DLC Coated Drills for Aluminum Alloy

DLC = Diamond Like Carbon
DLC Drill

Features:

- DLC (Diamond Like Carbon)
- Amorphous Substance Having Diamond Like Properties Characterized by a High Degree of Hardness, Low Coefficient of Friction and Wear Resistance
- Excellent Chip Evacuation Due to Unique Flute Geometry and Drill Point
- Extra Long Tool Life Due to DLC Coating
- End Mill Shank for Highly Precise and Accurate Drilling
- Excellent Drill for High Speed Machining of Aluminum and Copper Alloy

Materials

Aluminum 1060, 6061, Aluminum Alloys 4032, 5052, 7075, Copper Alloys and ADC with SI up to 12%

Japan & US Stock Item
Coating Characteristics of DLC

• High Resistance to Built-Up Edge by Super Low Friction Coating

Structure of DLC

<table>
<thead>
<tr>
<th>Graphite</th>
<th>DLC</th>
<th>Diamond</th>
</tr>
</thead>
<tbody>
<tr>
<td>135°</td>
<td>(sp²)</td>
<td>1330°</td>
</tr>
<tr>
<td>1800 1600 1400 1200</td>
<td>1800 1600 1400 1200</td>
<td>1800 1600 1400 1200</td>
</tr>
<tr>
<td>C</td>
<td>C + H</td>
<td>C</td>
</tr>
<tr>
<td>-</td>
<td>1000 ~ 8000 HV</td>
<td>10000 HV</td>
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Solution in Drilling

1. Countermeasures

Anti-Built up Edge $\Rightarrow$ Adoption of DLC Coating

Better Chip Evacuation $\Rightarrow$ Gradually Increase of Flute Width (Pat. P)

$l_1$ $<$ $l_2$

Top

End
Performance of Dry Drilling in Aluminum Cast Alloy 12% Si

After Drilling 3000 Holes
DLC Carbide Drill

After Drilling 260 Holes
Uncoated Carbide Drill

Conditions
Diameter: 5.5mm (.2165)
Speed: 100 m/min (330 SFM) (5800 RPM)
Feed: 0.08mm/rev (18 IPM)
Depth: 16.5mm Blind (.6496)
Material: ADC12/383.0
No Coolant

No. of Holes (pc)
Broke After Drilling 3567 Holes
Broke After Drilling 260 Holes
Thank You