

# TECHNICAL BULLETIN

COATED ENDLESS ROD | LS-TB-023

## BULLETIN NO.

LS-TB-023

## TOPIC

COATED ENDLESS ROD WEAR TEST

## ISSUE DATE

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## ISSUED BY

ENGINEERING

## BACKGROUND

The cyclic loading nature of rod-driven artificial lift equipment promotes crack propagation to failure through fatigue. Lifting Solutions Coated Endless Rod continuous sucker rod offers a unique solution for these failures. The poly-coating increases performance in corrosive and abrasive environments.

To demonstrate the effectiveness of LSI's Coated Endless Rod continuous sucker rod, a simplified wear test program was initiated that looked at both Coated Endless Rod and bare Endless Rod in J55 tubing. Long term testing programs are being developed with more specialized testing equipment in the future to look at more complex scenarios involving loading, speed, abrasives and the combination thereof.

## ENDLESS ROD TEST EQUIPMENT

Specialized equipment is designed specifically to run wear tests on rods. The equipment can run up to four different configurations in each test. The equipment consists of a chain drive mechanism that runs all four rods at the same speed, and an evenly distributed side load is applied between the tubing and rod, and a pump to circulate fluid around the test samples. The fluid composition for this test program was water.



## TEST CONDITIONS

Conditions	Parameter	Comment
Speed	355 rpm	
Side Load	100 lbf	
Tubing length	10 inches	120 lbf per linear foot
Measurement interval	Every 1 to 2 million cycles	Approximately every 2-4 days
Measurement of tubing	Tubing inside diameter	Measured with ID micrometer
Measurement of rod	Rod outside diameter	Measured with caliper





Wear on the tubing is measured at 3 locations along the contact surface (i.e., outer edges and middle).  
 Wear on the rod is measured at 3 locations along the contact surface (i.e., top, middle and bottom)

### SAMPLE CONFIGURATIONS

Sample 1: 3-1/2" J55 tubing and 1-1/8" bare Endless Rod  
 Sample 2: 3-1/2" J55 tubing and 1-1/8" Coated Endless Rod

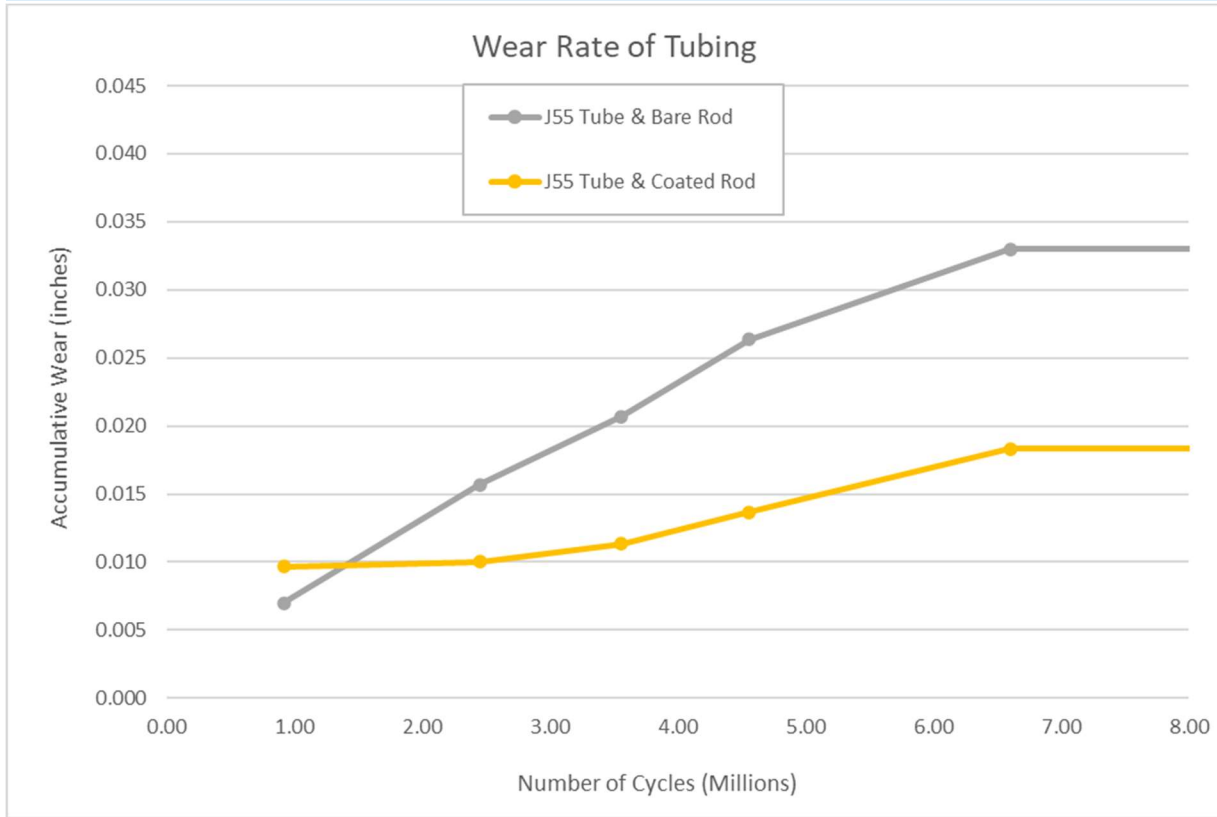
### OBSERVATIONS

Wear after 8.15 million cycles

Sample	1		2	
Component	J55 Tubing	Bare Rod	J55 Tubing	Coated Rod
Image				
Measured Wear	0.033"	0.006"	0.018"	0.002"

### TEST DATA

Test Run	Tubing Wear (inches)					
	3					
Measurement Interval	1	2	3	4	5	6
Accumulative Cycles (millions)	0.92	2.45	3.56	4.56	6.6	8.15
Test Set ↓ Rod Size ⇨	1-1/8" Rods					
J55 Tube and Bare Rod	0.007	0.016	0.021	0.026	0.033	0.033
J55 Tube and Coated Rod	0.010	0.010	0.011	0.014	0.018	0.018



### Conclusion

The Coated Endless Rod continuous sucker rod provides a reduction in tubing wear over the bare continuous sucker rod in J55 tubing by approximately 45% after 8.15 million cycles (~16 days at 355 rpm). The coated endless rod experienced 66% less wear than the bare rod.

The test results demonstrated that the Coated Endless Rod continuous sucker rod provided a benefit by providing a reduction in tubing and rod wear which can be attributed to a lower coefficient of friction between the two surfaces.

As an added benefit the coating provides a sacrificial wear layer, extending the useful life of the bare rod.