



## Internal Turning with 8mm Tool STMD vs Carbide E08K-SCLCR 06 R

### Reduce or Eliminate Turning Vibration!

When the diameter of the tool gets smaller, its stiffness decreases and the risk of vibration in machining increases. A carbide tool is not a vibration damped tool, but rather a stiffer tool as its body material – tungsten carbide, has a higher stiffness comparing to steel. With the tool diameter getting smaller, it's eigen frequency's variation increases and the tool's vibration frequency in machining will change dramatically comparing to a bigger size tool.

Machinists are aware that, when the tool diameter is smaller than 10 mm (3/8 inch), it is necessary to start with a carbide tool, when doing internal turning operations. When there is a challenge of vibration, the carbide turning tool holder becomes a consumable in the workshop, as it breaks into two halves frequently.

The typical approach is to do turning with a low cutting speed, and try different federate or depth of cut, and find a combination that has the least vibration and finish by post processing. When the L/D of the tool exceeds 5xD for an 8 mm (5/16 inch) tool, it becomes extremely difficult to make the process work.

MAQ has bought a carbide tool from the largest competitor on the market, and here comes the results:

<b>Depth of cut: 0.25 mm</b> <b>Cutting insert: CCMT 060204-FP P25C</b> <b>Workpiece: 4340 Steel HRC 30</b>		<b>Nose radius: 0.4 mm</b> <b>Cutting condition: Wet</b> <b>Cutting speed: 150 m/min</b>		<div style="display: flex; align-items: center;"> <div style="width: 15px; height: 15px; background-color: green; margin-right: 5px;"></div> No vibrations  <div style="width: 15px; height: 15px; background-color: yellow; margin-right: 5px; margin-top: 5px;"></div> Some vibrations  <div style="width: 15px; height: 15px; background-color: red; margin-right: 5px; margin-top: 5px;"></div> Strong vibrations         </div>			
<b>Carbide E08K-SCLCR 06 R</b>				<b>MAQ STMD M08-120 SCLCR</b>			
<u>4XD</u>	Ra 1.67 μm	Ra 2.60 μm	Ra 3.34 μm	4XD	-	-	-
<u>5XD</u>	-	-	-	5XD	-	-	-
<u>6XD</u>	-	-	-	6XD	Ra 1.67 μm	Ra 2.60 μm	Ra 3.34 μm
<u>7XD</u>	-	-	-	7XD	Ra 1.67 μm	Ra 2.60 μm	Ra 3.34 μm
Feed (mm/rev)	<u>0.12</u>	<u>0.15</u>	<u>0.17</u>	Feed (mm/rev)	<u>0.12</u>	<u>0.15</u>	<u>0.17</u>