

## **Application: Collets**

463 Brownsdale Road Renfrew, PA 16053 USA 1.724.586.5659 info@carbinite.com www.CARBINITE.com

### Carbinite METAL COATINGS www.carbinite.com

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Since Carbinite Metal Coatings was founded in 1997, workholding applications have accounted for over 80% of our orders, with 2/3 of those from long-term, repeat customers. While these statistics are impressive, our current and prospective customers want more than sales figures to prove that Carbinite is an effective solution for improving workholding grip.

Carbinite's engineering team has been busy conducting a series of tests to show how our tungsten-carbide coatings effect the coefficient of friction in various workholding applications. The increase in COF reduces or eliminates material slippage, leading to improved cycle times, reduced waste, and ultimately increasing productivity. We are excited to share these test results with you.

# **Application: Collets**

Our engineering team first tested smooth collets in 2018, followed by serrated collets in 2020. The test was designed to determine the amount of torque required to cause steel and aluminum rods to slip in uncoated smooth and serrated collets,



followed by identical collets coated with Carbinite. Testing was conducted in real-world conditions, similar to how our customers use collets.

#### **Testing Parameters** CNC **Materials** Measurement Collets Carbinite HAAS SL20 4140 Steel AC Delco 16C Ø 7/8" Grade W+ (emery grit 220) Smooth: Torque Lyndex 6061 T6 Adaptor Draw Bar: Grade #2 Serrated: Aluminum ARM602-4 60 and 110 psi (emery grit 100) Southwick& Meister

### **Procedure**

#### SMOOTH COLLET TEST

A: Set the CNC machine to 60 psi draw bar pressure for the light pressure test.

B: Install the smooth, uncoated collet.

C: Place the aluminum specimen and clamp.

D: Record the amount of torque needed for the part to begin slipping (average of three readings).

E: Repeat the procedure using the steel specimen.



F: Install the collet coated with Carbinite W+ and repeat the procedure, using new steel and aluminum specimens to ensure accuracy.

G: Repeat the procedure using the collet coated with Carbinite #2.

H: Change the CNC machine draw bar pressure to 110 psi for the moderate pressure test. Duplicate steps B-G.

#### SERRATED COLLET TEST

Since this test was conducted later, the smooth test was repeated to ensure consistency and accuracy.

Steps A-H were performed, substituting the serrated collets for the smooth.

# **Combined Results**

\*Average of three torque readings needed to cause the part to slip.









**NOTE:** The test with the SMOOTH collet coated with Carbinite #2 and the test with the SERRATED collet coated with Carbinite W+ were stopped at the above torque levels in order to avoid damage to the equipment. The torque reading would have been higher had the test not been ended by the operator!

\*Machine time courtesy of Micro Miniature Mfg, Butler, PA

## Conclusion

In comparison with an uncoated smooth collet, between 1.4x and at least 6.0x more torque is needed to cause a part to slip under our test conditions:



### Contact



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