



Artificial Lift Services

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## Q2-COMPOSITE PLATED TUBING

Q2 Composite Plated Tubing (CPT) was developed to be an improvement to the production tubing that is currently available on the market. It allows for reduced friction, lower wear, open flow and is available in all API grades of tubing.

There are many types of solutions on the market, from standard tubing, plastic lined tubing, epoxy coated tubing and hardened tubing, either by case hardening or boronizing. Each takes a niche, but with Q2-CPT tubing we overlap all the niches to provide a solution that provides the best value for the customer.

### DESCRIPTION

Q2-CPT tubing is manufactured under license using a patented process. All tubing starts off as seamless tubing and then is manufactured to the various API Grades as needed by our customers. The tubing is manufactured as regular tubing up to the plating process where the internal diameter is specially processed to have a uniform surface. It is then cleaned, acid etched, and plated to proper thickness with a proprietary plating composition. The tubing is then heat treated to cure the plating to the proper hardness. This heat treatment does not have an effect on the original grade of material like other processes such as boronizing. If it starts off as L80 it remains L80 after the plating process.

Our Premium tubing is additionally nickel-carbide plated on the outer diameter to increase resistance to corrosion.

### FEATURES

- High hardness plating [68-70HRC] with low coefficient of friction.
- The plating is highly resistant to aggressive service such as H<sub>2</sub>S, CO<sub>2</sub>, NaCl, HCl, etc. Resistance to H<sub>2</sub>SO<sub>4</sub> based on temperature and density.
- The plating does not fail under high heat or pressure.
- No restriction of flow in the I.D. as with poly-lined or epoxy coated tubing.
- Seamless tubing.
- No distortions or cracking of threads or the tubing body as can occur with boronized tubing due to the high temperatures to process.

### PRODUCTS OFFERED

- J55, L80 and N80 grades of range 2 tubing (27'-32', typically 31.5' in length).
- Sizes available; 2-3/8", 2-7/8" and 3-1/2".
- Each joint has a coupling torqued in place.
- **Standard** = I.D. plated only.
- **Premium** = with Nickel-Carbide plated O.D. added (special order).



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## CPT DEVELOPMENT AND TESTING

### TESTING TUBING MATERIALS AVAILABLE IN THE MARKET

A third part national level laboratory for testing sucker rods and tubing was used to test wear resistance of several materials used for tubing meeting 5CT requirements. The testing method was developed to simulate worst case conditions that may be encountered in actual well conditions.

Testing was performed on L80, J55, tungsten coated tubing, Q2 Composite Plated Tubing (**Q2-CPT**), Q2 heat treated tubing (**Q2-HTT J55**) and boronized tubing.

The test method used was reciprocating a coupling with a 76-lbf (338.1 N) load, for a length of 9.84 inches (0.25m), at 28 strokes per minute with an average linear speed of 0.394 ft/sec (0.12m/s) on the ID of the tubing surface. This simulated actual use in the well and not rotary wear as used by others providing wear numbers in industry for various products. The load on the coupling created a friction between it and the tubing and only water was used during the testing with no other lubricants present (100% water cut). From these results, calculations were made for an annual period depth of wear.

The testing was severe and after each round once significant wear was detected and measured the material was taken out of continued wear testing. The L80, J55 and tungsten plated tubing were eliminated after the first round.

After each stage of testing the samples rested in water to determine if oxidation would occur. After the second stage of testing the **Q2-HTT J55** tubing was eliminated from further testing due to wear and heavy oxidation.

**Q2-CPT** and boronized tubing were tested for a third stage of 12.5 hours. Both samples survived 42.5 hours of testing. The end results were the **Q2-CPT** had a polished surface and the boronized plating had the surface ground away showing a polished layer of a crackled finish boron diffused throughout the regular metallurgy of the base material.

The effect on the spray metal couplings was a polishing of the surface layer from grinding away on the spray metal outer layer. All couplings still had an intact spray metal coating, the most severe being the coupling used with the boronized tubing.

### CONCLUSION

The conditions of the testing showed that standard tubing (J55 or L80) and tungsten plated tubing in 100% water cut whether rubbed by a t-type or spray-metal coupling will fail at a very accelerated rate.

The calculations for the annualized wear of the tubing indicated a very wide range of results for the materials tested. Only the Boronized, **Q2-CPT** and **Q2-HTT J55** tubing would not have worn through after a year under these test conditions (figure 1). We took the results of the annualized wear and set the L80/T-type coupling results as the reference point of one to make it easier to show on a graph the outcomes of the testing (Figure 2).

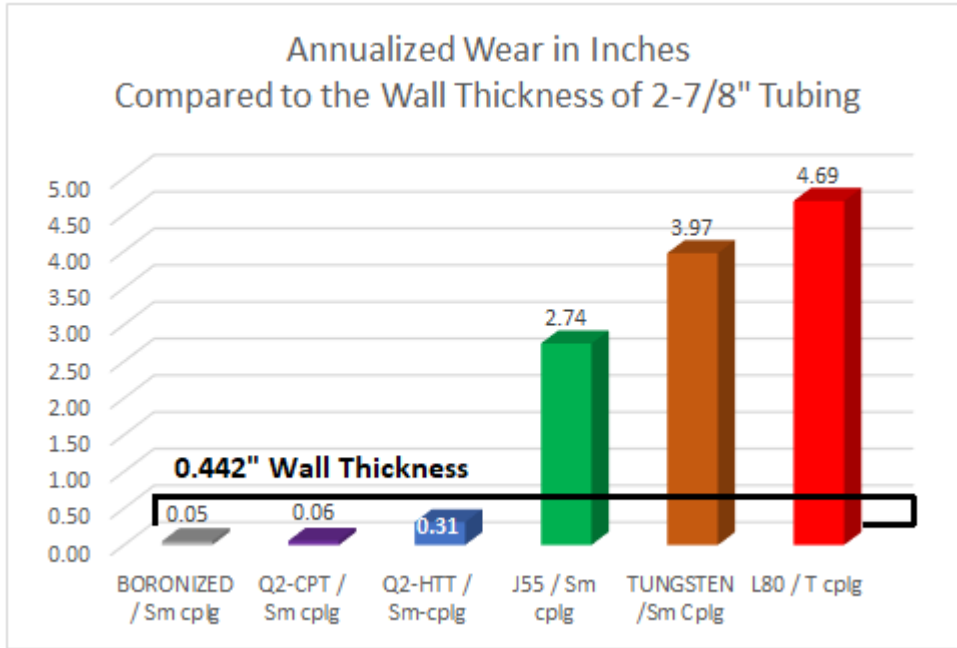


Figure 1

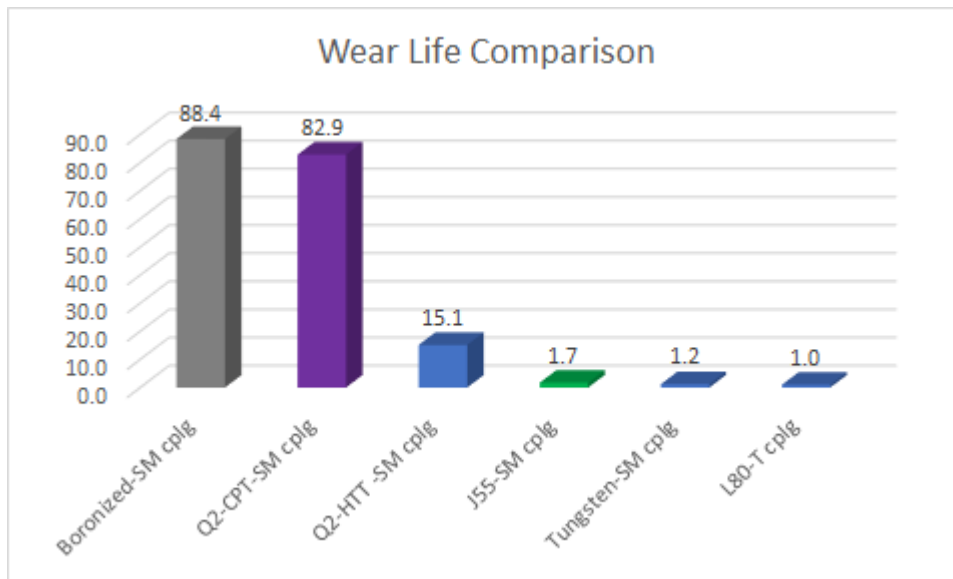


Figure 2



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T-type coupling wear from testing against L-80 tubing



L-80 tubing wear from rubbing against the t-type coupling



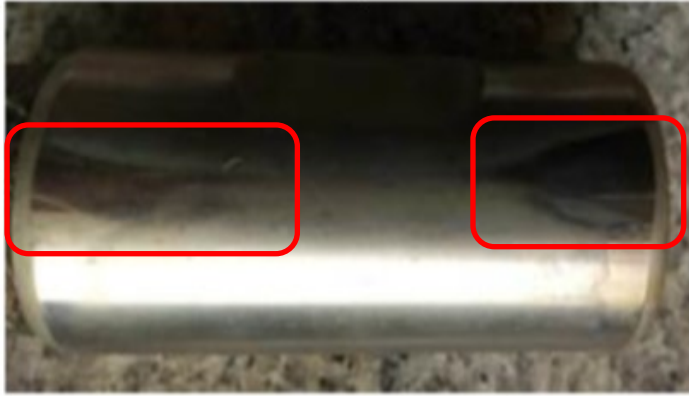
Q2-CPT shows no wear or oxidation after two stages of testing and soaking for 12 hours. Testing continued.

Q2-Heat Treated J55 tubing shows both wear and oxidation after 2 stages of testing and soaking for 12 hours. Testing stopped at this point and wear life was calculated



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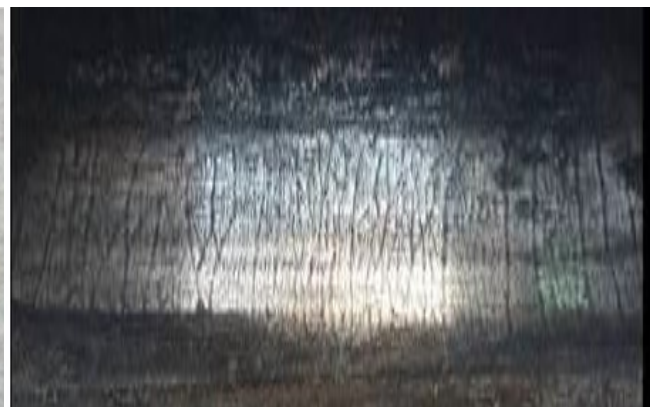
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Spray metal coupling and Heat Treated (Q2-HTT) tubing wear before water bath



Spray metal coupling and Composite Plated Tubing (Q2-CPT) wear



Spray metal coupling and Boronized tubing wear



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## PART NUMBERS AND DESCRIPTION

STANDARD Q2-CPT TUBING	
PART NUMBER	DESCRIPTION
CPT20R2J55	CPT-TBG, 2-3/8", RANGE-2, J55, ID-ONLY
CPT25R2J55	CPT-TBG, 2-7/8", RANGE-2, J55, ID-ONLY
CPT30R2J55	CPT-TBG, 3-1/2", RANGE-2, J55, ID-ONLY
CPT20R2L80	CPT-TBG, 2-3/8", RANGE-2, L80, ID-ONLY
CPT25R2L80	CPT-TBG, 2-7/8", RANGE-2, L80, ID-ONLY
CPT30R2L80	CPT-TBG, 3-1/2", RANGE-2, L80, ID-ONLY
CPT20R2N80	CPT-TBG, 2-3/8", RANGE-2, N80, ID-ONLY
CPT25R2N80	CPT-TBG, 2-7/8", RANGE-2, N80, ID-ONLY
CPT30R2N80	CPT-TBG, 3-1/2", RANGE-2, N80, ID-ONLY

PREMIUM Q2-CPT TUBING	
PART NUMBER	DESCRIPTION
CPT20R2J55P	CPT-TBG, 2-3/8", RANGE-2, J55, PREM-ID/OD
CPT25R2J55P	CPT-TBG, 2-7/8", RANGE-2, J55, PREM-ID/OD
CPT30R2J55P	CPT-TBG, 3-1/2", RANGE-2, J55, PREM-ID/OD
CPT20R2L80P	CPT-TBG, 2-3/8", RANGE-2, L80, PREM-ID/OD
CPT25R2L80P	CPT-TBG, 2-7/8", RANGE-2, L80, PREM-ID/OD
CPT30R2L80P	CPT-TBG, 3-1/2", RANGE-2, L80, PREM-ID/OD
CPT20R2N80P	CPT-TBG, 2-3/8", RANGE-2, N80, PREM-ID/OD
CPT25R2N80P	CPT-TBG, 2-7/8", RANGE-2, N80, PREM-ID/OD
CPT30R2N80P	CPT-TBG, 3-1/2", RANGE-2, N80, PREM-ID/OD

## IDENTIFICATION

COLOR CODING					
TUBING TYPE		ENTIRE COUPLING	COUPLING BAND	ENTIRE TUBING	TUBING BAND
J55	STANDARD	BRIGHT GREEN	NONE	BLACK WITH PURPLE ENDS	1 BRIGHT GREEN
L80	STANDARD	RED	1 BROWN	BLACK WITH PURPLE ENDS	1 RED, 1 BROWN
N80	STANDARD	RED	NONE	BLACK WITH PURPLE ENDS	1 RED
J55	PREMIUM	BRIGHT GREEN	NONE	NICKEL FINISH	1 BRIGHT GREEN
L80	PREMIUM	RED	1 BROWN	NICKEL FINISH	1 RED, 1 BROWN
N80	PREMIUM	RED	NONE	NICKEL FINISH	1 RED

