

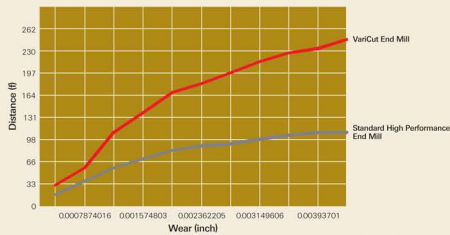
## Unique and patent pending tool design

### How VariCut differs from standard high performance end mills:

- VariCut is designed with a new patent pending core form and a new end geometry that uses unequal flute spacing to enable higher feed rates - optimal to different cutting depths.
- VariCut is able to slot at 1D - 1.5D (diameter) in a wide range of work piece materials.
- VariCut is able to plunge to a depth of 1D and then start to slot.
- VariCut has reinforced corner geometry, using a radius or chamfer with dubbing, which results in less power consumption during cutting.
- VariCut performance - combination of removal rate and extended tool life means it will match or outperform any other 4 flute "Vari-Style" End Mill in the market.
- VariCut optimum geometry gives the possibility to achieve maximum metal removal rates (MPR).



### Tool wear of VariCut versus standard high performance end mills



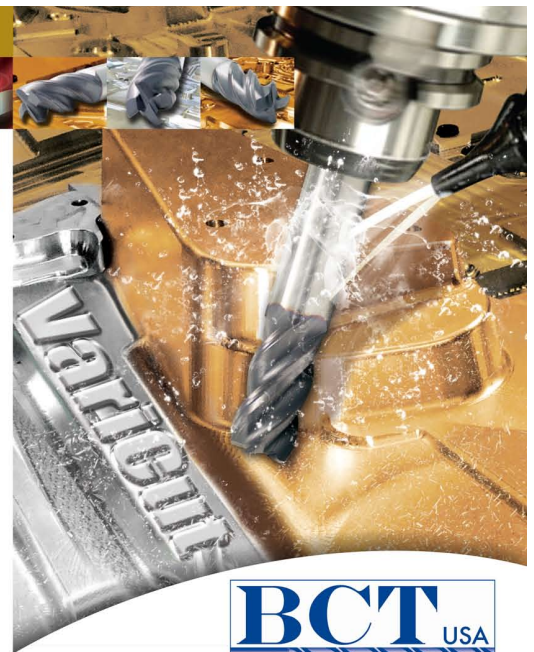
SOLID CARBIDE VARICUT END MILL

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SOLID CARBIDE VARICUT END MILL

# Used in Aerospace, Medical, Automotive, Manufacturing and General Engineering

For machining on small, medium or large Stainless or Titanium parts



On Stainless, or Titanium, it will match or outperform any other 4 flute Vari-Style End Mill in the market.

Brooke Cutting Tools USA new "Vari-Style" End Mill, the Vari-Cut, has a new patent pending tool design. This unique design uses a new core form, and a new reinforced end geometry with unequal flute spacing which enables it to remove the most amount of material in the least amount of time with an excellent surface finish.

### Where to use VariCut

- Where high volumes of material must be removed ... VariCut provides the highest metal removal rates
- Where many passes are taken to remove the material ... VariCut can take deeper and wider cuts – axial & radial
- Where different end mills are used for slotting, side milling, roughing, semi-finishing and finishing ... VariCut can do the entire operation with the same tool.
- Deep pocketing ... VariCut with extended neck has the design to maximize MRR
- Where facility works with many different materials ... VariCut is effective in the widest range of materials – including Cast Irons, Carbon Alloys, Stainless Steels, Titanium & High Temp Alloys



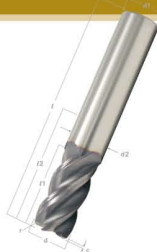
### Regrinding and Re-coating Services

Brooke Cutting Tools USA offers a cost effective value-added service of regrinding of any unused carbide tooling. This enables longer machining cycles over the life of the solid carbide tool, with enhanced tool performance. Coupled to this, Brooke Cutting Tools USA also offers a PVD re-coating service to further improve the performance of the reground solid carbide tool.

The materials and properties of the coating used is best matched to solid carbide cutting tool substrate materials allowing the coated solid carbide end mill to be successfully employed under extreme conditions of hard machining and typically permits much faster and more economical machining of dies in steel and super hard steels.

### Recommended Tool Holders

For maximum rigidity, we recommend high performance, high clamping torque milling chucks, especially for roughing operations. For shrink fit systems, we strongly suggest the use of heavy duty high performance systems and suggest they be used only for semi-finishing and finishing operations.



### The main features and benefits of VariCut include:

- Unique and Patent Pending Core Form designed in conjunction with our international development partners who have decades of design and development experience in the carbide tooling industry, provides high performance combining metal removal rates with an extended tool life.
- Sub-micron carbide grade of European origin.
- Specialty adapted Oerlikon Balzers coating which further improves operational performance and tool life.
- Cylindrical shank with h6 tolerance.
- Chatter-free machining in a wide range of speeds, feeds and applications which prevents chipping on cutting edges and corners resulting in an excellent surface finish on milled parts.
- Excellent in slotting operations up to a 1.25D axial depth of cut in a wide range of work piece materials and in profiling operations up to 0.5D radial x 1.5D axial depth of cut.
- Reinforced corner geometry, using a radius or chamfer with dubbing, which results in a longer tool life and less power consumption during cutting.
- Possible design modifications - Neck according to customer request.

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### VariCut Speeds and Feeds

Material Type	Hardness HB	Tensile Strength	Slotting	Side Milling	Recommended Surface Speed (m/min)	Recommended feed in mm per tooth for Slot Milling (for cutting length 10, 20, 30, 40)			
						1/4	1/2	3/8	1/2
Free Cutting Carbon Steel	1150	391.16	45	45	656	0.00191	0.00206	0.00232	0.00266
	1200	413.70	45	45	656	0.00191	0.00206	0.00232	0.00266
	1248	436.24	45	45	656	0.00191	0.00206	0.00232	0.00266
	1330	458.78	45	45	656	0.00191	0.00206	0.00232	0.00266
Alloy Steel	1330	458.78	45	45	656	0.00191	0.00206	0.00232	0.00266
	1380	481.32	45	45	656	0.00191	0.00206	0.00232	0.00266
	1430	503.86	45	45	656	0.00191	0.00206	0.00232	0.00266
	1480	526.40	45	45	656	0.00191	0.00206	0.00232	0.00266
Hardened Alloy Steel	1480	526.40	45	45	656	0.00191	0.00206	0.00232	0.00266
	1530	548.94	45	45	656	0.00191	0.00206	0.00232	0.00266
	1580	571.48	45	45	656	0.00191	0.00206	0.00232	0.00266
	1630	594.02	45	45	656	0.00191	0.00206	0.00232	0.00266
Stainless Steel - Martensitic (420 Series)	200-400	584.77/66	15 x D	15 x D	164	0.00108	0.00147	0.00178	0.00216
	400-500	607.31	15 x D	15 x D	164	0.00108	0.00147	0.00178	0.00216
	500-600	630.85	15 x D	15 x D	164	0.00108	0.00147	0.00178	0.00216
	600-700	653.39	15 x D	15 x D	164	0.00108	0.00147	0.00178	0.00216
Stainless Steel - Austenitic (300 Series)	240-300	514.92/258	15 x D	15 x D	299	0.00130	0.00178	0.00216	0.00254
	300-350	537.46	15 x D	15 x D	299	0.00130	0.00178	0.00216	0.00254
	350-400	560.00	15 x D	15 x D	299	0.00130	0.00178	0.00216	0.00254
	400-450	582.54	15 x D	15 x D	299	0.00130	0.00178	0.00216	0.00254
Duplex Steel	270	677.02	15 x D	15 x D	377	0.00156	0.00216	0.00254	0.00292
	275	699.56	15 x D	15 x D	377	0.00156	0.00216	0.00254	0.00292
	280	722.10	15 x D	15 x D	377	0.00156	0.00216	0.00254	0.00292
	285	744.64	15 x D	15 x D	377	0.00156	0.00216	0.00254	0.00292
Grey Cast Irons	150-200	379.13	15 x D	15 x D	492	0.00191	0.00206	0.00232	0.00266
	200-250	401.67	15 x D	15 x D	492	0.00191	0.00206	0.00232	0.00266
	250-300	424.21	15 x D	15 x D	492	0.00191	0.00206	0.00232	0.00266
	300-350	446.75	15 x D	15 x D	492	0.00191	0.00206	0.00232	0.00266
Nodular Cast Irons	150-200	379.13	15 x D	15 x D	427	0.00156	0.00216	0.00254	0.00292
	200-250	401.67	15 x D	15 x D	427	0.00156	0.00216	0.00254	0.00292
	250-300	424.21	15 x D	15 x D	427	0.00156	0.00216	0.00254	0.00292
	300-350	446.75	15 x D	15 x D	427	0.00156	0.00216	0.00254	0.00292
Martensitic Cast Irons	200-250	401.67	15 x D	15 x D	328	0.00130	0.00178	0.00216	0.00254
	250-300	424.21	15 x D	15 x D	328	0.00130	0.00178	0.00216	0.00254
	300-350	446.75	15 x D	15 x D	328	0.00130	0.00178	0.00216	0.00254
	350-400	469.29	15 x D	15 x D	328	0.00130	0.00178	0.00216	0.00254
Heat Resisting Alloys	260	677.02	15 x D	15 x D	194	0.00156	0.00216	0.00254	0.00292
	265	700.56	15 x D	15 x D	194	0.00156	0.00216	0.00254	0.00292
	270	723.10	15 x D	15 x D	194	0.00156	0.00216	0.00254	0.00292
	275	745.64	15 x D	15 x D	194	0.00156	0.00216	0.00254	0.00292
Commercially Pure Titanium	275	722.10	15 x D	15 x D	197	0.00130	0.00178	0.00216	0.00254
	280	744.64	15 x D	15 x D	197	0.00130	0.00178	0.00216	0.00254
	285	767.18	15 x D	15 x D	197	0.00130	0.00178	0.00216	0.00254
	290	789.72	15 x D	15 x D	197	0.00130	0.00178	0.00216	0.00254
Commercially Alloyed Titanium	350	877.02	15 x D	15 x D	164	0.00108	0.00147	0.00178	0.00216
	355	900.56	15 x D	15 x D	164	0.00108	0.00147	0.00178	0.00216
	360	923.10	15 x D	15 x D	164	0.00108	0.00147	0.00178	0.00216
	365	945.64	15 x D	15 x D	164	0.00108	0.00147	0.00178	0.00216

Parameters based on ideal conditions. Please refer parameter according to real applications.



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