COROD® Continuous Rod

Technical Specifications, Applications, Features, and Benefits

Weatherford®

COROD® Continuous Rod

Boosts uptime in noncorrosive or mildly corrosive wells that are effectively inhibited

Applications

- Reciprocating-rod-lift (RRL) systems
- Progressing-cavity-pump (PCP) systems

Features and Benefits

- Continuous-string design eliminates thread connections and their potential for pin and coupling failures, saving costly interventions
- Uniform-body design evenly distributes contact loads, reducing severity of tubing and rod wear
- Large, uninterrupted annular-tubing space minimizes pressure losses and facilitates laminar, non-turbulent flow to the wellhead
- Lightweight design provides improved efficiency over conventional sucker-rod strings, allowing for lower pump-landing depths
- Cold-working process (shot peening) produces residual stress on the outer material layer, which in turn increases resistance to fatigue and corrosion failure

Product Description

Weatherford COROD continuous rod provides a superior alternative to conventional sucker rods, which are coupled every 25 or 30 ft (7.6 or 9.1 m). COROD continuous rod requires couplings only at the top and bottom of the rodstring, regardless of well depth.
This innovative solution reduces pin and coupling failures by decreasing the number of threaded connections, thereby minimizing potential for rodstring failures and costly well interventions. Uniform contact loads and a lighter weight also reduce motor power requirements. COROD continuous rod is offered in round and semi-elliptical designs that are available in multiple grades and sizes for maximized, fit-for-purpose, efficiencies in varying well environments.

COROD continuous rod extends the life span of tubing by eliminating localized contact loads caused by couplings. Installation is quick, and Weatherford offers a full array of field servicing options.

Weatherford®

COROD® Continuous Rod (Semi-Elliptical)

Optimized shape for maximized efficiency in RRL systems

Applications

- Reciprocating rod-lift systems
- Light-crude wells
- Cold heavy oil production with sand (CHOPS) wells
- Cyclic steam, flood, and assisted gravity-drainage (SAGD) wells

Features and Benefits

- Elliptical-body design further reduces contact loading between rod and tubing, resulting in less localized wear and part replacements
- Ribbon-like rod shape promotes predictable bending along one plane, eliminating rod damage caused by coiling or springing effects
- Formed, semi-elliptical design minimizes surface discontinuities, increasing rod-string life
- Consistent minor diameter of less than 3/4 in. (19.05 mm), which prevents the rod from undergoing stresses exceeding its yield strength when coiled on transport reels

Product Description

Semi-elliptical COROD continuous rod is a uniquely shaped rod product designed to optimize RRL applications. As a superior alternative to conventional sucker rods, semi-elliptical COROD is formed to fit the curvature of the tubing string, resulting in less tubing contact pressure than with continuous round rods and conventional sucker rods.

Semi-elliptical COROD continuous rod is manufactured in seven sizes at 1/16-in. (1.58 mm) increments, allowing for custom rod-string designs adaptable to any length. Semi-elliptical COROD provides a lower overall string weight with balanced-taper, string design that significantly reduces loads on the surface-pumping-unit gearbox as well as horsepower requirements. As a result, a smaller pumping unit can reach greater pumping depths and achieve higher pumping rates over conventional sucker rods and round, continuous rods. Weatherford also offers a full array of field-servicing options for quick and efficient installations and well maintenance.

Conventional sucker rod with slim-hole coupling

Round COROD continuous rod

Semi-elliptical COROD continuous rod

Weatherford®

COROD® Continuous Rod

Mechanical Properties

API Grade	Codes	Material	Min Tensile Strength		Min Yield Strength (0.2% offset)		Min Elongation	Max Hardness	
								Rockwell	Brinell
D Carbon	D, DR	1536M	115,000 psi	790 MPa	85,000 psi	590 MPa	10%	28	271
D Alloy	DE, DER	4120M	115,000 psi	790 MPa	90,000 psi	620 MPa	10%	28	271
	DWR	4320M	115,000 psi	790 MPa	90,000 psi	620 MPa	10%	30	286
	ME, MER	4120M	130,000 psi	896 MPa	110,000 psi	758 MPa	7%	32	301
D Special	SR	1536M	140,000 psi	965 MPa	115,000 psi	790 MPa	4.5%	34	319
	SE, SER	4120M	140,000 psi	965 MPa	115,000 psi	790 MPa	4.5%	36	336
	SWR	4320M	145,000 psi	1,000 MPa	120,000 psi	825 MPa	4.5%	38	353

Maximum Torque Capacity

COROD	Size	Code						
		DR	SR	DER	MER	SER	DWR	SWR
8.5R	1-5/32 in. (29.4 mm)	1,510 ft-lbs (2,047 N·m)	N/A	1,600 ft-lbs (2,169 N·m)	1,960 ft-lbs (2,657 N·m)	2,050 ft-lbs (2,779 N·m)	1,600 ft-lbs (2,169 N·m)	2,130 ft-lbs (2,888 N·m)
8R	1-1/8 in. (28.6 mm)	1,390 ft-lbs (1,885 N·m)	1,890 ft-lbs (2,562 N·m)	1,480 ft-lbs (2,006 N·m)	1,800 ft-lbs (2,440 N·m)	1,890 ft-lbs (2,562 N·m)	1,480 ft-lbs (2,006 N·m)	1,970 ft-lbs (2,671 N·m)
6R	1 in. (25.4 mm)	980 ft-lbs (1,329 N·m)	1,320 ft-lbs (1,789 N·m)	1040 ft-lbs (1,410 N·m)	1270 ft-lbs (1,722 N·m)	1,320 ft-lbs (1,789 N·m)	1040 ft-lbs (1,410 N·m)	1,380 ft-lbs (1,871 N·m)
4R	7/8 in. (22.2 mm)	660 ft-lbs (895 N·m)	N/A	690 ft-lbs (935 N·m)	N/A	900 ft-lbs (1,220 N·m)	N/A	930 ft-lbs (1,261 N·m)
3R	13/16 in. (20.6 mm)	520 ft-lbs (705 N·m)	N/A	550 ft-lbs (745 N·m)	N/A	710 ft-lbs (963 N·m)	N/A	740 ft-lbs (1,003 N·m)

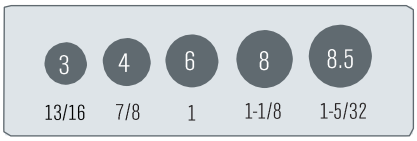
Weatherford®

COROD® Continuous Rod

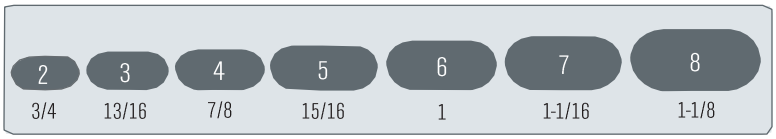
Dimensional Properties

COROD	Nominal Size	Weight	Area	Major Diameter ±0.020 in. (±0.5 mm)	Minor Diameter ±0.020 in. (±0.5 mm)
8	1-1/8 in. (28.6 mm)	3.38 lbs/ft (5.03 kg/m)	0.994 in^2 (641.3 mm^2)	1.570 in. (39.9 mm)	0.745 in. (18.9 mm)
7	1-1/16 in. (27.0 mm)	3.01 lbs/ft (4.49 kg/m)	0.887 in^2 (572.0 mm^2)	1.430 in. (36.3 mm)	0.745 in. (18.9 mm)
6	1 in. (25.4 mm)	2.67 lbs/ft (3.98 kg/m)	0.785 in^2 (506.7 mm^2)	1.260 in. (32.0 mm)	0.740 in. (18.8 mm)
5	15/16 in. (23.8 mm)	2.35 lbs/ft (3.50 kg/m)	0.690 in^2 (445.3 mm^2)	1.115 in. (28.3 mm)	0.730 in. (18.5 mm)
4	7/8 in. (22.2 mm)	2.04 lbs/ft (3.05 kg/m)	0.601 in^2 (387.9 mm^2)	1.005 in. (25.5 mm)	0.700 in. (17.8 mm)
3	13/16 in. (20.6 mm)	1.76 lbs/ft (2.63 kg/m)	0.518 in^2 (334.5 mm^2)	0.940 in. (23.9 mm)	0.650 in. (16.5 mm)
2	3/4 in. (19.1 mm)	1.50 lbs/ft (2.24 kg/m)	0.442 in^2 (285.0 mm^2)	0.870 in. (22.1 mm)	0.600 in. (15.2 mm)
8.5R	1-5/32 in. (29.4 mm)	3.57 lbs/ft (5.32 kg/m)	1.050 in^2 (677.4 mm^2)	1.156 in. (29.4 mm)	N/A
8R	1-1/8 in. (28.6 mm)	3.38 lbs/ft (5.03 kg/m)	0.994 in^2 (641.3 mm^2)	1.125 in. (28.6 mm)	
6R	1 in. (25.4 mm)	2.67 lbs/ft (3.98 kg/m)	0.785 in^2 (506.7 mm^2)	1.000 in. (25.4 mm)	
4R	7/8 in. (22.2 mm)	2.04 lbs/ft (3.05 kg/m)	0.601 in^2 (387.9 mm^2)	0.875 in. (22.2 mm)	
3R	13/16 in. (20.6 mm)	1.76 lbs/ft (2.63 kg/m)	0.518 in^2 (334.5 mm^2)	0.812 in. (20.6 mm)	

COROD Sizes



Round COROD sizes (inches)



Semi-elliptical COROD sizes (inches)

Weatherford®

COROD® Continuous Rod

Product Types

Every grade of Weatherford COROD continuous rod is manufactured using a quench-and-temper heat treatment for maximized strength and endurance.

D Grade Regular Strength	• 1536M material • Available in round sizes 3R to 8.5R • Available in semi-elliptical sizes 2E to 8E • API Grade D carbon	Medium-load pumping applications in noncorrosive or mildly corrosive, but effectively inhibited wells where H_2S may be present.
DE Grade Regular Strength	• 4120M material • Available in round sizes 4R to 8.5R • Available in semi-elliptical sizes 3E to 8E • API Grade D alloy	Medium-load pumping applications in noncorrosive or mildly corrosive, but effectively inhibited wells where CO_2 or chlorides may be present. DE Grade is made from a chrome-molybdenum alloy, micro-alloyed with titanium to improve mechanical and heat-treating properties. DE Grade chromium content is increased to 2% to improve corrosion resistance in certain applications.
DW Grade Regular Strength	• 4320M material • Available in round sizes 6R and 8.5R • API Grade D alloy	Medium-load pumping applications in mildly corrosive or more corrosive, but effectively inhibited wells. DW Grade is made from a chrome-nickel-molybdenum alloy, specifically formulated to improve stress tolerance and fatigue resistance.
ME Grade Mid-Strength	• 4120M material • Available in round sizes 4R to 8.5R • Available in semi-elliptical sizes 3E to 8E • API Grade D alloy	Medium-load pumping applications in deep, high-volume wells in noncorrosive or mildly corrosive environments that are effectively inhibited. ME Grade is made from a chrome-molybdenum alloy, micro-alloyed with titanium to improve mechanical and heat-treating properties. ME Grade chromium content is increased to 2% to improve corrosion resistance in certain applications.
S Grade High Strength*	• 1536M material • Available in round size 6R and 8R only • API Grade D carbon	Medium- to high-load pumping applications in noncorrosive or mildly corrosive, but effectively inhibited wells in which H_2S may be present.
SE Grade High Strength	• 4120M material • Available in round sizes 3R to 8.5R • Available in semi-elliptical sizes 3E to 8E • API Grade D special	Heavy-load pumping applications in deep, high-volume wells for mildly corrosive or corrosive environments that are effectively inhibited. SE Grade is made from a chrome-molybdenum alloy, micro-alloyed with titanium to improve mechanical and heat-treating properties. SE Grade chromium content is increased to 2% to improve corrosion resistance in certain applications.
SW Grade High Strength	• 4320M material • Available in round sizes 3R to 8.5R • API Grade D special	Heavy-load pumping applications in mildly or more corrosive but effectively inhibited wells. DW Grade is made from a chrome-nickel-molybdenum alloy, specifically formulated to improve stress tolerance and fatigue resistance.

*Welds must undergo special heat treatment to maintain mechanical properties.

THE RIGHT SOLUTION FOR MULTIPLE APPLICATIONS

COROD continuous rod is effective for both RRL and PCP applications. Weatherford specialists, backed by a wealth of historical and technical expertise, can help select the right solution for optimum performance and production.

Weatherford®

MAXIMIZE UPTIME WITH THE RIGHT RODSTRING

Weatherford delivers an unbiased solution for any rod-driven application. To learn more about these industry-leading, application-specific technologies, visit **weatherford.com**.

Weatherford®