

Tiny Tools

Technical Section

Carbide Grades:

BXC (P30 - P50, K25 - K40)

PVD TiN coated grade for low cutting speed. Works well with a wide range of stainless steels.

BMK (K10 - K20)

Sub-micron grade with advanced PVD triple coating. Extremely high

heat resistant and smooth cutting operation, for high performance, and normal machining conditions. General purpose for all materials.

K20 (K10 - K30)

Uncoated Carbide grade for non ferrous metals, aluminum and cast iron.

TNX



Cutting Cased

New advanced carbide grade TNX for higher feeds and high performance, at medium to high cutting speed. Extra fine grain size with high hardness and toughness combined with triple layer reddish coating, provides high edge stability and better chip flow.

Cutting speed for Tiny Tools

| Standard BXC BMK K20 TNX Non-Alloy steel and cast steel, free cutting steel, free cutting steel, activel, free cutting steel, and loos than 5% alloying elements ab.25%C Annealed Quenched and tempered Quenched and tempered Quenched and tempered Annealed 82-230 98-262 118-262 M Stainless steel, and tool steel Annealed Quenched and tempered Annealed 66-131 82-164 98-164 M Stainless steel and cast steel steel Cast iron nodular (GGG) Ferritic/martensitic Perritic/pearlitic 82-131 98-197 118-262 K Grey cast iron (GG) Ferritic/pearlitic 82-137 98-262 118-262 Malleable cast iron Ferritic/pearlitic 82-197 98-262 118-262 K Grey cast iron (GG) Pearlitic 98-230 98-262 118-262 Malleable cast iron Ferritic/pearlitic 98-230 98-262 118-262 Malleable cast iron Pearlitic 98-164 236-394 118-262 Malleable cast iron Ferritic/pearlitic 98-262 118-262 66-131 Not cureable Cured < | ISO Otanalanal | Material | | Condition | ft/min | | | | | | | | | | | |
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| P cast steel, free cutting steel <-0.55% C 20.55% C Quenched and tempered Quenched and tempered 82-230 98-262 118-262 Image: P Low alloy steel and cast steel (less than 5% alloying elements) Annealed Quenched and tempered 66-131 82-164 98-164 High alloy steel, cast steel, and tool steel Annealed Quenched and tempered 66-131 82-164 98-164 M Stainless steel and cast steel Annealed Quenched and tempered 66-131 82-164 98-164 M Stainless steel and cast steel Annealed Quenched and tempered 66-131 82-164 98-164 M Stainless steel and cast steel Amealed Perritic/martensitic 82-131 98-197 118-262 K Grey cast iron nodular (GGG) Ferritic/pearlitic 82-30 98-262 118-262 Malleable cast iron Pearlitic 98-230 98-262 118-262 Muminum-cast, alloyed < <td><<td>Cured 131-262 166-131 197-995 Non metalic Duroplastics, fiber plastics Hard rubber 131-262 66-131 197-295 Non metal</td><th></th><td>Non-Alloy steel and</td><td>≥0.25%C</td><td>Annealed</td><td rowspan="2">82-230</td><td></td><td></td><td></td></td> | < <td>Cured 131-262 166-131 197-995 Non metalic Duroplastics, fiber plastics Hard rubber 131-262 66-131 197-295 Non metal</td> <th></th> <td>Non-Alloy steel and</td> <td>≥0.25%C</td> <td>Annealed</td> <td rowspan="2">82-230</td> <td></td> <td></td> <td></td> | Cured 131-262 166-131 197-995 Non metalic Duroplastics, fiber plastics Hard rubber 131-262 66-131 197-295 Non metal | | Non-Alloy steel and | ≥0.25%C | Annealed | 82-230 | | | | | | | | | |
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| Nameable cash for Pearlitic 00-101 00-104 73-104 Aluminum-wrought alloy Not cureable 164-328 197-394 98-164 236-394 Aluminum-cast, alloyed < <td><<td><<td>Not cureable 131-262 164-295 66-131 197-295 Aluminum-cast, alloyed <<td><<td><<td><<td><<td>Not cureable 131-262 164-295 66-131 197-295 Copper alloys Brass 98-197 98-230 66-131 118-230 Non metalic Duroplastics, fiber plastics 131-262 66-131 118-230 Non metalic Duroplastics, fiber plastics 131-262 66-131 118-230 Ni or Co Annealed 49-98 49-131 59-131 High temp. alloys, Super alloys Ni or Co 33-98 33-98 39-98 Hardened steel 147 59-131 59-131 H</td><th></th><td colspan="2" rowspan="2">Malleable cast iron</td><td>Ferritic</td><td rowspan="2">66-131</td><td>66-164</td><td></td><td>70-164</td></td></td></td></td></td></td></td> | < <td><<td>Not cureable 131-262 164-295 66-131 197-295 Aluminum-cast, alloyed <<td><<td><<td><<td><<td>Not cureable 131-262 164-295 66-131 197-295 Copper alloys Brass 98-197 98-230 66-131 118-230 Non metalic 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66-131 118-230 Ni or Co Annealed 49-98 49-131 59-131 High temp. alloys, Super alloys Ni or Co 33-98 33-98 39-98 Hardened steel 147 59-131 59-131 H</td><th></th><td colspan="2" rowspan="2">Malleable cast iron</td><td>Ferritic</td><td rowspan="2">66-131</td><td>66-164</td><td></td><td>70-164</td></td> | < <td>Not cureable 131-262 164-295 66-131 197-295 Copper alloys Brass 98-197 98-230 66-131 118-230 Non metalic Duroplastics, fiber plastics 131-262 66-131 118-230 Non metalic Duroplastics, fiber plastics 131-262 66-131 118-230 Ni or Co Annealed 49-98 49-131 59-131 High temp. alloys, Super alloys Ni or Co 33-98 33-98 39-98 Hardened steel 147 59-131 59-131 H</td> <th></th> <td colspan="2" rowspan="2">Malleable cast iron</td> <td>Ferritic</td> <td rowspan="2">66-131</td> <td>66-164</td> <td></td> <td>70-164</td> | Not cureable 131-262 164-295 66-131 197-295 Copper alloys Brass 98-197 98-230 66-131 118-230 Non metalic Duroplastics, fiber plastics 131-262 66-131 118-230 Non metalic 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| $ N = N \\ N \\$ | | Pearlitic | 00-104 | | 73-104 | | | | | | | | | | | |
| N Aluminum-cost, alloyed < | | Aluminum-wrought alloy | | Not cureable | 164-328 | 197-394 | 98-164 | 236-394 | | | | | | | | |
| N Aluminum-cast, alloyed <=12% Si >12% Si >12% Si Not cureable Cured 131-262 164-295 66-131 197-295 Copper alloys >1% Pb Free cutting 3 98-197 98-230 66-131 118-230 Electrolytic copper Non metalic Duroplastics, fiber plastics Hard rubber 131-262 66-131 118-230 S High temp. alloys, Super alloys Fe based Annealed Cured 49-98 49-131 59-131 High temp. alloys, Super alloys Ni or Co based Alpha+beta alloys cured 33-98 33-98 39-98 Hardened 51-55 HRc 33-98 33-98 39-98 39-98 Hardened steel Hardened 51-55 HRc 33-98 33-98 39-98 | | | | Cured | | | | 200 00 1 | | | | | | | | |
| N Instrument of data alloyed Image: constraint of data alloyed Cured 131-262 164-295 66-131 197-295 N Image: constraint of data alloyed >12% Si High temperature 131-262 164-295 66-131 197-295 Copper alloys Image: constraint of data >1% Pb Free cutting 98-197 98-230 66-131 118-230 Non metalic Duroplastics, fiber plastics 131-262 66-131 118-230 Non metalic Fe based Cured 131-262 66-131 118-230 Non metalic Fe based Cured 131-262 66-131 118-230 Ni or Co Annealed 49-98 49-131 59-131 Image: constraint of the plastics Ni or Co Cast Cast 33-98 33-98 39-98 Hardened steel Hardened 51-55 HRc 33-98 33-98 39-98 39-98 Hardened 56-62 HRc Cast 33-98 33-98 39-98 39-96 | | Aluminum-cast, alloyed | <=12% Si | Not cureable | | 164-295 | 66-131 | 197-295 | | | | | | | | |
| N Simple Simple Simple High temperature Image: Component of the system Simple Si | | | | Cured | 131-262 | | | | | | | | | | | |
| $ \begin{array}{c c c c c c c c c c c c c c c c c c c $ | Ν | | >12% Si | High temperature | | | | | | | | | | | | |
| Copper alloys Brass 98-197 98-230 66-131 118-230 Non metalic Duroplastics, fiber plastics 131-262 66-131 66-131 Migh temp. alloys, Super alloys Fe based Annealed 49-98 49-131 59-131 High temp. alloys, Super alloys Ni or Co based Annealed 49-98 49-131 59-131 High temp. alloys, Super alloys Ni or Co based Annealed 49-98 49-131 59-131 High temp. alloys, Super alloys Ni or Co based Cast 33-98 33-98 39-98 Hardened steel Hardened 45-50 HRc 33-98 33-98 39-98 59-131 Hardened steel Hardened 51-55 HRc 33-98 33-98 39-98 59-131 Hardened cols Cast iron Cast 33-98 33-98 39-98 39-98 Chilled cast iron Cast iron Cast 33-98 33-98 39-98 | ••• | Copper alloys | <u>>1% Pb</u> | Free cutting | | 98-230 | 66-131 | 118-230 | | | | | | | | |
| $ \begin{array}{c c c c c c c c c c c c c c c c c c c $ | | | | Brass | 98-197 | | | | | | | | | | | |
| Non metalic Duroplastics, tiber plastics 131-262 66-131 High temp. alloys, Super alloys Fe based Annealed 49-98 49-131 59-131 Ni or Co based Ni or Co based Cured 49-98 49-131 59-131 High temp. alloys, Super alloys Ni or Co based Annealed 49-98 49-131 59-131 High temp. alloys, Super alloys Ni or Co based Alpha+beta alloys cured 33-98 33-98 39-98 Hardened steel Hardened 45-50 HRc Hardened 51-55 HRc 33-98 49-131 59-131 Hardened steel Hardened 56-62 HRc 33-98 33-98 39-98 Chilled cast iron Cast 33-98 33-98 39-98 Cast iron Hardened 33-66 33-66 39-66 | | | | Electrolytic copper | | | | | | | | | | | | |
| S High temp. alloys, Super alloys Fe based Annealed Cured 49-98 49-131 59-131 High temp. alloys, Super alloys Ni or Co based Annealed Cured 49-98 49-131 59-131 High temp. alloys, Super alloys Ni or Co based Annealed Cast 49-98 49-131 59-131 H Hardened steel Alpha+beta alloys cured 33-98 33-98 39-98 H Hardened steel Hardened 51-55 HRc Hardened 56-62 HRc 33-98 33-98 39-98 Chilled cast iron Cast 33-98 33-98 39-98 Cast iron Hardened 33-66 33-66 39-66 | | Non metalic | | Duroplastics, fiber plastics | 131-262 | | 66-131 | | | | | | | | | |
| Fe based Annealed Cured 49-98 49-131 59-131 High temp. alloys, Super alloys Ni or Co based Annealed Cured 49-98 49-131 59-131 Titanium alloys Alpha+beta alloys cured 33-98 33-98 33-98 39-98 Hardened steel Hardened 51-55 HRc Hardened 56-62 HRc 33-98 33-98 39-98 Chilled cast iron Cast 33-98 33-98 39-98 Cast iron Hardened 33-66 33-66 39-66 | | | | Hard rubber | | | | | | | | | | | | |
| High temp. alloys, Super alloys Ni or Co based Annealed Cured 49-98 49-131 59-131 Hardened steel Ni or Co based Cast 33-98 33-98 33-98 39-98 Hardened steel Hardened 45-50 HRc Hardened 51-55 HRc 33-98 49-131 59-131 Chilled cast iron Cast 33-98 33-98 39-98 Cast iron Cast 33-98 33-98 39-98 | | High temp. alloys, Super alloys | Fe based | Fe based Cured | 49-98 | 49-131 | | | | | | | | | | |
| S alloys, Super alloys Ni or Co based Altheated 49-90 49-101 39-101 Image: Chilled cast iron Cast 33-98 33-98 33-98 39-98 Hardened steel Hardened 51-55 HRc Hardened 56-62 HRc 33-98 33-98 39-98 Chilled cast iron Cast 33-98 33-98 39-98 Cast iron Cast 33-98 33-98 39-98 | | | | | | | | 59-131 | | | | | | | | |
| based Outed Cast Outed Titanium alloys Alpha+beta alloys cured 33-98 33-98 39-98 Hardened steel Hardened 45-50 HRc Hardened 51-55 HRc 33-98 49-131 59-131 Chilled cast iron Cast 33-98 33-98 39-98 Cast iron Cast 33-98 33-98 39-98 Cast iron Hardened 33-66 33-66 39-66 | S | | Ni or Co based | Cured | | | | | | | | | | | | |
| Titanium alloys Alpha+beta alloys cured 33-98 33-98 39-98 Hardened steel Hardened 45-50 HRc Hardened 45-50 HRc 1000000000000000000000000000000000000 | | | | Cast | | | | | | | | | | | | |
| Hardened steel Hardened 45-50 HRc Hardened 51-55 HRc 33-98 49-131 59-131 Chilled cast iron Cast 33-98 33-98 33-98 39-98 Cast iron Hardened 56-62 HRc 33-66 33-66 39-66 | | Titanium allovs | | Alpha+beta allovs cured | 33-98 | 33-98 | | 39-98 | | | | | | | | |
| Hardened steel Hardened 51-55 HRc Hardened 56-62 HRc 33-98 49-131 59-131 Chilled cast iron Cast 33-98 33-98 39-98 Cast iron Hardened 33-66 33-66 39-66 | H | Hardened steel | | Hardened 45-50 HRc | 33-98 | 49-131 | | | | | | | | | | |
| H Hardened 56-62 HRc Chilled cast iron Cast 33-98 33-98 39-98 Cast iron Hardened 33-66 33-66 39-66 | | | | Hardened 51-55 HRc | | | | 59-131 | | | | | | | | |
| Chilled cast iron Cast 33-98 33-98 39-98 Cast iron Hardened 33-66 33-66 39-66 | | | | Hardened 56-62 HRc | | | | | | | | | | | | |
| Cast iron Hardened 33-66 33-66 39-66 | | Chilled cast iron | | Cast | 33-98 | 33-98 | | 39-98 | | | | | | | | |
| | | Cast iron | | Hardened | 33-66 | 33-66 | | 39-66 | | | | | | | | |

Recommended Feed Rate: .0005 - .001 inch/rev

Tiny Tools



Threading Passes

| Pitch: | mm | 0.5 | 0.7 | 0.8 | 1.0 | 1.25 | 1.5 | 2-5 |
|------------------|-----|--------|--------|--------|--------|--------|---------|---------|
| | TPI | 48 | 36 | 32 | 24 | 20 | 16 | 14-5 |
| Number of Passes | | 6 - 12 | 7 - 14 | 7 - 16 | 8 - 18 | 8 - 20 | 10 - 22 | 20 - 38 |

CMR Carmex Multi-Task Tiny Tools

- Carmex is introducing a new and innovative Multi-Task Tiny Tool **CMR** for Boring, Turning, Facing and Chamfering with a single tool.
- The unique design enables machining of the material without the need for a pilot hole.
- The new tool shortens the machining cycle time and the number of tools required providing **High Productivity**.
- Effective through coolant hole with a spiral flute, evacuates the chips out of the hole uninterruptedly.
- Unique chip breaker and flute design.
- To use with standard SIM toolholders on Swiss Type or CNC lathe machines.
- Available in **BMK** Grade only.

Working Method

- The tool penetrates the work piece and produces the hole compliant with the minimum diameter the tool allows.
- The tool can penetrate the material in one pass or several passes depending on the work piece material, coolant pressure, machine power etc.
- The hole can be enlarged by multi radial passes.



The tool is equipped with an additional cutting edge, which is located across the main front edge. This allows production of an additional 45° chamfer on the work piece without the need to stop the spindle or processing operation.



CMR General Recommendations

Coolant fluid

Dry machining should not be performed under any circumstances. It is necessary to use an internal coolant in all applications. Oil or Emulsion lubricants are recommended for best performance. In the event of low coolant pressure, adding an external coolant can improve the tool operation.

The cooling stream is designed to provide three benefits:

- 1. Cooling the cutting edge of the tool, and the contact area.
- 2. Pushing the chip away from the tool quickly, thereby reducing wear of the edge.
- 3. Helping to break the chip into smaller pieces and evacuating them from the cutting area.

| ISO Standard | Material | Cutting Speed ft/min | | |
|-----------------|------------------------------------------|----------------------|--|--|
| | Low and Medium Carbon Steels <0.55%C | 65-245 | | |
| Р | High Carbon Steels ≥0.55%C | 65-245 | | |
| | Alloy Steels, Treated Steels | 65-200 | | |
| | Stainless Steels - Free Cutting | 65-200 | | |
| Μ | Stainless Steels - Austenitic | 65-230 | | |
| | Cast Steels | 65-230 | | |
| К | Cast Iron | 65-330 | | |
| | Aluminum ≤12%Si, Copper | 130-490 | | |
| Ν | Aluminum >12% Si | 65-330 | | |
| | Synthetics, Duroplastics, Thermoplastics | 130-490 | | |
| S | Nickel Alloys, Titanium Alloys | 50-200 | | |
| н | Hardened Steels | - | | |

Cutting Data

Recommended Feed Rate: .0005 - .001 inch/rev

Tiny Tools



HK Broaching Tools for Hexagon Keys

The HK broaching system have been developed to machine internal keyways inside blind or through holes, using CNC machines.

- To use with Carmex standard SIM Bar Holders
- The holder can be located directly in the turret or the machine spindle
- Holder with rear clamping screw for full support during operation
- Available in **BMK** Grade only.

Working Demo





Cutting Data

| Material Tensile Strength (Ibs/in) | Feed rate (in/min) | In-feed per stroke (inch) |
|------------------------------------|--------------------|---------------------------|
| 58.000-94.000 | 276-354 | .00240035 |
| 101.000-123.000 | 197-256 | .00160028 |
| 130.500-145.000 | 157-217 | .00120022 |
| 160.500-174.000 | 118-177 | .00080016 |

The cutting data above is an initial recommendation and depends on the machine condition, workpiece profile and the application clamping

- A relief groove is highly recommended, if not possible a gradual volume decrease should be made at the end of the broaching groove
- The HK tool must be positioned outside of the hole/groove before each stroke
- After setup and first stroke, we recommend to observe the tool and the application to make sure no collision occurred