
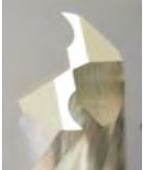

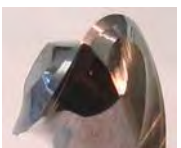
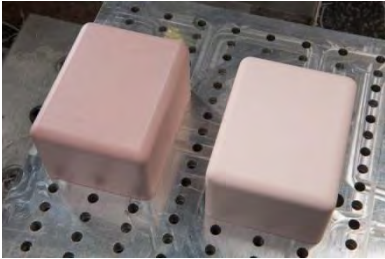


HYTAC[®] Syntactic Foam & CTB-44 Toolboard Quick Start Machining Guide

Cutter Type	<ul style="list-style-type: none"> • 2-flute, plastic cutting tools. 4-flute or metal cutting tools will result in a rough surface that collects plastic buildup and provide inconsistent plug results • Solid Carbide. High speed steel (HSS) is not suitable. • SHARP TOOLS are required. Syntactic foams are abrasive. Check cutting edges and monitor plug surface for evidence of dull tooling. (Dull tools will result in a rough surface that collects plastic buildup and provides inconsistent plug results.) 																																																											
Speed and Feed	<p>For material removal, slotting or profiling:</p> <p style="text-align: center;"><u>2 flute up-cut spiral</u></p> <div style="display: flex; justify-content: space-around; align-items: center;">   </div> <p style="text-align: center;"><i>Pictured: 52-7XX series, Onsrud Tool</i></p> <table border="1" style="width: 100%; text-align: center; border-collapse: collapse;"> <thead> <tr> <th colspan="2"></th> <th colspan="7">Spindle RPM</th> </tr> <tr> <th colspan="2"></th> <th>5,000</th> <th>7,500</th> <th>10,000</th> <th>12,500</th> <th>15,000</th> <th>17,500</th> <th>20,000</th> </tr> </thead> <tbody> <tr> <th rowspan="5" style="writing-mode: vertical-rl; transform: rotate(180deg);">Cutting Diameter</th> <th>3/16"</th> <td>50</td> <td>75</td> <td>100</td> <td>125</td> <td>150</td> <td>175</td> <td>200</td> </tr> <tr> <th>3/8"</th> <td>70</td> <td>105</td> <td>140</td> <td>175</td> <td>210</td> <td>245</td> <td>280</td> </tr> <tr> <th>1/2"</th> <td>90</td> <td>135</td> <td>180</td> <td>225</td> <td>270</td> <td>315</td> <td>360</td> </tr> <tr> <th>5/8"</th> <td>100</td> <td>150</td> <td>200</td> <td>250</td> <td>300</td> <td>350</td> <td>400</td> </tr> <tr> <th>3/4"</th> <td>100</td> <td>150</td> <td>200</td> <td>250</td> <td>300</td> <td>350</td> <td>400</td> </tr> </tbody> </table> <p style="text-align: center;">Feed rate shown in bold in inches/minute</p> <p style="text-align: center;"><i>Radial depth of cut = 100% Axial depth of cut = 1 x D</i></p>			Spindle RPM									5,000	7,500	10,000	12,500	15,000	17,500	20,000	Cutting Diameter	3/16"	50	75	100	125	150	175	200	3/8"	70	105	140	175	210	245	280	1/2"	90	135	180	225	270	315	360	5/8"	100	150	200	250	300	350	400	3/4"	100	150	200	250	300	350	400
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Speed and Feed	<p>For 3D contouring:</p> <p style="text-align: center;"><u>High finish ball nose</u></p> <div style="display: flex; justify-content: space-around; align-items: center;">   </div> <p style="text-align: center;"><i>Pictured: 65-2XX series, Onsrud Tool</i></p> <table border="1" style="width: 100%; text-align: center; border-collapse: collapse;"> <thead> <tr> <th colspan="2"></th> <th colspan="7">Spindle RPM</th> </tr> <tr> <th colspan="2"></th> <th>5,000</th> <th>7,500</th> <th>10,000</th> <th>12,500</th> <th>15,000</th> <th>17,500</th> <th>20,000</th> </tr> </thead> <tbody> <tr> <th rowspan="4" style="writing-mode: vertical-rl; transform: rotate(180deg);">Cutting Diameter</th> <th>1/8"</th> <td>40</td> <td>60</td> <td>80</td> <td>100</td> <td>120</td> <td>140</td> <td>160</td> </tr> <tr> <th>1/4"</th> <td>50</td> <td>75</td> <td>100</td> <td>125</td> <td>150</td> <td>175</td> <td>200</td> </tr> <tr> <th>3/16"</th> <td>50</td> <td>75</td> <td>100</td> <td>125</td> <td>150</td> <td>175</td> <td>200</td> </tr> <tr> <th>3/8"</th> <td>70</td> <td>105</td> <td>140</td> <td>175</td> <td>210</td> <td>245</td> <td>280</td> </tr> </tbody> </table> <p style="text-align: center;">Feed rate shown in bold in inches/minute</p> <p style="text-align: center;"><i>Radial depth of cut = 33% Axial depth of cut = up to 2 x D</i></p>			Spindle RPM									5,000	7,500	10,000	12,500	15,000	17,500	20,000	Cutting Diameter	1/8"	40	60	80	100	120	140	160	1/4"	50	75	100	125	150	175	200	3/16"	50	75	100	125	150	175	200	3/8"	70	105	140	175	210	245	280								
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Coolant	<ul style="list-style-type: none"> • None or air. Chips/dust generated must be cleared from the tool area. Re-cutting chips will quickly dull a tool and may create a fire hazard. 																																																											
Protection	<ul style="list-style-type: none"> • For HYTAC-XTL, B1X, FLX, FLXT, C1R, CTB-44: Safety goggles • For HYTAC-W, WF, WFT: Enclosed chip space, dust extraction, safety goggles, dust mask, protective gloves 																																																											

Examples of correctly-machined surface finishes, common problems and solutions

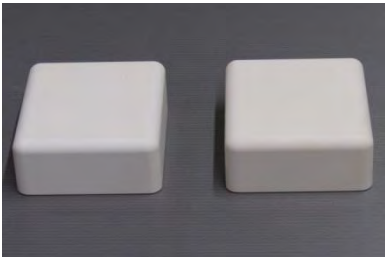
As machined (XTL, FLX)



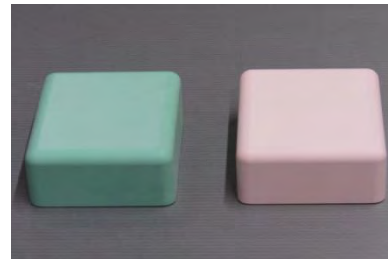
Sharp tool, accurate & consistent speed (XTL)



As machined (W, WF)



As machined (FLXT, FLX)



Poor or 'fuzzy' surface quality. Possible causes: dull tool, slow feed rate, tool geometry, tool direction (B1X)



As polished (C1R)



Pockmarked surface. Possible causes: rough plug surface, material sticking (XTL)

Excellent clarity as a result of smooth surface (XTL)

