Since Carbinite Metal Coatings was started in 1997, approximately 43% of our business has consisted of workholding applications. Over 2/3 of our workholding orders are from long-term, repeat customers. While these numbers are significant, our existing and prospective customers are discerning. They want hard data that can back-up our claims that Carbinite’s textured tungsten-carbide coating does increase the coefficient of friction, reducing or eliminating slippage of parts in workholding applications.

Carbinite is launching a new series of tests on workholding applications to give our customers this data. The first in our series of tests, the Collet Performance Test, has been completed and we are excited to share the results.

**Application: Collets**

Carbinite’s founder and Chief Technical Officer, Rob Freyvogel, devised a test to determine the amount of torque required to cause steel and aluminum parts to slip in a standard, uncoated (smooth) collet versus identical collets coated with Carbinite. It is important that this test be under real-world conditions similar to how our customers use collets.
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### Testing Parameters

<table>
<thead>
<tr>
<th>CNC</th>
<th>Materials</th>
<th>Measurement</th>
<th>Collets</th>
<th>Carbinite</th>
</tr>
</thead>
<tbody>
<tr>
<td>HAAS SL20</td>
<td>4140 Steel</td>
<td>AC Delco Torque</td>
<td>Lyndex</td>
<td>Grade W+</td>
</tr>
<tr>
<td>Draw Bar:</td>
<td>6061 T6 Aluminum</td>
<td>Adaptor ARM602-4</td>
<td>16C Ø 7/8”</td>
<td>(emery grit 220)</td>
</tr>
<tr>
<td>60 and 110 psi</td>
<td></td>
<td></td>
<td>Grade #2</td>
<td>(emery grit 100)</td>
</tr>
</tbody>
</table>

### Procedure

Test 1: Set the CNC machine to 60 psi draw bar pressure for the light pressure test.

A: Install the smooth, uncoated collet.

B: Place the aluminum specimen and clamp.

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

D: Repeat the procedure using the steel specimen.

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

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

Test 2: Change the CNC machine draw bar pressure to 110 psi for the moderate pressure test. Duplicate steps A-F.

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

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

**Light Test - 60 psi Draw Bar Pressure**

- **Carbine #2**: Steel 27.53, Aluminum 30.87
- **Carbine W+**: Steel 18.83, Aluminum 19.33
- **Smooth Collet**: 6.13, 7.47

**Moderate Test - 110 psi Draw Bar Pressure**

- **Carbine #2**: Steel 114.90, Aluminum 106.07
- **Carbine W+**: Steel 69.87, Aluminum 72.17
- **Smooth Collet**: 28.53, 35.20
<table>
<thead>
<tr>
<th>Metal Parts</th>
<th>Aluminium Parts</th>
<th>Steel Parts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Torque Multiplier</td>
<td>2.59X</td>
<td>2.05X</td>
</tr>
<tr>
<td></td>
<td>4.13X</td>
<td>3.07X</td>
</tr>
<tr>
<td></td>
<td>60 psi</td>
<td>110 psi</td>
</tr>
<tr>
<td></td>
<td>3.01X</td>
<td>2.45X</td>
</tr>
<tr>
<td></td>
<td>2.45X</td>
<td>4.03X</td>
</tr>
</tbody>
</table>

In comparison with a smooth collet, results show between 2.05X and 4.49X more torque is needed for a part to slip in a Carbinite coated collet.

Contact

Carbinite
METAL COATINGS

724.586.5659
info@carbinite.com