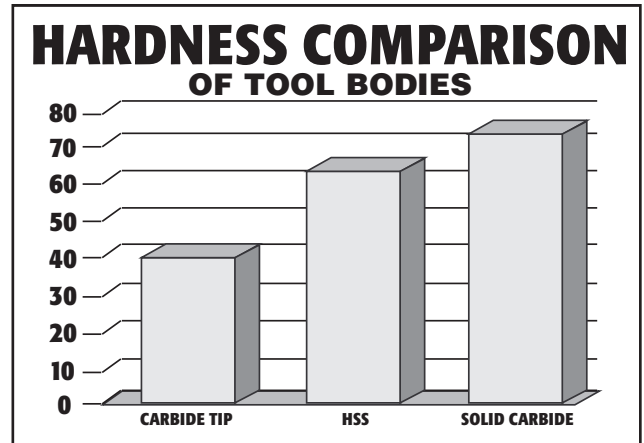
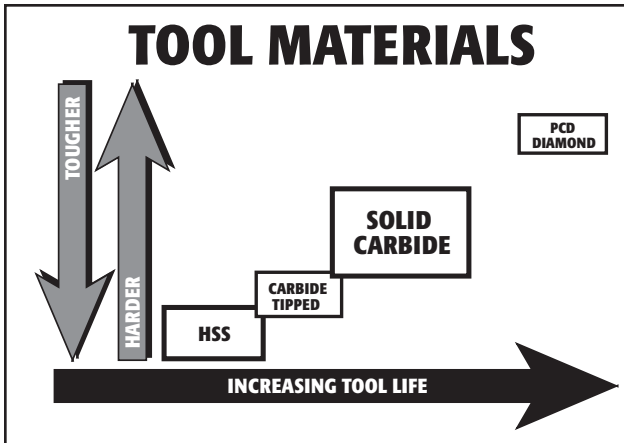


# CUTTING TOOL MATERIALS

Tool materials utilized in the manufacture of router bits in the industrial market place involve high-speed steel, carbide tipped, solid carbide, and PCD diamond. The choice of tooling depends upon the relative characteristics of the material being machined and the equipment available for a specific application. High-speed steel and carbide tipped tools tend to fall into the category of manually fed router applications while solid carbide and PCD diamond is best applied to CNC operations. Basically, as hardness of tool material increases and toughness decreases, the tooling of the harder material functions better in the consistent feeding environment of CNC machinery.



## HSS-HIGH SPEED STEEL

<p><b>PROS:</b></p> <ul style="list-style-type: none"> <li>LOWER COST TOOLING</li> <li>TOUGH BODIES REDUCE BREAKAGE IN OLDER SPINDLES AND HAND ROUTERS</li> <li>SHARPER EDGES ALLOW EASIER HAND FEEDING</li> <li>DO NOT BIND AS MUCH IN "WARM" THERMOFORMED PLASTIC PARTS</li> <li>MANY GEOMETRIES AVAILABLE</li> <li>LONG CEL'S AVAILABLE</li> </ul>	<p><b>CONS:</b></p> <ul style="list-style-type: none"> <li>CAN EXPERIENCE VIBRATION PROBLEMS DUE TO REDUCED RIGIDITY</li> <li>SHORTER TOOL LIFE DUE TO REDUCED ABRASION RESISTANCE</li> <li>SLOWER FEED RATES THAN OTHER TOOL MATERIALS</li> </ul>
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## CARBIDE TIPPED

<p><b>PROS:</b></p> <ul style="list-style-type: none"> <li>LOWER COST</li> <li>LONG LIFE WITH A TOUGH BODY</li> <li>GOOD FOR HAND ROUTING OF ABRASIVE MATERIALS</li> </ul>	<p><b>CONS:</b></p> <ul style="list-style-type: none"> <li>REDUCED RIGIDITY</li> <li>SLOW FEED RATES</li> <li>LIMITED GEOMETRIES AVAILABLE</li> <li>LONG CEL'S NOT USUALLY AVAILABLE IN SMALL DIAMETERS</li> <li>POOR PLUNGING ABILITY</li> </ul>
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## SOLID CARBIDE

<p><b>PROS:</b></p> <ul style="list-style-type: none"> <li>BEST RIGIDITY - BEST FINISH</li> <li>HIGH FEED RATES AND REDUCED CYCLE TIMES</li> <li>LARGEST VARIETY OF GEOMETRIES</li> <li>LONG TOOL LIFE</li> <li>MULTIPLE RESHARPENINGS</li> <li>BEST PLUNGING CAPABILITIES</li> </ul>	<p><b>CONS:</b></p> <ul style="list-style-type: none"> <li>HIGH INITIAL COST</li> <li>INCREASED BREAKAGE IF NOT USED IN WELL-MAINTAINED MACHINERY</li> <li>ALUMINUM AND PLASTIC TOOLING IS FREQUENTLY NOT RESHARPENABLE</li> </ul>
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## PCD DIAMOND

<p><b>PROS:</b></p> <ul style="list-style-type: none"> <li>LONG TOOL LIFE IN ABRASIVE MATERIALS</li> </ul>	<p><b>CONS:</b></p> <ul style="list-style-type: none"> <li>VERY HIGH INITIAL COST</li> <li>POOR PLASTIC, SOFT WOOD, AND ALUMINUM GEOMETRY</li> <li>TYPICALLY CANNOT PLUNGE</li> <li>LIMITED FEEDRATES DUE TO STEEL BODIES AND FLATFACE GEOMETRY</li> </ul>
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