HAM 423R Spiral Solid carbide contour and edge routers
2 cutting edges, right-hand cut, right-hand spiral fluted, shank dia. 1/8" (3.175 mm), total length 1 1/2" (38 mm), with Fishtail (standard).
Router for composite materials and nonferrous metals (e.g. Aluminum)

HAM 480/482 solid carbide end mills
Engineering data
• Special geometry for Alu
• Big chip space
• Centre cutting

HAM 421 solid carbide end mills
Engineering data
• Centre cutting
• All round end mill

HAM 430 solid carbide end mills
Engineering data
• up to Ø 2.8 mm, 3 cutting edge centre cutting
• from Ø 3.0 mm, 1 cutting edge over centre

HAM 401 solid carbide end mills
Engineering data
• up to Ø 3.0 mm centre cutting
• from Ø 3.5 mm 1 cutting edge over centre
• all round end mill

HAM 466 solid carbide deburring and chamfering mills
Engineering data
• for chamfering and deburring

HAM 404 solid carbide end mills
Engineering data
• centre cutting
• web thickness reinforced
• especially for finishing machining
HAM 462 solid carbide engraving bits

Engineering data
- Centre cutting
- Special tool for engraving and copying

HAM 491 solid carbide end mill

Engineering data
- Centre cutting
- Rake angle very positive
- Big chip space
- Especially for machining of plastics

High Quality Carbide Tools
Made in France

Plastic, Wood, Foam Board, Solid Surface
Solid Carbide Single Flute
13000 Series Spiral 'O'

Upcut
Right Hand Helix
Right Hand Cut
Designed to throw chip (waste) UP. This is the most popular design and is compatible with most CNC vacuum systems.

Aluminum, Brass, Copper, Non-Ferrous Metal
Solid Carbide Single Flute
33000 Series Single Flute Spiral 'O'

Upcut
Right Hand Helix
Right Hand Cut
Designed to throw chip (waste) UP. This is the most popular design and is compatible with most CNC vacuum systems.
<table>
<thead>
<tr>
<th>Tool Type</th>
<th>Series</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Two Flute Upcut &amp; Downcut Spiral (compression spiral) - Series 3100</td>
<td></td>
<td>Compression spiral means the upcut and downcut spiral flutes compress the material being cut preventing chipping or fuzzing on the top and bottom of the cut. Our unique flute geometry allows the &quot;Viper&quot; to cut faster and longer than other compression spirals on the market today. It also allows extended sharpening life with excellent performance throughout the tools useful life. Compression spirals are used extensively for cutting double side laminates (melamine, vinyl, high pressure laminates, painted board, etc.) These tools can also be used on natural woods where edge fuzzing is a problem with standard spiral tools. The double edge design allows for feed rates of around 900 inches per minute at 18,000 RPM when using a 1/2” diameter tool.</td>
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<tr>
<td>Single Edge &quot;O&quot; Flute Straight - Series 5400</td>
<td></td>
<td>&quot;O&quot; flute tools create the perfect curled chip that allows the softer plastic to be cut without chip rewelding. Ideally suited for plastic materials that form curled chips as opposed to fractured chips. The straight flute design does not import &quot;up&quot; or &quot;down&quot; forces into the part being routed. Therefore, ideally suited for irregularly shaped parts not capable of being thoroughly held in place by vacuum or fixtures. * = Not guaranteed against breakage due to extreme cutting edge length</td>
</tr>
<tr>
<td>Single Edge &quot;O&quot; Flute Upcut - Series 5600</td>
<td></td>
<td>These tools provide good clean cuts in hard plastics, as well as aluminum, while allowing the choice of upward chip removal. Tools which have an &quot;S&quot; behind the part number were manufactured with specific geometry for cutting softer plastics.</td>
</tr>
<tr>
<td>Two Flute Upcut Finishing Tool - Series 1200</td>
<td></td>
<td>Two flute finishing tools are used when a smooth edge cut is required and is a popular tool design for most routing applications. The helical cutting edge reduces material contact while in the cut. This is why spiral tools designs cut faster, quieter, and cleaner than straight edge tools. These tools are used for cutting materials where no special considerations are needed. The upcut spiral will provide a smooth bottom finish, while &quot;augering&quot; the chips upward. Due to the upcut design and the included angle of the cutting edge, these tools are razor sharp.</td>
</tr>
</tbody>
</table>

**Antarens, Inc.**

**Standard Cutters**

Our most frequently used tool for engraving plastics and metals. Antares cutters are made from Micrograin carbide with our exclusive MicroEdge® finish to produce cleaner cuts and stay sharper longer. Standard cutting tools produce a cut with a 30° side angle for plastics and a 40° side angle for metals. They are available in a variety of tip widths

<table>
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<tr>
<td>Standard Cutters</td>
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<tr>
<td>AC-125-1/8” x 4 1/2” Solid Micrograin Carbide</td>
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<tr>
<td>AC-236 - 6mm x 165mm Micrograin Carbide Tipped for Scripta G Models</td>
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