for both reciprocating and Progressing Cavity Pump (PCP) applications.
- **Type 75 API Grade D (Special Alloy)** - AISI A-4330-M Nickel-Chromium-Molybdenum Alloy Steel. Designed for heavy loads at any depth in corrosive well fluids that are effectively inhibited against corrosion attack. This grade has been alloyed and then effectively heat-treated to maximize its corrosion and fatigue resistance. Type 75 rods are ideally suited for both reciprocating and Progressing Cavity Pump (PCP) applications.
- **Type 96 Special High Strength Grade** - AISI A-4138-M Chromium-Molybdenum Alloy Steel. Designed for extra heavy loads at any depth in corrosive well fluids that are effectively inhibited against corrosion attack. This grade has been alloyed, effectively heat treated, to resist corrosion and fatigue. Type 96 rods are designed for reciprocating applications but can be utilized in some Progressing Cavity Pump (PCP) applications.
- **Type 97 Special High Strength Grade** - AISI A-4330-M Nickel-Chromium-Molybdenum Alloy Steel. Designed for extra heavy loads at any depth in corrosive well fluids that are effectively inhibited against corrosion attack. This grade has been alloyed, effectively heat treated, to maximize its corrosion and fatigue resistance. Type 97 rods are designed for reciprocating applications but can be utilized in some Progressing Cavity Pump (PCP) applications.
- **Pony Rods** - Manufactured to the same dimensions, tolerances and grades as our Sucker Rods and Drive Rods®. Standard lengths: 1' (.30 m) – machined only 2' (.61 m), 4' (1.22 m), 6' (1.83 m), 8' (2.44 m) and 10' (3.05 m). Other lengths are available on request.

Definitions

Loads

- ***Light** = less than 25,000 psi (172 Mpa)
- ***Medium** = 25,000 psi to 35,000 psi (172 Mpa to 241 Mpa)
- ***Heavy** = 35,000 psi to 42,000 psi (241 Mpa to 290 Mpa)
- ***Extra Heavy** = 42,000 psi and greater (290 Mpa)

Seating Depth and/or Sucker Rod String Lengths

- ***Shallow** = less than 4,000 ft. (1219 m)
- ***Medium** = 4,000 ft. to 7,000 ft. (1219 m to 2134 m)
- ***Deep** = 7,000 ft. and deeper (2134 m)

Definitions not intended as design criteria. Call your nearest AOT representative for specific rod string design recommendations.

Norris Type Physical Properties - as normalized and tempered	54	78	75	96	97
Tensile, ksi	115/140	120/140	125/140	140/150	140/150
Yield, ksi	85 min.	100 min.	100 min.	115 min.	115 min.
El, 8" %	15 min.	10 min.	10 min.	10 min.	10 min.
Reduction in Area %	50 min.	45 min.	45 min.	45min.	45 min.
Hardness, Rc	22/30	22/30	22/30	30/33	30/33



Specifications

Maximum Torque Limit for Norris Sucker Rods, Drive Rods® and Pony Rods

All torque values are ft. lbs.

Rod Size	Grade D Carbon (54)	Grade D Alloy (78)	Grade D Special Alloy (75)	Special Service (96)	Special Service (97)
3/4"	430	460	470	500	500
7/8"	675	735	750	800	800
1"	1,010	1,100	1,110	1,200	1,200
*1" with 7/8" modified pins	N.A.	1,100	1,110	1,200	1,200
1 1/8"	N.A.	1,570	N.A.	N.A.	1,700
*1-1/4" with 1" modified pins	N.A.	2,000	2,100	2,500	2,500
*1 1/4" with 1 1/8" modified pins	N.A.	2,000	2,100	2,500	2,500
*1 1/2" with 1 1/8" modified pins	N.A.	3,000	3,150	3,750	3,750

- All values based on rods and couplings in like new condition.
- * Non-API Drive Rods® specifically designed for torsional application.
- No derating factor for slimhole couplings when High Strength Couplings are used.
- Values based on actual test results.
- E116 Norris/O'Bannon Rod Elevator for 1 1/4" Drive Rods®.
- E115 (Modified) Norris/O'Bannon Rod Elevator for 1 1/2" Drive Rods®.
- To maximize rod fatigue life, AOT recommends using a .8 safety factor.

NOTE: Correct sucker rod makeup is critical to the operation of a Progressing Cavity Pump installation.

For further information please contact:



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