

The go-to range

Next level standard tooling

Steels and cast irons

Mixed materials

Steels, stainless and exotics

Aluminiums and non-ferrous

Lollipop cutters

Barrel tools

Ball nose cutters

High feed cutters

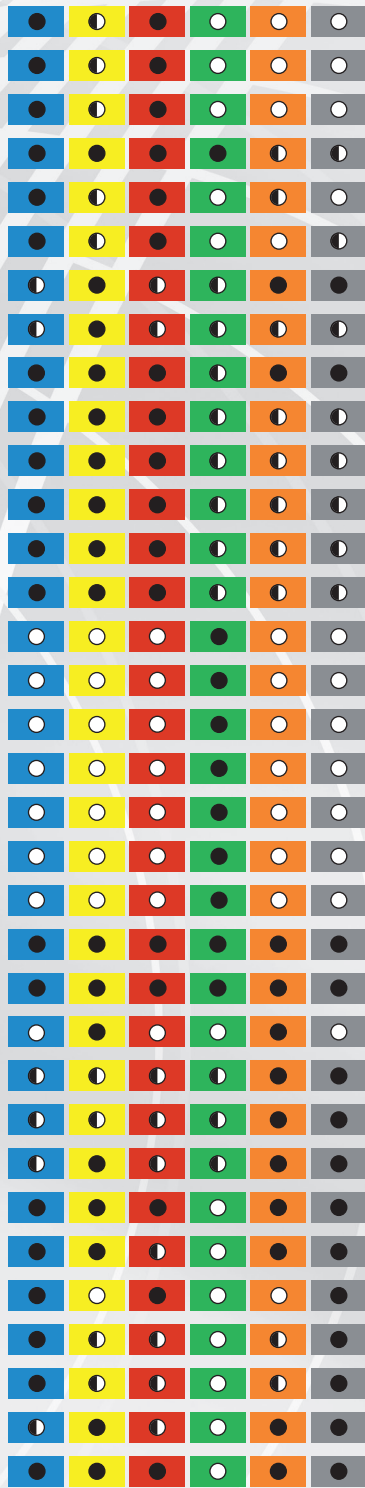
Multiflute cutters



INFINITE POSSIBILITIES.®































QUICKGRIND®
carbide tooling

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Icons key

	Standard – available ex-stock
	Customisable – Infinite Possibilities®
	Remanufacture compatible – regrind, recoat, reuse
	Centre cutting
	Helix angle 35-38°
	End angle 7° max
	VHM
	Coating type
	Variable helix
	Variable index
	Number of teeth
	Ball nose
	Coated ball nose
	Coated chamfer
	Coated corner radius
	Chip breaker
	Step down
	Orbis 270°
	Through-coolant
	Chamfer milling
	Slot milling
	Side finishing
	Side roughing
	Profile milling
	Ramping
	Trochoidal milling
	Plunge milling
	Pocket milling
	Helical milling
	3D milling


Fifty years in the making

Quickgrind is renowned for its bespoke, non-standard solid carbide tooling. Our mission is to provide you with solution-based tooling, to give you the right tool, for the right job, at the right price.

That's why most of our cutters can be designed specifically for your application – size, diameter, neck relief, coating and number of flutes can all be tailored to your needs. Through-coolant and other options are also available. This Infinite Possibilities® ethos means our range of tooling is, well, infinite. You can find an introduction to the Infinite Possibilities® process on the back page. You can also check to see which of our standard tools can be adapted to suit your specific requirements...

 **Look out for this icon to see which of our tools are Infinite Possibilities® compatible**

But you may not know that we also have an ever-expanding range of standard tooling, go-to cutters designed to meet the needs of a wide range of day-to-day applications across all material groups and industry sectors. This brochure is your introduction to that range.

 **Our standard tools are available ex-stock**

All of our standard tools are available ex-stock to keep your machines running and your customers happy. To help your bottom line even further, most have been designed to take advantage of our QuickEdge remanufacture process (re-grind, re-coat, re-use) which gives you up to 9 times extra usage out of your tools. Turn to page 49 to learn more.

Other compatible services include CAM consultancy and tool management. You are welcome to visit our state-of-the-art Technical Centre, a purpose-built space where you can discover all of these services and more – see pages 48 to 51 to find out more.

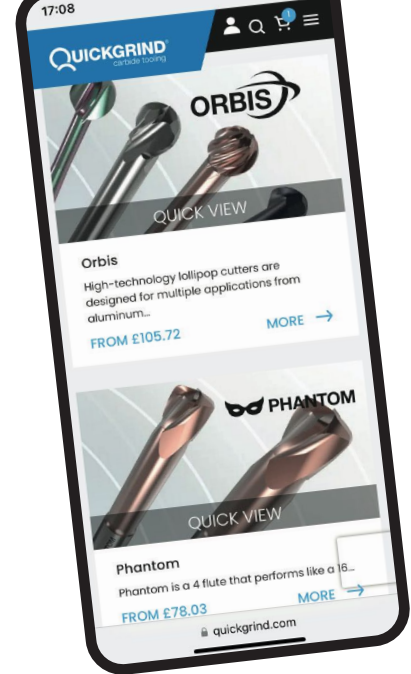
Whether it's Infinite Possibilities® or our 30 standard ranges with almost 500 tools to choose from, it's time to take a fresh look at Quickgrind. Standard or non-standard, we've got you covered.

Call +44 (0) 1684 294090
or visit quickgrind.com

Online shop

24/7 purchasing

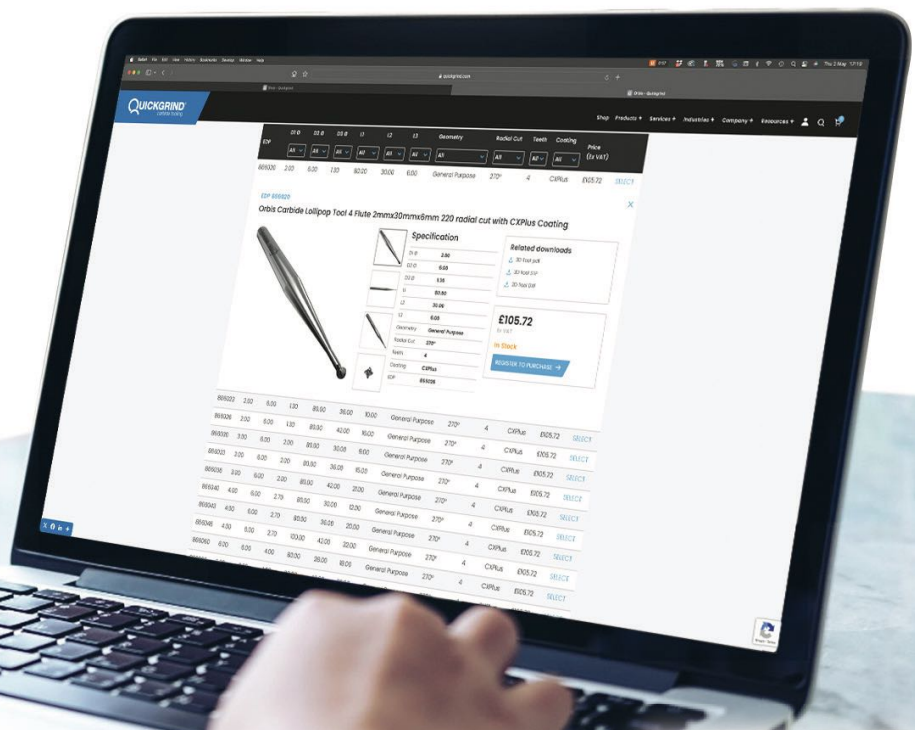
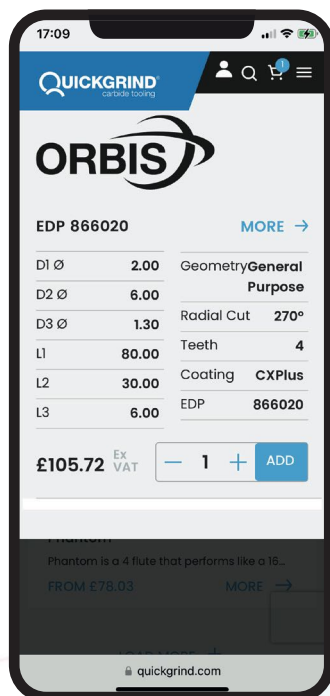
when and where you need



Check out our website complete with ecommerce facility for the convenience of tool purchasing any time, anywhere.

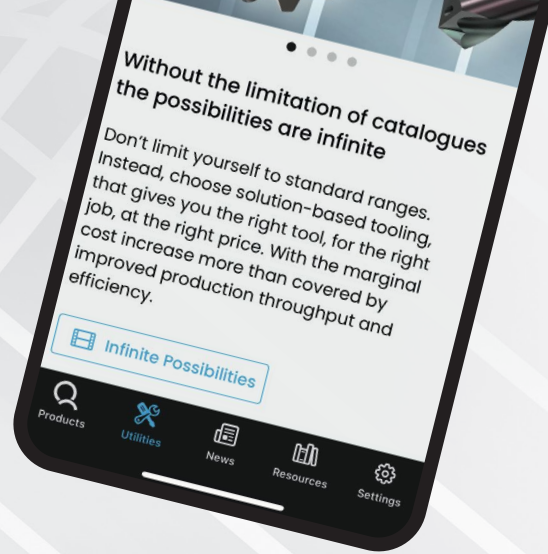
- **Ease of comparison:** You can easily compare prices, features and information on products across different ranges, helping you to make informed purchasing decisions. All of our current brochures are also available online.
- **Convenient payment options:** Our website offers various payment options including credit and debit cards, digital wallets and online payment gateways and, on approval, trade credit, providing you with flexibility, choice and convenience.
- **Efficient order management:** Streamline your order processing and fulfilment, reducing the time and resources required to manage your inventory and shipments.
- **24/7 accessibility:** Allows you to browse and shop at any time of the day or night, increasing convenience and accessibility.
- **Mobile enabled:** Accessible on mobile phone, tablet and computer, whatever your preference.
- **Areas covered:** Our ecommerce facility is currently available to all our UK customers with plans to expand internationally.
- **Convenience:** You can shop from wherever you want without the hassle of emails and telephone calls.
- **Promotions:** Be the first to hear about new products, promotions and offers.
- **Custom tooling quote:** Can't find what you need? Simply complete the online form to receive a custom tooling quote.

Be smart, buy smart. Visit quickgrind.com now and click on the Shop link.



Mobile app

Knowledge is power

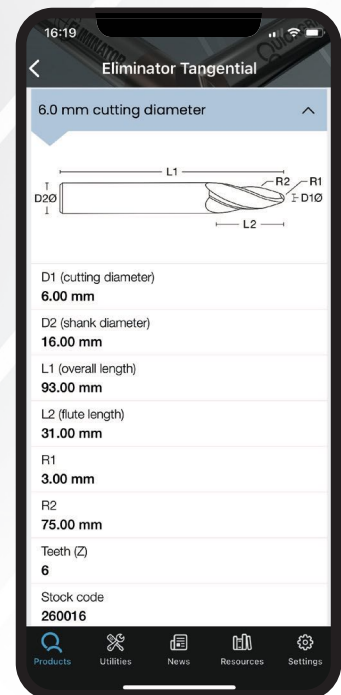
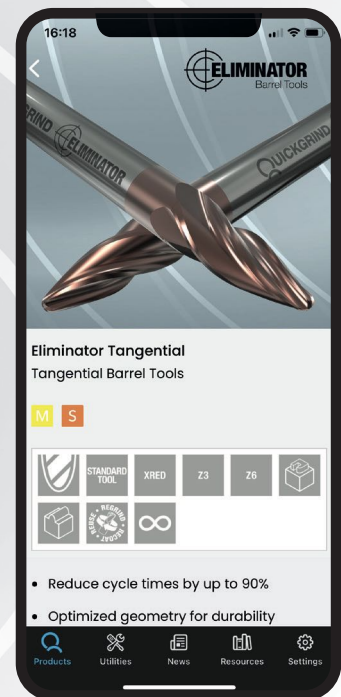
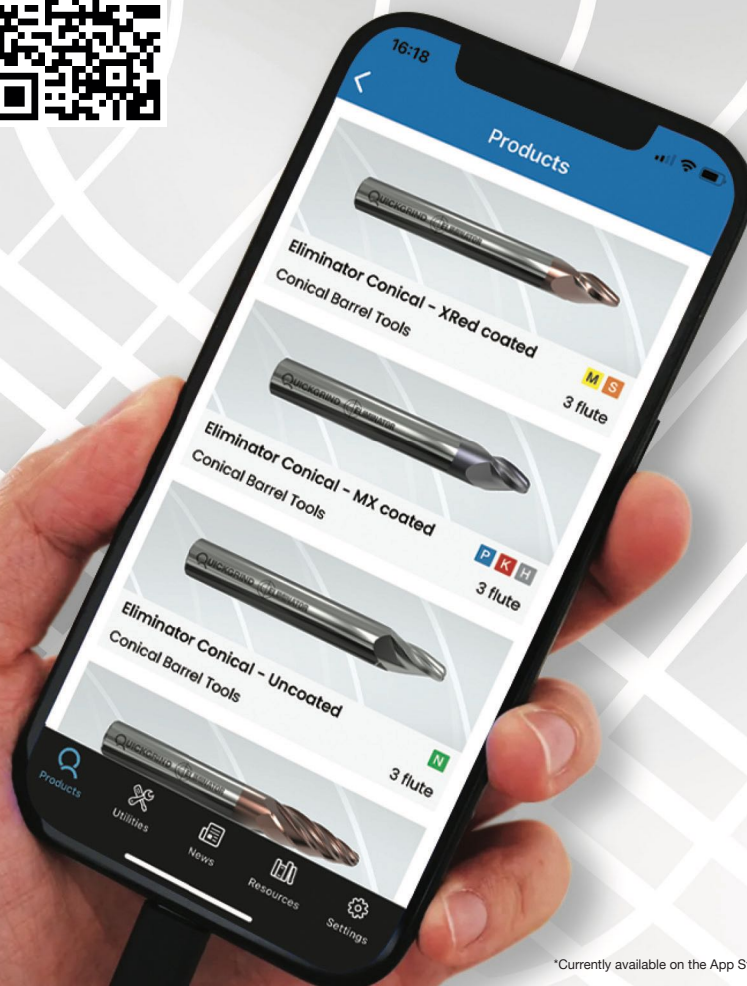


It's never been easier to tap into Quickgrind's 50+ years of tooling expertise and gain a competitive advantage in the fast moving world of machining.

By downloading the Quickgrind app you can enjoy...

- Milling and Drilling information at your fingertips
- Tool selection - the best tool for the job; find out more about our ranges
- Tool feed and speed calculator
- Ability to order standard range tooling direct from the app
- Easy access to videos
- Continual improvements to keep you ahead of the competition

Get the knowledge. Download the Quickgrind app today.*



*Currently available on the App Store. Google Play release to be announced.



Tool shown 499035

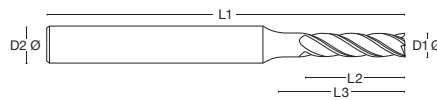
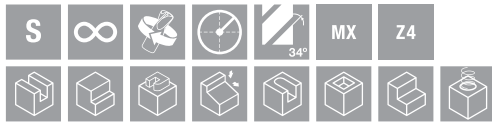
High productivity

in steels and cast iron

QPlus is designed for the high productivity machining of steels, cast iron and in some instances free machining stainless steel.

Competitively priced it is ideal for general use and comes with extended flute length as standard, and delivers high material removal due to its design recipe and superior coating.

Its excellent stability and free, smooth, chip evacuation make this tool suitable for HSM, slotting, roughing, finishing, trochoidal milling and profiling in mould and die, aerospace and other applications.



QPlus 4 flute variable end mill for a wide range of materials

D1 Ø mm	D2 Ø mm	L1 mm	L2 mm	L3 mm	Chamfer	Teeth Z	Stock code	List £
3.00	6.00	58.00	12.00	20.00	-	4	499010	22.66
4.00	6.00	58.00	14.00	20.00	-	4	499015	22.66
5.00	6.00	58.00	16.00	22.00	-	4	499020	22.66
6.00	6.00	58.00	19.00	-	0.25	4	499025	22.66
8.00	8.00	64.00	22.00	-	0.25	4	499030	29.14
10.00	10.00	73.00	25.00	-	0.25	4	499035	39.66
12.00	12.00	84.00	30.00	-	0.25	4	499040	52.61
16.00	16.00	100.00	40.00	-	0.25	4	499045	85.79
20.00	20.00	105.00	45.00	-	0.25	4	499050	175.74

See pages 58 and 60 for cutting data



Tool shown 499010



Tool shown 497100

Extended reach

reduced costs

QPlus2 is a performance tool for many general machine shop operations and applications. An excellent go-to tool with the benefit of extra flute lengths above the standard.

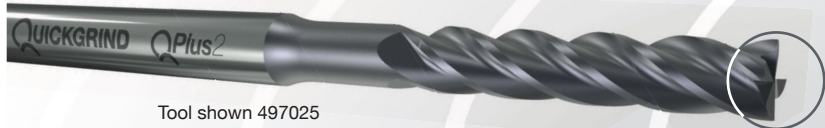
Designed with sharp corner geometry this tool is very useful when looking to achieve square corners in manufactured parts.



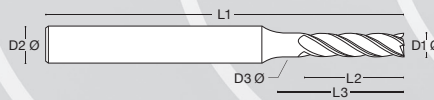
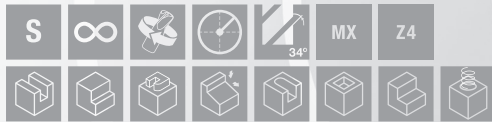
Unique recipe of base material and geometry

MX coating for excellent wear resistance

Sharp corner geometry



Tool shown 497025



QPlus2 4 flute variable end mill for a wide range of materials

D1 Ø mm	D2 Ø mm	D3 Ø mm	L1 mm	L2 mm	L3 mm	Teeth Z	Stock code	List £
1.00	3.00	0.95	39.00	3.00	8.00	4	497010	24.22
1.50	3.00	1.45	39.00	6.00	11.00	4	497015	22.34
2.00	3.00	1.95	39.00	9.00	15.00	4	497020	20.30
2.50	3.00	2.45	39.00	12.00	18.00	4	497025	20.30
3.00	3.00	-	39.00	12.00	-	4	497030	19.14
3.50	6.00	3.45	58.00	12.00	20.00	4	497035	26.09
4.00	6.00	3.95	58.00	14.00	20.00	4	497040	26.26
4.50	6.00	4.45	58.00	14.00	20.00	4	497045	26.97
5.00	6.00	4.95	58.00	16.00	22.00	4	497050	26.26
5.50	6.00	5.45	58.00	16.00	22.00	4	497055	33.05
6.00	6.00	-	58.00	19.00	-	4	497060	22.95
8.00	8.00	-	64.00	22.00	-	4	497080	30.42
10.00	10.00	-	73.00	25.00	-	4	497100	39.92
12.00	12.00	-	84.00	30.00	-	4	497120	52.85
16.00	16.00	-	93.00	40.00	-	4	497160	85.94
20.00	20.00	-	105.00	45.00	-	4	497200	127.82

See pages 58 and 60 for cutting data



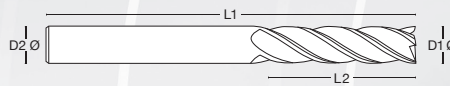
Tool shown 749200

Long Series

for improved access

The QPlus2-LS (Long Series) 4 flute universal carbide end mill with MX coating is suitable for steels, cast irons and some stainless steels.

Remember, QPlus2-LS can be adapted to suit your applications and operations. If you don't see the specification you need in the table below please contact us and ask about Infinite Possibilities®



QPlus2-LS 4 flute variable end mill for a wide range of materials

D1 Ø mm	D2 Ø mm	L1 mm	L2 mm	Teeth Z	Stock code	List £
3.00	3.00	60.00	25.00	4	749030	34.69
4.00	4.00	60.00	25.00	4	749040	32.85
5.00	5.00	75.00	25.00	4	749050	35.74
6.00	6.00	80.00	30.00	4	749060	42.82
8.00	8.00	100.00	35.00	4	749080	65.21
10.00	10.00	100.00	40.00	4	749100	84.81
12.00	12.00	100.00	50.00	4	749120	89.59
16.00	16.00	125.00	65.00	4	749160	181.43
20.00	20.00	165.00	80.00	4	749200	264.27

See pages 58 and 60 for cutting data



Tool shown 749030



High Performance Chamfer Mills

Tool shown 189080

Chamfer and more

in all materials

QChamfer can be used for many machining operations from chamfering to bevelling, deburring, spotting and countersinking.

Our Infinite Possibilities® programme means we can adapt this tool to suit your operation. Consider QChamfer for deburring the component while still on the machine to reduce manual deburring.

Our standard QChamfer has a 90° inclusive point angle and comes with our CXPlus coating which is recommended for applications in low/high tensile steels, cast irons, tool steels, stainless steels, titanium and nickel alloys.



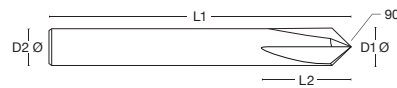
CXPlus coating

Chamfer, bevel, deburr, spot and countersink



Tool shown 189040

90° inclusive point angle



QChamfer 4 flute chamfer mill for a wide range of materials

D1 Ø mm	D2 Ø mm	L1 mm	L2 mm	Teeth Z	Stock code	List £
4.00	4.00	51.00	11.00	4	189040	17.00
6.00	6.00	58.00	13.00	4	189060	24.47
8.00	8.00	64.00	19.00	4	189080	32.20
10.00	10.00	73.00	22.00	4	189100	52.20
12.00	12.00	84.00	26.00	4	189120	69.68

[See page 58 for cutting data](#)



High Performance Ball Nose End Mills

Unique geometry for most applications

The QBall 4 flute universal carbide ball nose with MX coating is suitable for a wide range of materials, from steels through to exotic alloys. Its unique geometry makes this tool suitable for most applications.

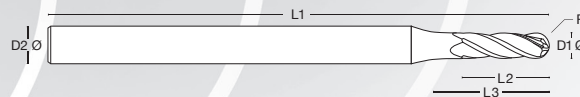
- Latest MX PVD coating developed specifically for aggressive machining conditions in steels and cast iron
- Maintains sharp edges and is also suitable for remanufacture and recoating
- HV hardness 3300, 2-4µ thickness, <0.6 coefficient of friction PVD AITIN and micro hardness of >500Hv



Tool shown 336010



Tool shown 336050



QBall 4 flute ball nose end mill for a wide range of materials

D1 Ø mm	D2 Ø mm	L1 mm	L2 mm	L3 mm	R mm	Teeth Z	Stock code	List £
1.00	3.00	39.00	4.00	5.00	0.50	4	336010	21.72
1.50	3.00	39.00	4.50	5.00	0.75	4	336015	21.08
2.00	3.00	39.00	6.50	8.00	1.00	4	336020	21.72
2.50	3.00	39.00	9.50	11.50	1.25	4	336025	21.72
3.00	3.00	39.00	12.00	-	1.50	4	336030	18.02
4.00	4.00	51.00	12.00	-	2.00	4	336040	21.99
5.00	5.00	51.00	14.00	-	2.50	4	336050	28.77
6.00	6.00	58.00	16.00	-	3.00	4	336060	33.33
8.00	8.00	64.00	20.00	-	4.00	4	336080	44.22
10.00	10.00	73.00	22.00	-	5.00	4	336100	56.09
12.00	12.00	84.00	26.00	-	6.00	4	336120	72.72
16.00	16.00	93.00	32.00	-	8.00	4	336160	119.17
20.00	20.00	105.00	35.00	-	10.00	4	336200	171.62

See page 63 for cutting data



High Performance End Mills

High MRR with longer tool life

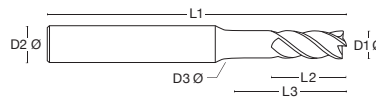
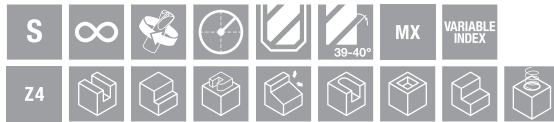
QCut is a high performance end mill designed for the machining of steels, cast iron and in some instances free machining stainless steel.

QCut delivers high material removal due to its design recipe and superior MX coating, and has excellent stability and free, smooth, chip evacuation. It is suitable for HSM, slotting, roughing, finishing, trochoidal milling, profiling in mould and die, aerospace and other applications.

- Latest MX PVD coating developed specifically for aggressive machining conditions in steels and cast iron
- Maintains sharp edges and is also suitable for remanufacture and recoating
- HV hardness 3300, 2-4 μ thickness, <0.6 coefficient of friction PVD AlTiN and micro hardness of >500Hv



Tool shown 801200

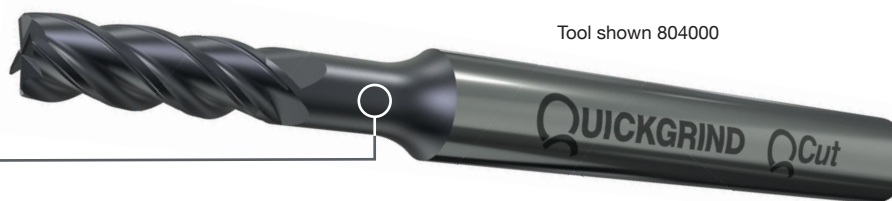


QCut 4 flute variable end mill for steels

D1 Ø mm	D2 Ø mm	D3 Ø mm	L1 mm	L2 mm	L3 mm	Chamfer x 45°	Teeth Z	Stock code	List £
3.00	6.00	2.80	58.00	11.00	16.00	0.15	4	803000	33.19
4.00	6.00	3.80	58.00	11.00	18.00	0.15	4	804000	33.19
5.00	6.00	4.80	58.00	13.00	18.00	0.25	4	805000	33.19
6.00	6.00	-	58.00	13.00	-	0.25	4	806000	33.19
8.00	8.00	-	64.00	19.00	-	0.25	4	808000	41.48
10.00	10.00	-	73.00	22.00	-	0.25	4	801000	49.57
12.00	12.00	-	84.00	26.00	-	0.25	4	801200	65.83
16.00	16.00	-	93.00	32.00	-	0.35	4	801600	100.08
20.00	20.00	-	105.00	38.00	-	0.35	4	802000	148.06

See pages 58 and 60 for cutting data

Neck relieved to overcome reach issues



Tool shown 804000



High Performance End Mills

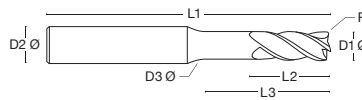
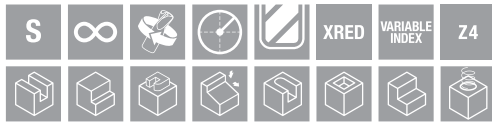
Tool shown 195615

A cut above the rest

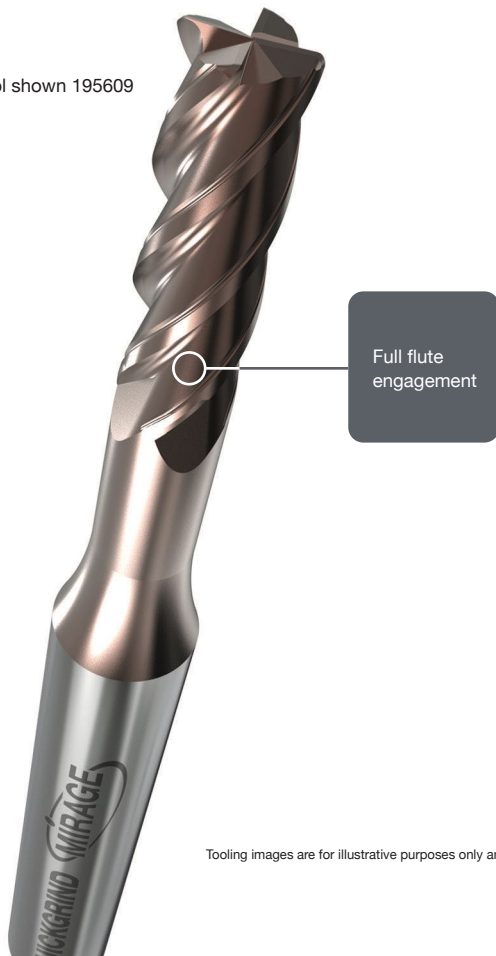
Designed for multiple applications in a wide range of materials especially stainless steel, titanium and super alloys, our Mirage 4 flute end mill provides unrivalled high performance.

Suitable for trochoidal milling, Mirage allows for full flute engagement with step overs (a_e) of anything from $\leq 5\%$ to $\geq 15\%$ in super alloys/stainless steel depending on the CAM software and machine parameters.

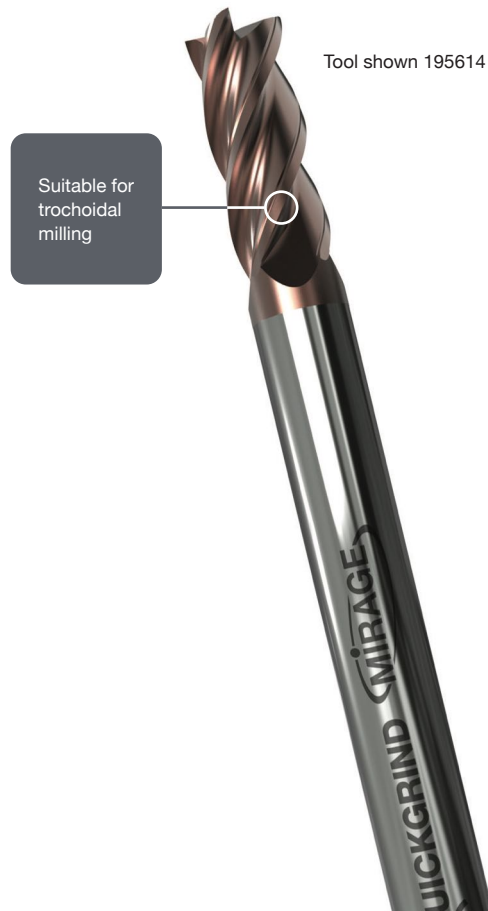
Contact our technical team for assistance – please call +44 (0) 1684 294090 or email contact@quickgrind.com



Tool shown 195609



Tool shown 195614



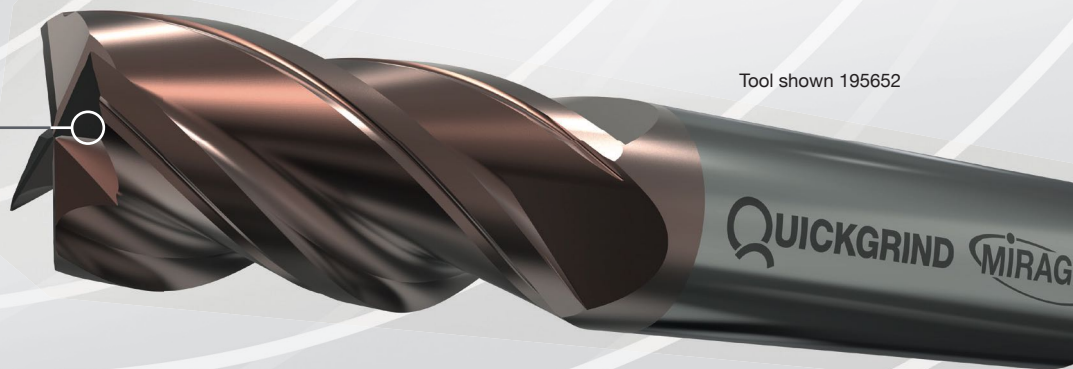


Mirage 4 flute variable end mill for super alloys, titanium and stainless steel

D1 Ø mm	D2 Ø mm	D3 Ø mm	L1 mm	L2 mm	L3 mm	R mm	Teeth Z	Stock code	List £
3.00	6.00	2.80	58.00	10.00	20.00	-	4	195605	48.93
3.00	6.00	2.80	58.00	10.00	20.00	0.25	4	195606	48.93
4.00	6.00	3.80	58.00	11.00	20.00	-	4	195608	48.93
4.00	6.00	3.80	58.00	11.00	20.00	0.25	4	195609	48.93
5.00	6.00	4.80	58.00	14.00	22.00	-	4	195611	48.93
5.00	6.00	4.80	58.00	14.00	22.00	0.25	4	195612	48.93
6.00	6.00	-	58.00	13.00	-	-	4	195614	48.93
6.00	6.00	-	58.00	13.00	-	0.25	4	195615	48.93
6.00	6.00	-	58.00	13.00	-	1.00	4	195618	48.93
8.00	8.00	-	64.00	18.00	-	-	4	195621	56.65
8.00	8.00	-	64.00	18.00	-	0.50	4	195622	56.65
8.00	8.00	-	64.00	18.00	-	1.00	4	195624	56.65
10.00	10.00	-	73.00	22.00	-	-	4	195628	66.99
10.00	10.00	-	73.00	22.00	-	0.50	4	195629	66.99
10.00	10.00	-	73.00	22.00	-	1.00	4	195631	66.99
12.00	12.00	-	84.00	26.00	-	-	4	195635	82.80
12.00	12.00	-	84.00	26.00	-	0.50	4	195636	82.80
12.00	12.00	-	84.00	26.00	-	1.00	4	195638	82.80
12.00	12.00	-	84.00	26.00	-	2.00	4	195640	82.80
12.00	12.00	-	84.00	26.00	-	3.00	4	195641	82.80
16.00	16.00	-	93.00	32.00	-	-	4	195644	166.10
16.00	16.00	-	93.00	32.00	-	0.50	4	195645	166.10
16.00	16.00	-	93.00	32.00	-	1.00	4	195647	166.10
16.00	16.00	-	93.00	32.00	-	1.50	4	195648	166.10
16.00	16.00	-	93.00	32.00	-	2.00	4	195649	166.10
16.00	16.00	-	93.00	32.00	-	3.00	4	195650	166.10
20.00	20.00	-	105.00	38.00	-	-	4	195652	280.15
20.00	20.00	-	105.00	38.00	-	1.00	4	195655	280.15

See pages 58 and 60 for cutting data

Designed for multiple applications



Tool shown 195652



High Performance End Mills

Tool shown 395636

Three flutes can be better than four

Certain applications benefit from a high performance end mill that has three flutes. Often normally only available in a general design and for non-ferrous materials from other manufacturers, our Delta range fits the bill when machining stainless.

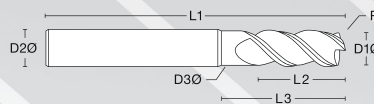
A very capable tool, Delta is designed to work in a wide range of component materials. The additional feature of extended reach increases the versatility of the tool. It is ideal for aggressive slotting, pocketing and ramping due to increased chip clearance and reduced harmonics.

When considering which tool to use, understanding the pros and cons of the number of flutes should be taken into consideration. The higher number of flutes generally allows a higher feed rate per tooth, but a high flute count means a larger core and smaller flute depth.

For example a three flute tool has a smaller core and larger flute space than an eight flute tool, providing more room for the chips to be ejected. Operations such as slotting and horizontal milling on driven tooling benefit from this tool.



Tool shown 395606



Delta 3 flute end mill for general purpose

D1 Ø mm	D2 Ø mm	D3 Ø mm	L1 mm	L2 mm	L3 mm	R mm	Teeth Z	Stock code	List £
3.00	6.00	2.80	58.00	10.00	20.00	0.25	3	395606	24.56
4.00	6.00	3.80	58.00	12.00	20.00	0.25	3	395609	25.17
5.00	6.00	4.75	58.00	14.00	22.00	0.25	3	395612	26.61
6.00	6.00	5.75	58.00	15.00	24.00	0.25	3	395614	31.88
8.00	8.00	7.50	64.00	18.00	26.00	0.50	3	395621	40.09
10.00	10.00	9.50	73.00	22.00	30.00	0.50	3	395629	48.44
12.00	12.00	11.50	84.00	32.00	40.00	0.50	3	395636	57.38
16.00	16.00	15.50	93.00	32.00	50.00	0.50	3	395645	109.61

See pages 58 and 60 for cutting data



A quantum leap in MRR and tool life

Quantum is a new HPC solid carbide end mill designed for a wide range of applications in all materials.

It can be used for both conventional machining or more modern machining methods such as dynamic or trochoidal milling.

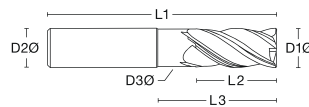
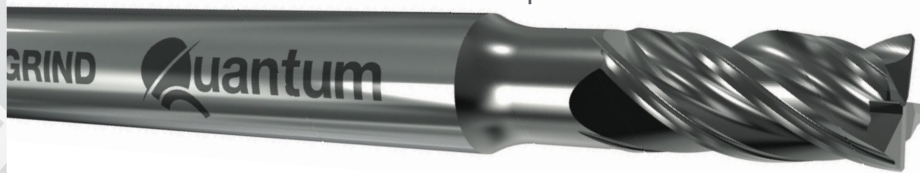
With the aid of modern CAD/CAM software Quantum will perform under all types of cutting conditions. Its unique carbide recipe makes it the go-to tool for all types of machine shop, while Quickgrind's new coating technology is delivering hugely improved results in both MRR and tool life.



CXPlus coating for wet and dry machining at medium to high speeds

Neck relieved to overcome reach issues

Tool shown 681050



NEW Quantum 4 flute general purpose end mill

D1 Ø mm	D2 Ø mm	D3 Ø mm	L1 mm	L2 mm	L3 mm	Chamfer mm	Teeth Z	Stock code	List £
3.00	6.00	2.80	58.00	6.50	9.00	0.10	4	681030	43.92
4.00	6.00	3.80	58.00	8.00	12.00	0.10	4	681040	43.92
5.00	6.00	4.80	58.00	10.50	15.00	0.10	4	681050	43.92
6.00	6.00	5.80	58.00	13.00	18.00	0.10	4	681060	39.75
8.00	8.00	7.70	64.00	17.00	24.00	0.20	4	681080	56.68
10.00	10.00	9.70	73.00	21.00	30.00	0.20	4	681100	84.15
12.00	12.00	11.60	85.00	25.00	36.00	0.30	4	681120	112.14
16.00	16.00	15.50	93.00	33.00	48.00	0.30	4	681160	200.58
20.00	20.00	19.50	105.00	42.00	60.00	0.30	4	681200	304.42

See pages 58 and 60 for cutting data



High Performance End Mills

Tool shown 342100

Two tools in one

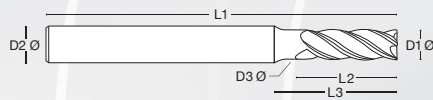
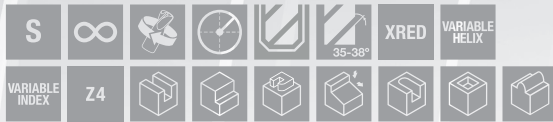
QVari is high performance 4 flute carbide end mill with variable helix and index design, suitable for both roughing and finishing, where applicable, with one tool.

The XRed coating is designed for a wide range of materials including steels, stainless steels, titanium and exotic alloys. QVari can be used in both conventional and trochoidal machining strategies.



XRed coating for steels, stainless and exotics

Suitable for roughing and finishing



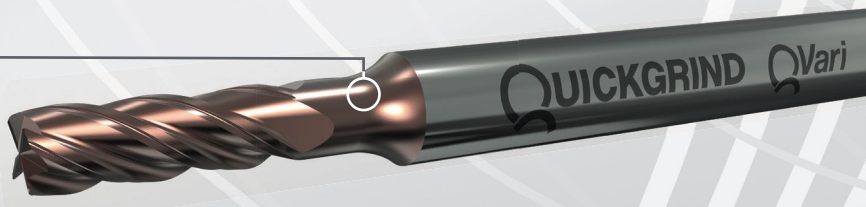
QVari 4 flute variable end mill for stainless

D1 Ø mm	D2 Ø mm	D3 Ø mm	L1 mm	L2 mm	L3 mm	Chamfer x 45°	Teeth Z	Stock code	List £
3.00	6.00	2.90	58.00	8.00	14.00	0.05	4	342030	31.37
4.00	6.00	3.90	58.00	11.00	16.00	0.05	4	342040	31.37
5.00	6.00	4.90	58.00	13.00	18.00	0.05	4	342050	31.37
6.00	6.00	-	58.00	15.00	-	0.08	4	342060	28.39
8.00	8.00	-	64.00	22.00	-	0.10	4	342080	40.48
10.00	10.00	-	73.00	25.00	-	0.15	4	342100	49.50
12.00	12.00	-	84.00	28.00	-	0.15	4	342120	65.97
16.00	16.00	-	93.00	35.00	-	0.20	4	342160	100.29
20.00	20.00	-	105.00	40.00	-	0.20	4	342200	152.21

See pages 58 and 60 for cutting data

Neck relieved to overcome reach issues

Tool shown 342040





Tool shown 272200

Variable helix and index

with extended reach

QVari-LR (Long Reach) is a high performance 4 flute long reach end mill. Its variable helix and index make this tool suitable for both roughing and finishing on long reach applications.

The XRed coating enhances tool life and makes this tool suitable for steels, stainless steels and exotic alloys. The variable helix geometry ensures stability is maintained when applying this tool in long reach machining applications. QVari-LR can be applied in conventional and trochoidal machining strategies.

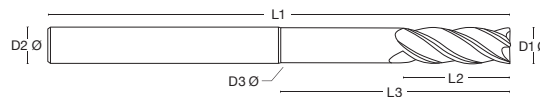
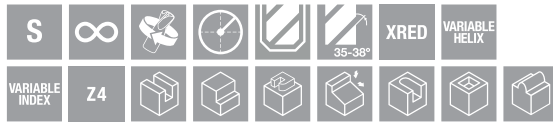


Suitable for roughing and finishing

XRed coating for steels, stainless and exotics



Tool shown 272080



QVari-LR 4 flute variable end mill for stainless and HRSA

D1 Ø mm	D2 Ø mm	D3 Ø mm	L1 mm	L2 mm	L3 mm	Chamfer x 45°	Teeth Z	Stock code	List £
6.00	6.00	5.50	80.00	17.00	35.00	0.08	4	272060	58.57
8.00	8.00	7.50	100.00	25.00	50.00	0.10	4	272080	76.21
10.00	10.00	9.50	100.00	28.00	50.00	0.15	4	272100	86.14
12.00	12.00	11.50	100.00	30.00	50.00	0.15	4	272120	98.22
16.00	16.00	15.50	145.00	38.00	75.00	0.20	4	272160	188.31
20.00	20.00	19.30	165.00	45.00	75.00	0.20	4	272200	256.44

See pages 58 and 60 for cutting data

Conventional and trochoidal milling

The QVari-CR is a high performance 4 flute carbide end mill with corner radius, variable helix and index design, making it suitable for both roughing and finishing, where applicable, with one tool.

The XRed coating enhances tool life and makes this tool suitable for steels, stainless steels and exotic alloys. QVari-CR can be used in both conventional and trochoidal machining strategies, while the variable corner radius sizes make it very popular within the aerospace industry, or other applications when there is a corner radius requirement.

- Latest XRed PVD coating developed specifically for hard materials at high speeds
- Suitable for remanufacture and recoating
- HV hardness 3500, 2-4µ thickness, <0.4 coefficient of friction PVD TiSiN and oxidation temperature of 1100°C

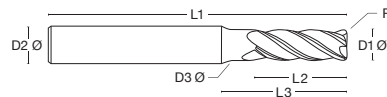
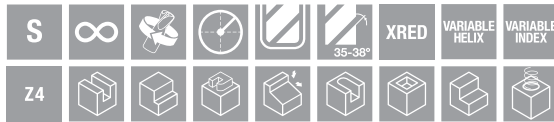
Tool shown 670209



Variable corner radius



Tool shown 670041



QVari-CR 4 flute variable end mill with radii for stainless and HRSA

D1 Ø mm	D2 Ø mm	D3 Ø mm	L1 mm	L2 mm	L3 mm	R mm	Teeth Z	Stock code	List £
3.00	6.00	2.90	58.00	8.00	14.00	0.50	4	670030	41.57
3.00	6.00	2.90	58.00	8.00	14.00	1.00	4	670031	41.57
4.00	6.00	3.90	58.00	11.00	16.00	0.50	4	670040	40.98
4.00	6.00	3.90	58.00	11.00	16.00	1.00	4	670041	40.98
5.00	6.00	4.90	58.00	13.00	18.00	0.50	4	670050	40.98
5.00	6.00	4.90	58.00	13.00	18.00	1.00	4	670051	40.98
6.00	6.00	-	58.00	15.00	-	0.50	4	670060	36.27
6.00	6.00	-	58.00	15.00	-	0.80	4	670061	36.27
6.00	6.00	-	58.00	15.00	-	1.00	4	670062	36.27
6.00	6.00	-	58.00	15.00	-	1.20	4	670063	36.27
6.00	6.00	-	58.00	15.00	-	1.50	4	670064	36.27
6.00	6.00	-	58.00	15.00	-	2.00	4	670065	36.27
8.00	8.00	-	64.00	22.00	-	0.50	4	670080	50.00
8.00	8.00	-	64.00	22.00	-	0.80	4	670081	50.00
8.00	8.00	-	64.00	22.00	-	1.00	4	670082	50.00



QVari-CR 4 flute variable end mill for stainless and HRSA

D1 Ø mm	D2 Ø mm	D3 Ø mm	L1 mm	L2 mm	L3 mm	R mm	Teeth Z	Stock code	List £
8.00	8.00	-	64.00	22.00	-	1.20	4	670083	50.00
8.00	8.00	-	64.00	22.00	-	1.50	4	670084	50.00
8.00	8.00	-	64.00	22.00	-	2.00	4	670085	50.00
8.00	8.00	-	64.00	22.00	-	2.50	4	670086	50.00
8.00	8.00	-	64.00	22.00	-	3.00	4	670087	50.00
10.00	10.00	-	73.00	25.00	-	0.50	4	670100	60.48
10.00	10.00	-	73.00	25.00	-	0.80	4	670101	60.48
10.00	10.00	-	73.00	25.00	-	1.00	4	670102	60.48
10.00	10.00	-	73.00	25.00	-	1.20	4	670103	60.48
10.00	10.00	-	73.00	25.00	-	1.50	4	670104	60.48
10.00	10.00	-	73.00	25.00	-	2.00	4	670105	60.48
10.00	10.00	-	73.00	25.00	-	2.50	4	670106	60.48
10.00	10.00	-	73.00	25.00	-	3.00	4	670107	60.48
12.00	12.00	-	84.00	28.00	-	0.50	4	670120	78.06
12.00	12.00	-	84.00	28.00	-	0.80	4	670121	78.06
12.00	12.00	-	84.00	28.00	-	1.00	4	670122	78.06
12.00	12.00	-	84.00	28.00	-	1.20	4	670123	78.06
12.00	12.00	-	84.00	28.00	-	1.50	4	670124	78.06
12.00	12.00	-	84.00	28.00	-	2.00	4	670125	78.06
12.00	12.00	-	84.00	28.00	-	2.50	4	670126	78.06
12.00	12.00	-	84.00	28.00	-	3.00	4	670127	78.06
16.00	16.00	-	93.00	35.00	-	0.50	4	670160	110.75
16.00	16.00	-	93.00	35.00	-	0.80	4	670161	110.75
16.00	16.00	-	93.00	35.00	-	1.00	4	670162	110.75
16.00	16.00	-	93.00	35.00	-	1.20	4	670163	110.75
16.00	16.00	-	93.00	35.00	-	1.50	4	670164	110.75
16.00	16.00	-	93.00	35.00	-	2.00	4	670165	110.75
16.00	16.00	-	93.00	35.00	-	2.50	4	670166	110.75
16.00	16.00	-	93.00	35.00	-	3.00	4	670167	110.75
20.00	20.00	-	105.00	40.00	-	0.50	4	670200	160.82
20.00	20.00	-	105.00	40.00	-	0.80	4	670201	160.82
20.00	20.00	-	105.00	40.00	-	1.00	4	670202	160.82
20.00	20.00	-	105.00	40.00	-	1.20	4	670203	160.82
20.00	20.00	-	105.00	40.00	-	1.50	4	670204	160.82
20.00	20.00	-	105.00	40.00	-	2.00	4	670205	160.82
20.00	20.00	-	105.00	40.00	-	2.50	4	670206	160.82
20.00	20.00	-	105.00	40.00	-	3.00	4	670207	160.82
20.00	20.00	-	105.00	40.00	-	4.00	4	670208	160.82
20.00	20.00	-	105.00	40.00	-	5.00	4	670209	160.82

See pages 58 and 60 for cutting data



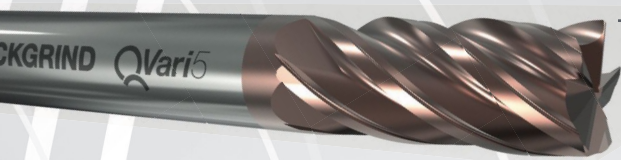
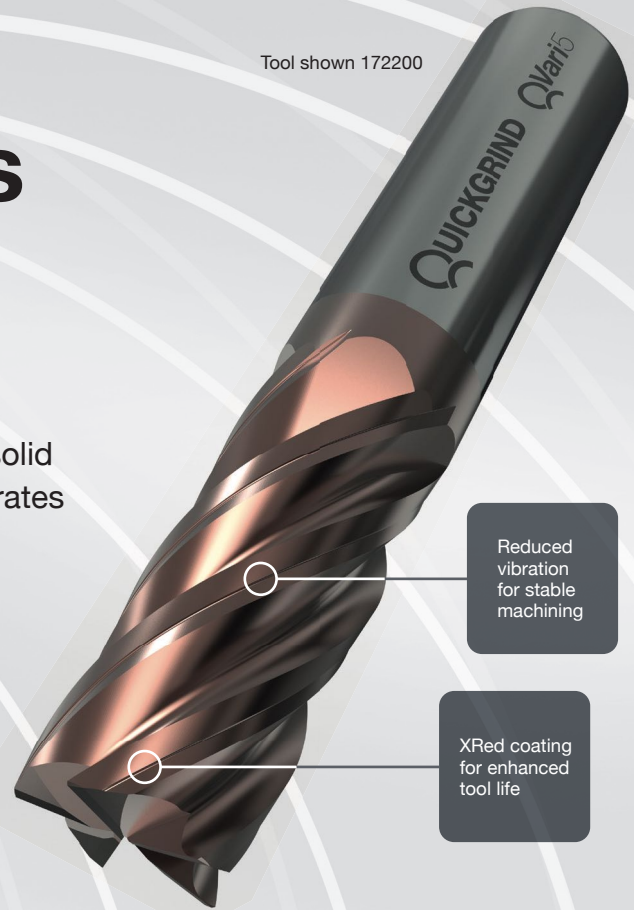
QVari-5 QVari-5CR
High Performance End Mills

Tool shown 172200

High feed rates with reduced vibration

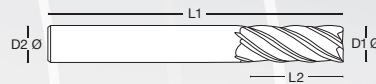
QVari-5 is a high performance 5 flute variable solid carbide end mill designed to enable high feed rates with reduced vibration for stable machining. QVari-5CR is our optional corner radii cutter.

The XRed coating enhances tool life and makes this tool very suitable for steels, stainless steel, titanium and super alloys. QVari-5 is an excellent tool for applying trochoidal machining strategies.



Tool shown 172100

Square corner shown – QVari-5CR features corner radii (see table below)



QVari-5 & QVari-5CR 5 flute variable end mill for stainless/HRSA

D1 Ø mm	D2 Ø mm	L1 mm	L2 mm	Chamfer x 45°	R mm	Teeth Z	Stock code	List £
6.00	6.00	58.00	13.00	0.08	-	5	172060	29.53
6.00	6.00	58.00	13.00	-	0.50	5	172061	29.53
6.00	8.00	58.00	13.00	-	1.00	5	172062	29.53
8.00	8.00	64.00	20.00	0.10	-	5	172080	42.11
8.00	8.00	64.00	20.00	-	0.50	5	172081	42.11
8.00	8.00	64.00	20.00	-	1.00	5	172082	42.11
10.00	10.00	73.00	22.00	0.15	-	5	172100	53.46
10.00	10.00	73.00	22.00	-	0.50	5	172101	53.46
10.00	10.00	73.00	22.00	-	1.00	5	172102	53.46
12.00	12.00	84.00	28.00	0.15	-	5	172120	71.23
12.00	12.00	84.00	28.00	-	0.50	5	172121	71.23
12.00	12.00	84.00	28.00	-	1.00	5	172122	71.23
16.00	16.00	93.00	34.00	0.20	-	5	172160	108.31
16.00	16.00	93.00	34.00	-	0.50	5	172161	108.31
16.00	16.00	93.00	34.00	-	1.00	5	172162	108.31
20.00	20.00	105.00	45.00	0.20	-	5	172200	164.38

See pages 58 and 60 for cutting data



Tool shown 788160

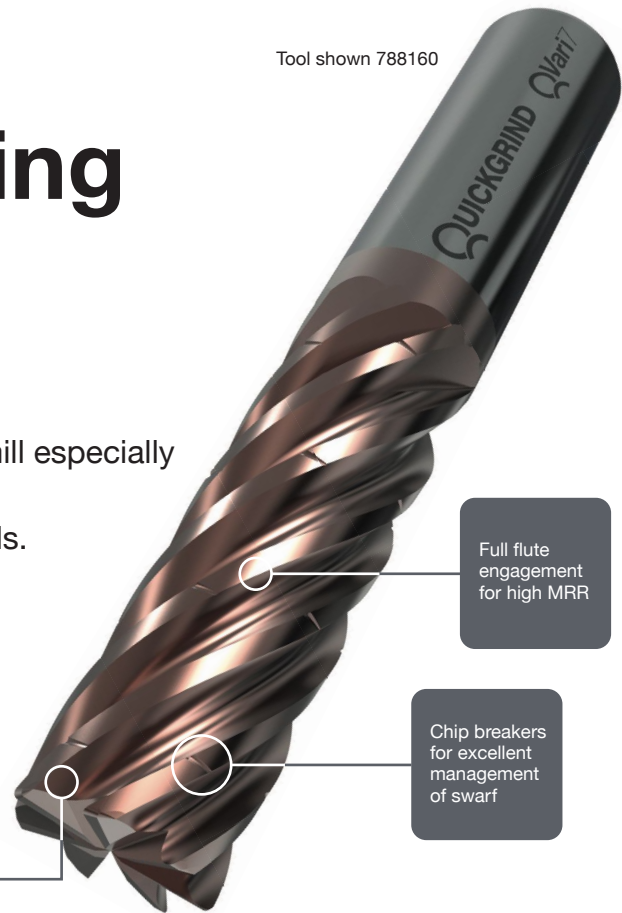
Trochoidal milling

with high MRR

QVari-7 is a high performance multi-flute end mill especially suited for trochoidal milling in stainless steels, PH-stainless, titanium and other HRSA materials.

High feed rates with low width of cut and full flute engagement results in high MRR. With high core strength this tool provides highly stable cutting in many applications.

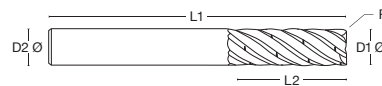
QVari-7 comes with chip breakers as standard for excellent swarf management.



XRed coating for improved tool life, chip flow and wear resistance

Full flute engagement for high MRR

Chip breakers for excellent management of swarf



QVari-7 7 flute variable end mill for stainless/HRSA

D1 Ø mm	D2 Ø mm	L1 mm	L2 mm	R mm	Teeth Z	Stock code	List £
6.00	6.00	58.00	18.00	0.50	7	788060	44.03
8.00	8.00	64.00	24.00	0.50	7	788080	52.59
10.00	10.00	73.00	30.00	0.50	7	788100	70.26
10.00	10.00	73.00	30.00	1.00	7	788105	70.26
12.00	12.00	84.00	36.00	0.50	7	788120	109.46
12.00	12.00	84.00	36.00	1.00	7	788125	109.46
16.00	16.00	93.00	48.00	0.50	7	788160	178.56
16.00	16.00	93.00	48.00	1.00	7	788165	178.56

See pages 58 and 60 for cutting data



Tool shown 788080

Core strength for highly stable cutting



High feed

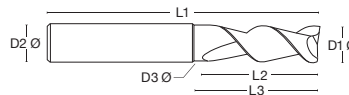
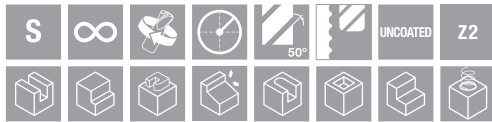
with excellent finish

The Alligator Duo 2 flute end mill is designed for machining a wide range of non-ferrous materials such as aluminium alloys.

A well-proven, tried and tested design it has been used for many years on a huge range of components from aerospace and motorsport to mould and die parts.

The flute design and end geometry allow for high speed and feed rates with excellent chip clearance and high material removal rates.

Alligator Duo is especially suitable for roughing strategies and with its sharp corner geometry and no corner breaks is very useful when machining square corners in manufactured parts.



Alligator Duo 2 flute end mill for aluminium

D1 Ø mm	D2 Ø mm	D3 Ø mm	L1 mm	L2 mm	L3 mm	Square corner	Teeth Z	Stock code	List £
3.00	6.00	2.80	58.00	12.00	20.00	Yes	2	198405	22.23
4.00	6.00	3.80	58.00	12.00	20.00	Yes	2	198408	22.23
5.00	6.00	4.80	58.00	18.00	24.00	Yes	2	198411	22.23
6.00	6.00	5.80	58.00	18.00	30.00	Yes	2	198414	22.23
8.00	8.00	7.80	64.00	18.00	30.00	Yes	2	198474	33.38
10.00	10.00	9.80	73.00	22.00	35.00	Yes	2	198480	47.41
12.00	12.00	11.80	84.00	26.00	45.00	Yes	2	198477	64.12
16.00	16.00	15.80	93.00	32.00	50.00	Yes	2	198486	99.44
20.00	20.00	19.80	105.00	38.00	55.00	Yes	2	198484	157.08


See page 64 for cutting data



Tool shown 198474

End geometry allows for high speeds and feeds



 **ALLIGATOR DUO** Ball Nose
High Performance Ball nose End Mills

Tool shown 298480

The ball nose with bite

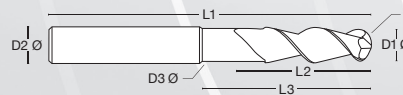
The Alligator Duo 2 flute ball nose is part of our successful Alligator end mill range and offers exceptional performance in non-ferrous materials including aluminium and aluminium alloys.

Copy milling, contour milling and profile milling are all strategies where this tool excels, providing a high degree of swarf removal and resistance to tool wear.

Our standard uncoated Duo ball nose comes in 6.00 to 16.00mm diameter and up to 93.00mm overall length and is ideal for most applications.



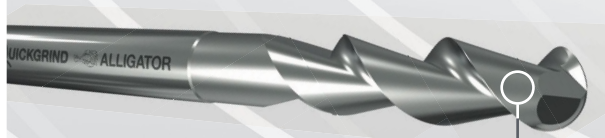
Neck relieved to overcome reach issues



Alligator Duo 2 flute ball nose for aluminium

D1 Ø mm	D2 Ø mm	D3 Ø mm	L1 mm	L2 mm	L3 mm	R mm	Teeth Z	Stock code	List £
6.00	6.00	5.80	58.00	18.00	30.00	3.00	2	298415	30.07
8.00	8.00	7.80	64.00	18.00	30.00	4.00	2	298475	44.67
10.00	10.00	9.80	73.00	22.00	35.00	5.00	2	298481	67.30
12.00	12.00	11.80	84.00	26.00	45.00	6.00	2	298479	84.23
16.00	16.00	15.80	93.00	32.00	50.00	8.00	2	298480	126.12

See page 64 for cutting data



Tool shown 298415

Uncoated for most applications



Performance enhanced

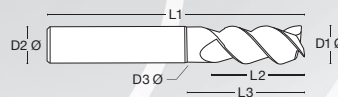
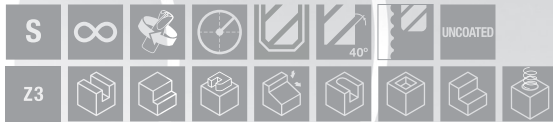
with high material removal rates

The Alligator Trio 3 flute end mill is ideal for high productivity machining of aluminium and other non-ferrous materials. Superior grinding techniques provide high material removal rates and excellent chip evacuation.

It is suitable for HSM, slotting, roughing, finishing, trochoidal milling, profiling in mould and die, aerospace and other applications.



Superior primary relief grinding



Alligator Trio 3 flute end mill for aluminium

D1 Ø mm	D2 Ø mm	D3 Ø mm	L1 mm	L2 mm	L3 mm	Chamfer x 45°	Teeth Z	Stock code	List £
3.00	6.00	2.80	58.00	8.00	16.00	0.05	3	398405	33.31
4.00	6.00	3.80	58.00	11.00	18.00	0.06	3	398408	35.63
5.00	6.00	4.70	58.00	13.00	20.00	0.06	3	398411	41.26
6.00	6.00	5.60	58.00	13.00	20.00	0.08	3	398414	37.19
8.00	8.00	7.50	64.00	19.00	25.00	0.10	3	398421	54.02
10.00	10.00	9.50	73.00	22.00	30.00	0.15	3	398429	71.89
12.00	12.00	11.50	84.00	26.00	36.00	0.15	3	398435	92.09
16.00	16.00	15.50	93.00	32.00	42.00	0.20	3	398444	142.80
20.00	20.00	19.50	105.00	38.00	50.00	0.25	3	398452	212.34

See page 64 for cutting data



Tool shown 398411



High Performance End Mills

Tool shown 698411

The choice

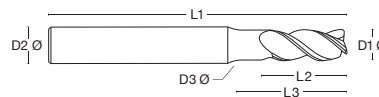
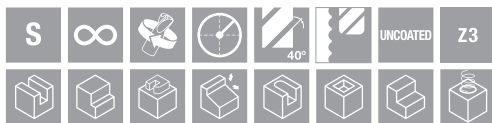
for 6000/7000 series aluminium

The Caiman is fast becoming the preferred tool when machining 6000 and 7000 series aluminium. Roughing and finishing applications at high speeds and feed rates are where this tool really performs.

Combine this with trochoidal milling where 25% + width of cut (a_e) and depth of cuts (a_p) of 2-3 x D are possible, this tool provides high levels of MRR and excellent swarf evacuation resulting in very long tool life.



Tool shown 698405



Caiman 3 flute end mill for 6000/7000 series aluminium

D1 Ø mm	D2 Ø mm	D3 Ø mm	L1 mm	L2 mm	L3 mm	Square corner	Teeth Z	Stock code	List £
3.00	6.00	2.80	58.00	8.00	13.00	Yes	3	698405	31.21
4.00	6.00	3.80	58.00	12.00	18.00	Yes	3	698406	33.90
5.00	6.00	4.70	58.00	14.00	20.00	Yes	3	698407	37.90
6.00	6.00	-	58.00	14.00	-	Yes	3	698408	34.41
8.00	8.00	-	64.00	19.00	-	Yes	3	698409	49.02
10.00	10.00	-	73.00	22.00	-	Yes	3	698410	63.91
12.00	12.00	-	84.00	26.00	-	Yes	3	698411	82.25
16.00	16.00	-	93.00	32.00	-	Yes	3	698412	127.29
20.00	20.00	-	105.00	38.00	-	Yes	3	698413	192.32

See page 64 for cutting data



High Performance End Mills

Tool shown 721160

Balanced 3 flute

for high speed milling

The QAlu is a high performance 3 flute solid carbide end mill designed with 3 teeth to centre for balanced HSM.

Open gullets within the geometry allow for ramping and plunging at higher feed rates while the TX-R coating and polished flutes enhance performance and finish. QAlu is excellent for roughing and finishing.

Designed with sharp corner geometry QAlu is ideal for machining square corners in manufactured parts, and the corner radius makes it suitable for aerospace projects.



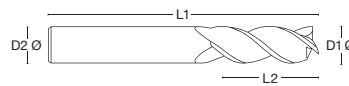
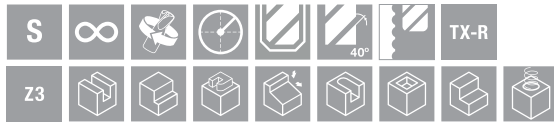
Tool shown 721030



Ramping and plunging at high feeds

- TX-R is a ta-C PVD Arc coating with a thickness of <math><0.5\mu\text{m}</math>
- Hardness HV 0.02 >5000
- Oxidation temperature 500°C
- Coefficient of friction <math><0.1</math>
- Process temperature below 180°C
- Very good, typically class 1 adhesion

Sharp corner edge geometry for clean cutting and finishing



QAlu 3 flute end mill for aluminium alloys and non-ferrous materials

D1 Ø mm	D2 Ø mm	L1 mm	L2 mm	Teeth Z	Stock code	List £
3.00	3.00	50.00	12.00	3	721030	34.33
4.00	4.00	51.00	16.00	3	721040	37.29
5.00	5.00	51.00	20.00	3	721050	41.67
6.00	6.00	58.00	24.00	3	721060	37.85
8.00	8.00	64.00	25.00	3	721080	53.93
10.00	10.00	73.00	27.00	3	721100	70.30
12.00	12.00	84.00	32.00	3	721120	90.48
16.00	16.00	93.00	39.00	3	721160	140.00
20.00	20.00	105.00	42.00	3	721200	211.56

See page 64 for cutting data



QAlu-R

High Performance Roughing End Mills

Tool shown 942120

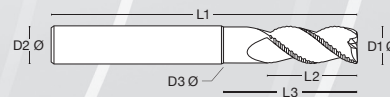
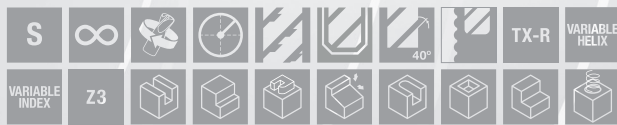
Trochoidal roughing of aluminium

QAlu-R is a high performance aluminium cutter with flat-crested-style geometry for enhanced performance in roughing applications.

QAlu-R can be used in conventional and trochoidal machining strategies with lower power requirements. It has variable index and helix and comes with TX-R coating.



Tool shown 942060



QAlu-R 3 flute roughing end mill for aluminium alloys and non-ferrous materials

D1 Ø mm	D2 Ø mm	D3 Ø mm	L1 mm	L2 mm	L3 mm	Chamfer x 45°	Teeth Z	Stock code	List £
6.00	6.00	5.70	58.00	13.00	23.00	0.10	3	942060	56.19
8.00	8.00	7.70	64.00	18.00	28.00	0.20	3	942080	69.97
10.00	10.00	9.50	73.00	21.00	31.00	0.25	3	942100	87.25
12.00	12.00	11.50	84.00	25.00	35.00	0.30	3	942120	105.99
16.00	16.00	15.30	93.00	32.00	50.00	0.45	3	942160	157.73
20.00	20.00	19.30	105.00	40.00	60.00	0.50	3	942200	232.96

See page 64 for cutting data

A coated 3 flute

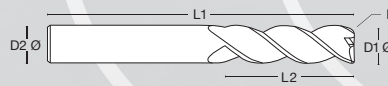
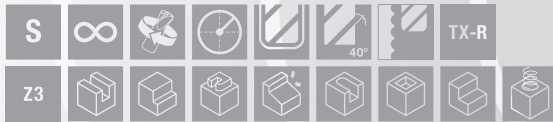
for excellent surface finishes

QAlu-CR is a high performance 3 flute solid carbide end mill with corner radii for machining aluminium and non-ferrous materials. The special 3 flute geometry and TX-R coating enhances tool life and achieves excellent surface finishes.

Tool shown 124121

Force-resistive submicrograin carbide for strength and toughness

Special 3 flute geometry with TX-R coating



Tool shown 124030

TX-R coating for extended tool life

Corner radii for machining aluminium and non-ferrous

Tool shown 124204



QAlu-CR 3 flute roughing end mill for aluminium alloys and non-ferrous materials

D1 Ø mm	D2 Ø mm	L1 mm	L2 mm	R mm	Teeth Z	Stock code	List £
3.00	3.00	50.00	12.00	0.25	3	124030	39.02
3.00	3.00	50.00	12.00	0.50	3	124031	39.02
3.00	3.00	50.00	12.00	0.75	3	124032	39.02
4.00	4.00	51.00	16.00	0.25	3	124040	39.71
4.00	4.00	51.00	16.00	0.50	3	124041	39.71
4.00	4.00	51.00	16.00	0.75	3	124042	39.71
5.00	5.00	51.00	20.00	0.25	3	124050	40.74
5.00	5.00	51.00	20.00	0.50	3	124051	40.74
5.00	5.00	51.00	20.00	0.75	3	124052	40.74
6.00	6.00	58.00	24.00	0.50	3	124060	42.88
6.00	6.00	58.00	24.00	1.00	3	124061	42.88
6.00	6.00	58.00	24.00	1.50	3	124062	42.88
6.00	6.00	58.00	24.00	2.00	3	124063	42.88
8.00	8.00	64.00	25.00	0.50	3	124080	55.27
8.00	8.00	64.00	25.00	1.00	3	124081	55.27
8.00	8.00	64.00	25.00	1.50	3	124082	55.27
8.00	8.00	64.00	25.00	2.00	3	124083	55.27
8.00	8.00	64.00	25.00	3.00	3	124084	55.27
10.00	10.00	73.00	27.00	0.50	3	124100	70.55
10.00	10.00	73.00	27.00	1.00	3	124101	70.55
10.00	10.00	73.00	27.00	1.50	3	124102	70.55
10.00	10.00	73.00	27.00	2.00	3	124103	70.55
10.00	10.00	73.00	27.00	3.00	3	124104	70.55
12.00	12.00	84.00	32.00	0.50	3	124120	90.93
12.00	12.00	84.00	32.00	1.00	3	124121	90.93
12.00	12.00	84.00	32.00	1.50	3	124122	90.93
12.00	12.00	84.00	32.00	2.00	3	124123	90.93
12.00	12.00	84.00	32.00	3.00	3	124124	90.93
16.00	16.00	93.00	39.00	0.50	3	124160	143.77
16.00	16.00	93.00	39.00	1.00	3	124161	143.77
16.00	16.00	93.00	39.00	1.50	3	124162	143.77
16.00	16.00	93.00	39.00	2.00	3	124163	143.77
16.00	16.00	93.00	39.00	3.00	3	124164	143.77
20.00	20.00	105.00	42.00	0.50	3	124200	214.08
20.00	20.00	105.00	42.00	1.00	3	124201	214.08
20.00	20.00	105.00	42.00	1.50	3	124202	214.08
20.00	20.00	105.00	42.00	2.00	3	124203	214.08
20.00	20.00	105.00	42.00	3.00	3	124204	214.08

[See page 64 for cutting data](#)



High Technology Lollipop Cutters

A new standard for complex components

Our Orbis high technology lollipop cutters are designed for multiple applications in virtually all materials from aluminium to peek, stainless steel to titanium and more.

Lollipop tools are often only used for undercuts and de-burring. Orbis, with its new CXPlus coating, is setting new standards of unrivalled high performance and surface finish in applications and component features that have previously caused many issues.

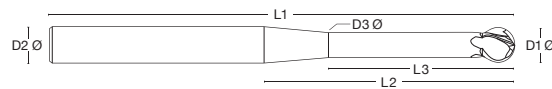


Tool shown 866083

Force-resistive submicrograin carbide for strength and toughness

Tapered neck and radial runout options for clearance and strength

Up to 270° plus spherical cutting



Tool shown 866033

Spherical cutting in all directions

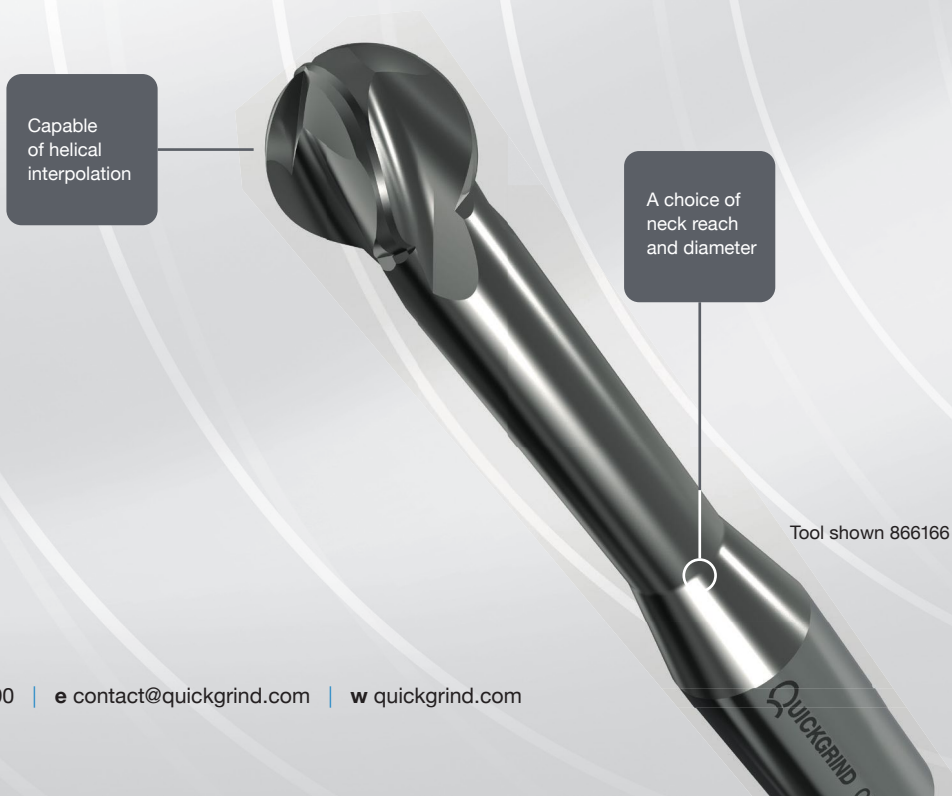
- Applications and features**
- Spherical cutting in all directions
 - Options of neck reach and diameter
 - High speed cutting
 - Machine manifolds and ports
 - Helical interpolation
 - Milling of complex thin walled components
 - Machining contour shapes
 - CXPlus coating for long life and the optimum cutting edge



Orbis 4 flute lollipop cutters for mixed materials

D1 Ø mm	D2 Ø mm	D3 Ø mm	L1 mm	L2 mm	L3 mm	Spherical head °	Teeth Z	Stock code	List £
2.00	6.00	1.30	80.00	30.00	6.00	270°	4	866020	105.72
2.00	6.00	1.30	80.00	36.00	10.00	270°	4	866023	105.72
2.00	6.00	1.30	80.00	42.00	16.00	270°	4	866026	105.72
3.00	6.00	2.00	80.00	30.00	9.00	270°	4	866030	105.72
3.00	6.00	2.00	80.00	36.00	15.00	270°	4	866033	105.72
3.00	6.00	2.00	80.00	42.00	21.00	270°	4	866036	105.72
4.00	6.00	2.70	80.00	30.00	12.00	270°	4	866040	105.72
4.00	6.00	2.70	80.00	36.00	20.00	270°	4	866043	105.72
4.00	6.00	2.70	100.00	42.00	32.00	270°	4	866046	105.72
6.00	6.00	4.00	80.00	28.00	18.00	270°	4	866060	105.72
6.00	6.00	4.00	80.00	40.00	30.00	270°	4	866063	105.72
6.00	6.00	4.00	100.00	44.00	32.00	270°	4	866066	105.72
8.00	8.00	5.40	100.00	38.00	24.00	270°	4	866080	135.92
8.00	8.00	5.40	100.00	54.00	40.00	270°	4	866083	135.92
8.00	8.00	5.40	100.00	68.00	55.00	270°	4	866086	135.92
10.00	10.00	6.70	100.00	48.00	30.00	270°	4	866100	170.66
10.00	10.00	6.70	100.00	58.00	40.00	270°	4	866103	170.66
10.00	10.00	6.70	100.00	68.00	55.00	270°	4	866106	170.66
12.00	12.00	8.00	100.00	58.00	36.00	270°	4	866120	207.66
12.00	12.00	8.00	100.00	68.00	55.00	270°	4	866126	207.66
16.00	16.00	10.70	100.00	54.00	48.00	270°	4	866160	243.15
16.00	16.00	10.70	100.00	68.00	55.00	270°	4	866166	243.15

See page 58 for cutting data



Tool shown 866166



Reduces cycle times by up to **90%**

Two tools in one

Our Eliminator conical barrel tools are revolutionising finishing and semi-finishing strategies on a wide range of components from motor racing to mould and die, and aerospace to medical, including turbine blades and blisks.

Highly efficient at finishing and semi-finishing the conical geometry is ideal for profiling flanks, steep walls, flat planes and faces with minimal curvature.

In terms of cycle times, the increased ap (step down) and reduced tool path distances can save you up to 90% on machining times.

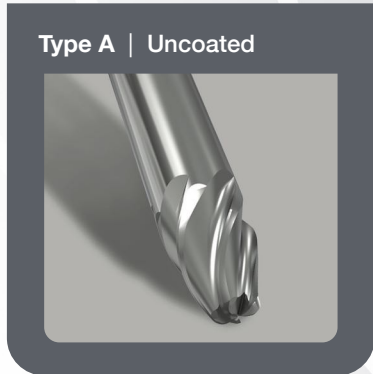
Smaller cusp (scallop) heights lead to a low Ra finish and reduced effects of thermal deformation (heat transfer) give you longer tool life.



Tool shown 307208

Geometry designed for both side and ball nose cutting

A choice of coatings for a wide range of materials



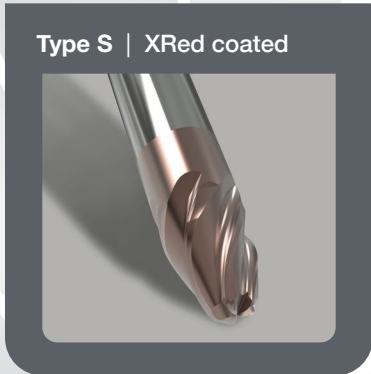
Type A | Uncoated

Non-ferrous N	
Aluminium 6061/6082	Die-cast aluminium 10% Si



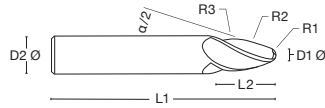
Type D | MX coated

Steels P	
Low alloy 1000/1100/1300	Medium alloy 200/252/300
Tool steels H13/P20/D2	High strength 420/5120
Cast iron K	
Grey cast iron	SG iron
Hardened materials H	
Hardened steels 45-55Hrc	



Type S | XRed coated

Stainless M	
Precipitation 13-8/15-5 17-4PH	Austenitic 303/304/316L
Martensitic 403/410/416	
High temp alloys S	
Inconel Hastelloy Incoloy	Titanium alloys Ti6AL4V Ti5Al-5V-5Mo



Eliminator conical barrel tool

D1 Ø mm	D2 Ø mm	L1 mm	L2 mm	R1 mm	R2 mm	R3 mm	Teeth Z	α/2	Type	Stock code	List £
2.00	6.00	58.00	8.50	1.00	250	2.00	3	20.00	A	852503	116.95
2.00	6.00	58.00	8.50	1.00	250	2.00	3	20.00	D	862503	122.81
2.00	6.00	58.00	8.50	1.00	250	2.00	3	20.00	S	872503	122.81
3.00	8.00	64.00	10.50	1.50	250	4.00	3	20.00	A	197202	132.98
3.00	8.00	64.00	14.50	1.50	1000	4.00	3	12.50	A	797202	132.98
3.00	8.00	64.00	10.50	1.50	250	4.00	3	20.00	D	207202	139.61
3.00	8.00	64.00	14.50	1.50	1000	4.00	3	12.50	D	897202	139.61
3.00	8.00	64.00	10.50	1.50	250	4.00	3	20.00	S	307202	139.61
3.00	8.00	64.00	14.50	1.50	1000	4.00	3	12.50	S	997202	139.61
4.00	10.00	73.00	12.50	2.00	250	5.00	3	20.00	A	197203	147.75
4.00	10.00	73.00	16.50	2.00	1000	5.00	3	12.50	A	797203	147.75
4.00	10.00	73.00	12.50	2.00	250	5.00	3	20.00	D	207203	155.12
4.00	10.00	73.00	16.50	2.00	1000	5.00	3	12.50	D	897203	155.12
4.00	10.00	73.00	12.50	2.00	250	5.00	3	20.00	S	307203	155.12
4.00	10.00	73.00	16.50	2.00	1000	5.00	3	12.50	S	997203	155.12
6.00	12.00	84.00	13.50	3.00	250	6.00	3	20.00	A	197204	166.20
6.00	12.00	84.00	19.50	3.00	1000	6.00	3	12.50	A	797204	166.20
6.00	12.00	84.00	13.50	3.00	250	6.00	3	20.00	D	207204	174.52
6.00	12.00	84.00	19.50	3.00	1000	6.00	3	12.50	D	897204	174.52
6.00	12.00	84.00	13.50	3.00	250	6.00	3	20.00	S	307204	174.52
6.00	12.00	84.00	19.50	3.00	1000	6.00	3	12.50	S	997204	174.52
8.00	16.00	93.00	18.50	4.00	500	8.00	3	20.00	A	197205	203.13
8.00	16.00	93.00	18.50	4.00	500	8.00	3	20.00	D	207205	213.30
8.00	16.00	93.00	18.50	4.00	500	8.00	3	20.00	S	307205	213.30
8.00	16.00	93.00	18.50	4.00	1500	8.00	3	20.00	A	197208	203.13
8.00	16.00	93.00	18.50	4.00	1500	8.00	3	20.00	D	207208	213.30
8.00	16.00	93.00	18.50	4.00	1500	8.00	3	20.00	S	307208	213.30

See page 62 for cutting data

Transforming finishing strategies

Like its conical cousin our tangential barrel tool is designed to replace scanning with a ball nose or corner radius end mill (see opposite page). Cutting on the flank allows speeds to be maintained over the feature.

The tangential geometry provides what is effectively a two-in-one tool, giving you both side and ball nose cutting. Finishing and semi-finishing performance is excellent as are flank profiling operations and machining steep walls, flat planes and faces with minimal curvature.

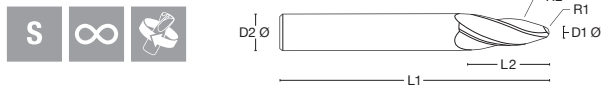
With the correct CAM cycles tangential barrel tools are capable of optimised tool paths and strategies, accessing areas the conical cannot. We use OPEN MIND *hyperMILL*® in-house as our CAM provider. See page 48 for more information.

Eliminator barrel tools are suitable for sharpening and recoating multiple times with our QuickEdge programme (see page 49), increasing your profitability while at the same time reducing your carbon footprint.



Tool shown 260012

High temp alloys S		Stainless M		
Inconel Hastelloy Incoloy	Titanium alloys Ti6AL4V Ti5Al-5V-5Mo	Precipitation 13-8/15-5 17-4PH	Austenitic 303/304/316L	Martensitic 403/410/416



Eliminator tangential barrel tool

D1 Ø mm	D2 Ø mm	L1 mm	L2 mm	R1 mm	R2 mm	Teeth Z	Geometry	Stock code	List £
1.00	6.00	58.00	22.00	0.50	95	3	S	230060	122.81
1.00	8.00	64.00	25.00	0.50	90	3	S	230080	139.61
2.00	10.00	73.00	26.00	1.00	85	3	S	230010	155.12
2.00	12.00	84.00	28.00	1.00	80	3	S	230012	174.52
3.00	16.00	93.00	31.00	1.50	75	3	S	230016	213.30
4.00	10.00	73.00	26.00	2.00	85	6	S	260010	155.12
4.00	12.00	84.00	28.00	2.00	80	6	S	260012	174.52
6.00	16.00	93.00	31.00	3.00	75	6	S	260016	213.30

See page 62 for cutting data

Effective radius R_w

Respective step down a_p (arc segments)

Radius r

Eliminator versus ballnose

Eliminator's large radius of curvature (R_w) gives an increased contact area making it possible to realise larger step down distances without any detrimental impact on the theoretical scallop height.

The result is highly accurate surfaces with excellent characteristics and finishes that can eliminate the need for polishing and other time consuming finishing techniques.

Winning in hardened steels

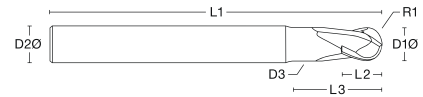
Our new Warrior 2 flute ball nose has been honed through experience by our R&D experts. The recipe of submicrograin solid carbide substrate and specially developed coating deliver excellent tool life in hardened tool steels and Inconels.

Reduced cycle times



Taper and neck relief versions available

New multi-layer XTF coating (see page 55)



NEW Warrior 2 flute ball nose end mill for hardened steels

D1 Ø mm	D2 Ø mm	D3 Ø mm	L1 mm	L2 mm	L3 mm	R mm	Teeth Z	Stock code	List £
2.00	3.00	1.90	50.00	2.00	10.00	1.00	2	210020	74.18
2.00	4.00	1.90	40.00	2.00	4.00	1.00	2	210021	65.44
2.00	6.00	1.90	60.00	2.00	4.00	1.00	2	210022	81.50
2.00	6.00	1.90	80.00	2.00	20.00	1.00	2	210023	84.64
2.00	6.00	1.90	80.00	2.00	35.00	1.00	2	210024	86.34
2.50	6.00	2.40	60.00	2.50	5.00	1.25	2	210025	81.50
3.00	3.00	-	50.00	3.00	-	1.50	2	210030	74.18
3.00	4.00	2.80	40.00	3.00	6.00	1.50	2	210031	65.44
3.00	6.00	2.80	60.00	3.00	6.00	1.50	2	210032	81.50
3.00	6.00	2.80	80.00	3.00	20.00	1.50	2	210033	84.64
3.00	6.00	2.80	80.00	3.00	40.00	1.50	2	210034	86.34
3.50	6.00	3.20	65.00	3.50	7.00	1.75	2	210035	89.96
4.00	4.00	-	40.00	4.00	-	2.00	2	210040	65.44
4.00	4.00	-	60.00	4.00	-	2.00	2	210041	80.08
4.00	6.00	3.70	65.00	4.00	8.00	2.00	2	210042	89.96
4.00	6.00	3.70	80.00	4.00	20.00	2.00	2	210043	96.88
4.00	6.00	3.70	80.00	4.00	52.00	2.00	2	210044	97.84
5.00	5.00	-	60.00	5.00	-	2.50	2	210050	80.08
5.00	6.00	4.60	50.00	5.00	10.00	2.50	2	210051	75.42
5.00	6.00	4.60	65.00	5.00	10.00	2.50	2	210052	89.96
5.00	6.00	4.60	100.00	5.00	50.00	2.50	2	210053	103.54
5.00	8.00	4.60	100.00	5.00	56.00	2.50	2	210054	105.43
6.00	6.00	-	50.00	6.00	-	3.00	2	210060	84.91
6.00	6.00	-	75.00	6.00	-	3.00	2	210061	87.96
6.00	6.00	-	100.00	6.00	-	3.00	2	210062	138.68
6.00	8.00	5.60	75.00	6.00	12.00	3.00	2	210063	89.96
6.00	8.00	5.60	100.00	6.00	56.00	3.00	2	210064	140.58
6.00	10.00	5.60	125.00	6.00	62.00	3.00	2	210065	183.32
8.00	8.00	-	65.00	8.00	-	4.00	2	210080	108.28
8.00	8.00	-	110.00	8.00	-	4.00	2	210081	170.97
8.00	8.00	7.40	75.00	8.00	16.00	4.00	2	210082	113.98
8.00	10.00	7.40	125.00	8.00	62.00	4.00	2	210083	183.32
8.00	12.00	7.40	150.00	8.00	67.00	4.00	2	210084	243.16
10.00	10.00	-	65.00	10.00	-	5.00	2	210100	129.18
10.00	10.00	-	125.00	10.00	-	5.00	2	210101	214.67
10.00	10.00	9.40	80.00	10.00	20.00	5.00	2	210102	133.92
10.00	12.00	9.40	125.00	10.00	61.00	5.00	2	210103	224.17
10.00	12.00	9.40	150.00	10.00	79.00	5.00	2	210104	254.55
12.00	12.00	-	125.00	12.00	-	6.00	2	210120	242.21
12.00	12.00	11.40	90.00	12.00	24.00	6.00	2	210121	186.17

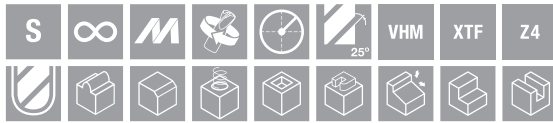
See page 59 for cutting data

NEW SAMURAI

High Performance Ball Nose End Mills

Killer performance

When the application demands four flutes, our exciting new Samurai is more than a match for those demanding situations. Superior submicrograin solid carbide and newly developed coating results in excellent tool life in the most complex components.



Superior submicrograin solid carbide

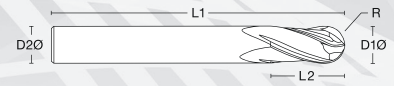
Multiflute options available



New multi-layer XTF coating



NEW Samurai 4 flute ball nose end mill for hardened steels



D1 Ø mm	D2 Ø mm	L1 mm	L2 mm	R mm	Teeth mm	Stock code	List £
1.00	6.00	50.00	3.00	0.50	4	320010	67.26
1.00	6.00	58.00	3.00	0.50	4	310010	67.26
2.00	6.00	58.00	6.00	1.00	4	320020	70.90
2.00	6.00	60.00	6.00	1.00	4	310020	70.90
3.00	6.00	58.00	8.00	1.50	4	320030	75.66
3.00	6.00	70.00	8.00	1.50	4	310030	75.66
4.00	6.00	58.00	8.00	2.00	4	320040	79.42
4.00	6.00	70.00	8.00	2.00	4	310040	79.42
5.00	6.00	58.00	12.00	2.50	4	320050	84.97
5.00	6.00	80.00	12.00	2.50	4	310050	84.97
6.00	6.00	58.00	12.00	3.00	4	320060	90.04
6.00	6.00	80.00	12.00	3.00	4	310060	90.04
8.00	8.00	64.00	14.00	4.00	4	320080	117.19
8.00	8.00	90.00	14.00	4.00	4	310080	117.19
10.00	10.00	73.00	18.00	5.00	4	320100	149.90
10.00	10.00	100.00	18.00	5.00	4	310100	149.90
12.00	12.00	84.00	22.00	6.00	4	320120	193.26
12.00	12.00	110.00	22.00	6.00	4	310120	193.26

See page 59 for cutting data





High Performance Ball Nose End Mills



Tool shown 495918

A stellar performer

The Zodiac 4 flute ball nose is based on our exceptional Mirage end mill and brings a new dimension to ball nose end milling.

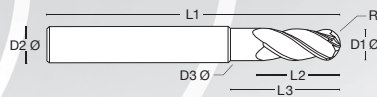
Four flutes provide for highly efficient swarf evacuation and enable high speed and feed machining with great stability. Whether contour milling or profiling this tool excels at roughing, semi-finishing, finishing and super-finishing in a wide range of materials.



XRed coating aids chip flow and resists wear



Tool shown 495915



Zodiac 4 flute ball nose for super alloys, titanium and stainless steel

D1 Ø mm	D2 Ø mm	D3 Ø mm	L1 mm	L2 mm	L3 mm	R mm	Teeth Z	Stock code	List £
3.00	6.00	2.80	58.00	10.00	15.00	1.50	4	495906	44.54
4.00	6.00	3.80	58.00	11.00	16.00	2.00	4	495908	48.04
5.00	6.00	4.70	58.00	13.00	18.00	2.50	4	495914	48.04
6.00	6.00	5.60	58.00	13.00	20.00	3.00	4	495915	42.69
8.00	8.00	7.50	64.00	18.00	27.00	4.00	4	495916	58.82
10.00	10.00	9.50	73.00	22.00	32.00	5.00	4	495917	77.86
12.00	12.00	11.50	84.00	26.00	38.00	6.00	4	495918	104.05
16.00	16.00	15.50	93.00	32.00	44.00	8.00	4	495944	149.76

See page 63 for cutting data



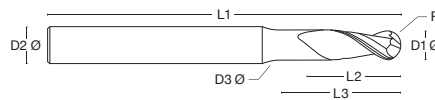
High Performance Ball Nose End Mills

Tool shown 195916

A real winner

This world beating 2 flute ball nose cutter is used to great effect in mould and die, general engineering and on components such as turbine blades.

Whether used with a 90° or 10-15° tilt approach Gladiator is a stable and accurate tool allowing for high speed cutting and machining. It is suitable for roughing, semi-finishing, finishing and super-finishing with profile, copy or contour milling.



Gladiator 2 flute ball nose for steels

D1 Ø mm	D2 Ø mm	D3 Ø mm	L1 mm	L2 mm	L3 mm	R mm	Teeth Z	Stock code	List £
3.00	6.00	2.80	58.00	5.00	14.00	1.50	2	195912	45.04
4.00	6.00	3.80	58.00	8.00	14.00	2.00	2	195913	45.04
5.00	6.00	4.80	58.00	10.00	17.00	2.50	2	195914	45.04
6.00	6.00	-	58.00	12.00	-	3.00	2	195915	45.04
8.00	8.00	-	64.00	16.00	-	4.00	2	195916	53.95
10.00	10.00	-	73.00	20.00	-	5.00	2	195917	75.33
12.00	12.00	-	84.00	25.00	-	6.00	2	195918	100.01

See page 63 for cutting data



Tool shown 195913



High feed, high ROI

This solid carbide coated high feed tool was initially developed with 3 flutes to machine deep pockets for a UK-based Formula 1 team.

As with all our high feed tools the large radii enables excellent stability when roughing at high feed rates. The combination of our unique geometry, small depth of cut and high feed means clients realise a very good return on investment.

In addition, cycle times are reduced resulting in greatly improved production throughput.

Tool shown 196206

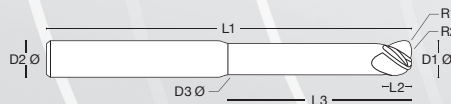


Neck relieved to overcome reach issues

XRed coating to aid chip flow and resist wear



Tool shown 196201



Spectre 3 flute high feed end mill

D1 Ø mm	D2 Ø mm	D3 Ø mm	L1 mm	L2 mm	L3 mm	R1/R2 mm	Teeth Z	Stock code	List £
3.00	6.00	2.75	58.00	1.20	32.00	0.25/2.00	3	196201	57.15
6.00	6.00	5.20	58.00	4.00	26.00	0.50/4.00	3	196202	60.81
6.00	6.00	5.20	80.00	4.00	34.00	0.50/4.00	3	196203	67.73
8.00	8.00	7.00	64.00	6.00	30.00	0.67/5.33	3	196234	82.68
8.00	8.00	7.00	80.00	6.00	40.00	0.67/5.33	3	196204	97.18
10.00	10.00	9.00	80.00	6.00	40.00	1.25/6.75	3	196205	111.75
12.00	12.00	10.40	100.00	8.50	50.00	1.50/8.00	3	196206	136.96
12.00	12.00	10.40	84.00	8.50	30.00	1.50/8.00	3	196216	127.38

See page 61 for cutting data



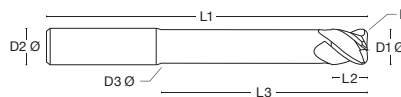
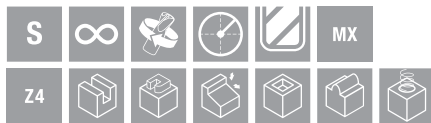
The very best of British

The superior mould and die tool, this state-of-the-art masterpiece produces exceptional results with significant productivity increases and reduced production costs.

Specially designed to reduce vibration under heavy cutting conditions and with high volume metal removal (HV-MRR), Bulldog is ideal for operations such as deep pocketing and slotting in difficult to machine materials without the push-off found with inferior tools.



Tool shown 8HXLLL



Bulldog 4 flute high feed end mill for mould and die steels/hardened steels

D1 Ø mm	D2 Ø mm	D3 Ø mm	L1 mm	L2 mm	L3 mm	R mm	Teeth Z	Stock code	List £
6.00	6.00	5.50	58.00	8.00	20.00	0.50	4	6HX	73.41
6.00	6.00	5.50	66.00	8.00	30.00	0.50	4	6HXL	73.41
8.00	8.00	7.50	64.00	10.00	35.00	1.00	4	8HX	90.50
8.00	8.00	7.50	90.00	10.00	50.00	1.00	4	8HXL	90.50
8.00	8.00	7.50	110.00	10.00	70.00	1.00	4	8HXLLL	90.50
10.00	10.00	9.30	73.00	10.00	35.00	2.00	4	10HX	99.50
10.00	10.00	9.30	90.00	10.00	50.00	2.00	4	10HXL	99.50
10.00	10.00	9.30	100.00	10.00	60.00	2.00	4	10HXLL	99.50
12.00	12.00	11.00	84.00	15.00	50.00	3.00	4	12HX	113.62
12.00	12.00	11.00	100.00	15.00	60.00	3.00	4	12HXL	113.62
12.00	12.00	11.00	125.00	15.00	80.00	3.00	4	12HXLL	113.62
16.00	16.00	15.00	100.00	15.00	60.00	3.50	4	16HX	212.97
16.00	16.00	15.00	125.00	15.00	80.00	3.50	4	16HXL	212.97
16.00	16.00	15.00	145.00	15.00	100.00	3.50	4	16HXLL	212.97

See page 62 for cutting data



High Performance High Feed End Mills

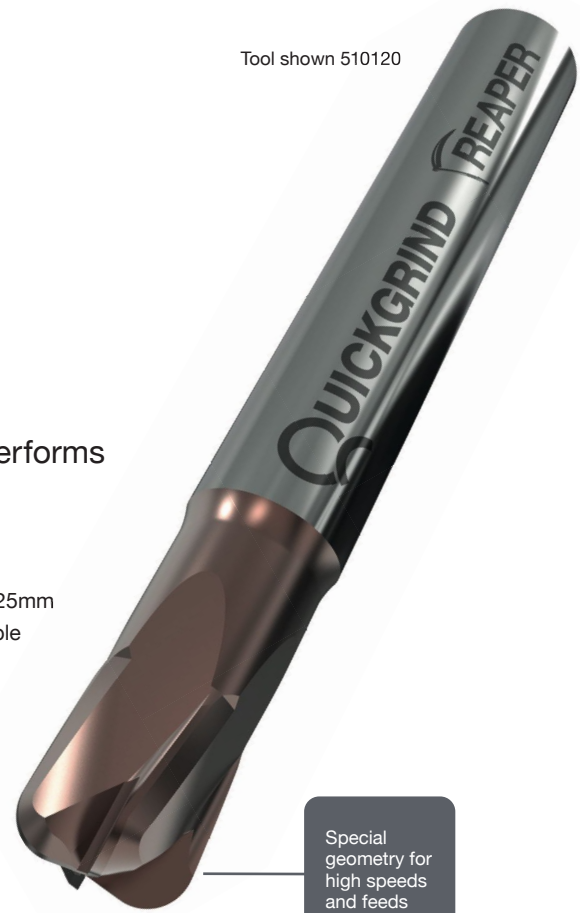
Tool shown 510120

High feed for hardened steels

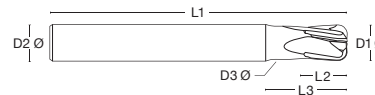
Available in sizes from 6.00 to 12.00mm this tool performs extremely well in hardened steels such as H13 and D2 $\geq 45\text{Hrc}$.

A highly efficient roughing tool for producing pockets and cavities up to 1"/25mm deep, Reaper's 4 flutes and specially designed end geometry make it suitable for running at high speed and feed, taking shallow depths of cut.

The corner radii enable excellent chip thinning with rapid chip removal and long tool life. Reaper's end design also makes it suitable for flat bottom finishing.



Special geometry for high speeds and feeds



Reaper 4 flute high feed end mill for steel/hardened steel

D1 Ø mm	D2 Ø mm	D3 Ø mm	L1 mm	L2 mm	L3 mm	R mm	Teeth Z	Stock code	List £
6.00	6.00	5.40	58.00	6.00	12.00	1.50	4	510060	83.44
8.00	8.00	7.50	64.00	8.00	16.00	2.00	4	510080	103.07
10.00	10.00	9.50	73.00	10.00	20.00	2.00	4	510100	137.43
12.00	12.00	11.05	84.00	12.00	24.00	3.00	4	510120	172.77

See page 62 for cutting data



Tool shown 510060



REAPER-LS

High Performance High Feed End Mills

Tool shown 530120

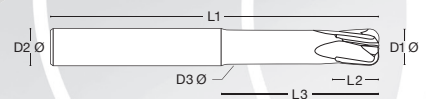
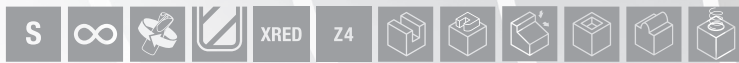
Longer reach for improved access

The same specification as the standard length version, Reaper-LS (Long Series) is available from 66mm to 100mm overall.



Tool shown 530060

End design for flat bottom finishing



Reaper-LS 4 flute high feed end mill for steel/hardened steel

D1 Ø mm	D2 Ø mm	D3 Ø mm	L1 mm	L2 mm	L3 mm	R mm	Teeth Z	Stock code	List £
6.00	6.00	5.40	66.00	6.00	24.00	1.50	4	530060	93.26
8.00	8.00	7.50	70.00	8.00	32.00	2.00	4	530080	114.85
10.00	10.00	9.50	85.00	10.00	40.00	2.00	4	530100	155.10
12.00	12.00	11.05	100.00	12.00	48.00	3.00	4	530120	193.39

See page 62 for cutting data



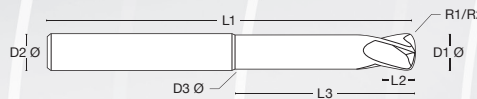
Tool shown 196306

Four flutes, extended life

Phantom is a 4 flute that performs like a 16 flute. A development of our Spectre the Phantom is a lens type tool that has been designed to be remanufactured many times using our QuickEdge process (see page 49).

Phantoms achieve 5-6x tool life over normal end mills in roughing operations and have become firm favourites in motorsport and aerospace, where they are used to machine titanium and stainless steel.

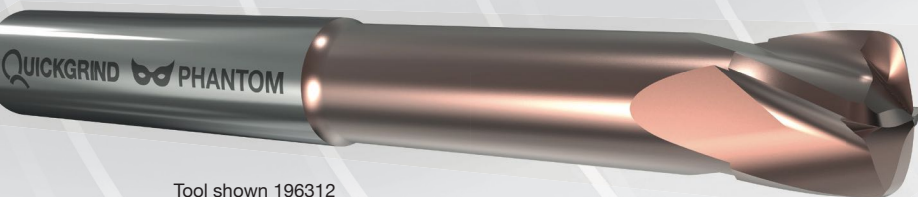
A relatively small depth of cut at high feed delivers great advantages to engineers and programmers.



Phantom 4 flute high feed lens tool

D1 Ø mm	D2 Ø mm	D3 Ø mm	L1 mm	L2 mm	L3 mm	R1/R2 mm	Teeth Z	Stock code	List £
6.00	6.00	5.75	58.00	6.00	24.00	1.20/9.00	4	196360	78.03
8.00	8.00	7.50	64.00	8.00	26.00	1.60/12.00	4	196380	97.16
10.00	10.00	9.50	73.00	10.00	30.00	2.00/15.00	4	196301	129.38
12.00	12.00	11.00	84.00	6.00	50.00	2.00/20.00	4	196312	161.43
16.00	16.00	15.00	93.00	8.00	50.00	2.50/25.00	4	196306	213.28
20.00	20.00	19.00	105.00	20.00	50.00	3.00/32.00	4	196320	327.61

See page 61 for cutting data



Tool shown 196312



DEMON
High Performance End Mills

The strong finisher

The Demon multiflute end mill will provide you with unrivalled high performance.

Designed for super-fine finishing applications in a wide range of components and materials, our unique geometry is the precise recipe to ensure highly accurate machining of any surface requiring a superb finish.

Ideal for profile milling in steels, hardened steels and exotics, Demon's higher speeds and feeds rates deliver increased productivity and high material removal rates.

Force-resistant submicrograin carbide for strength and toughness

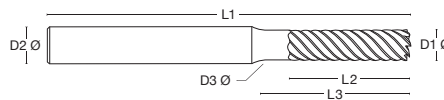
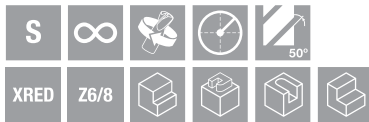
Multiflute count provides high core strength



Tool shown 9286D16



Tool shown 9286D5



Demon 8 flute end mill for finishing operations

D1 Ø mm	D2 Ø mm	D3 Ø mm	L1 mm	L2 mm	L3 mm	Square corner	Teeth Z	Stock code	List £
3.00	6.00	2.95	58.00	5.00	10.00	Yes	6	9286D3	75.01
4.00	6.00	3.95	58.00	8.00	13.50	Yes	6	9286D4	75.01
5.00	6.00	4.95	58.00	10.00	15.00	Yes	6	9286D5	75.01
6.00	6.00	-	58.00	12.00	-	Yes	6	9286D6	70.75
8.00	8.00	-	64.00	20.00	-	Yes	8	9286D8	91.88
10.00	10.00	-	73.00	25.00	-	Yes	8	9286D10	121.11
12.00	12.00	-	84.00	30.00	-	Yes	8	9286D12	153.91
16.00	16.00	-	93.00	40.00	-	Yes	8	9286D16	255.19

See page 58 for cutting data

Machining strategies

and cutting tool optimisation

Do you have a component that is taking too long to manufacture? Are you struggling to find the time and resources to investigate advanced machining and cutting tool strategies that could easily double your output? Yes? Then you need to put QuickCam to the test.

QuickCam is the advanced service from Quickgrind designed to support you with the machining of complex parts in difficult materials.

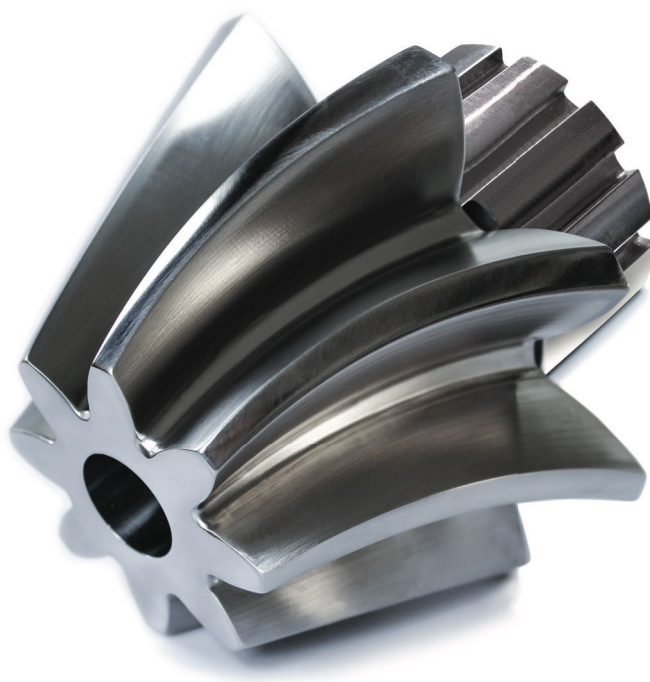
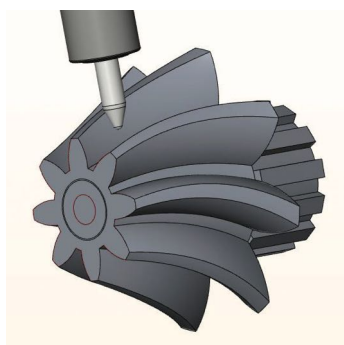
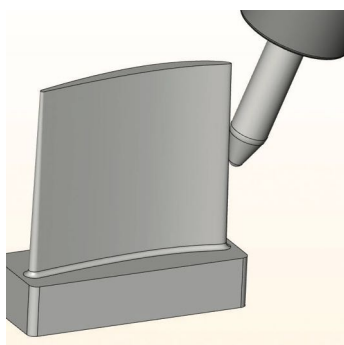
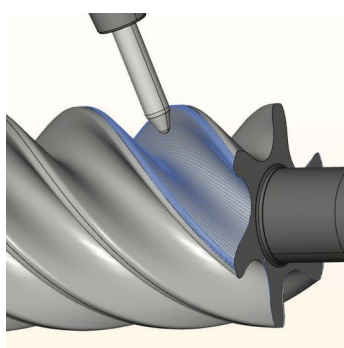
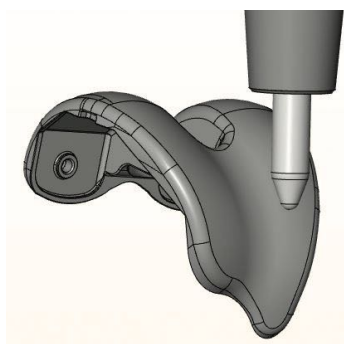
Implementing QuickCam in your business will give you reduced cycle times, leading to reduced tooling costs, increased output and improved capacity.

The bottom line? Improved throughput, more satisfied customers and increased profitability.

Contact us today to arrange
your free initial assessment.

t +44 (0) 1684 294090

e quickcam@quickgrind.com



Benefits

- Reduced cycle time costs
- Reduced tooling costs
- Increased output
- Improved capacity
- Increased profits

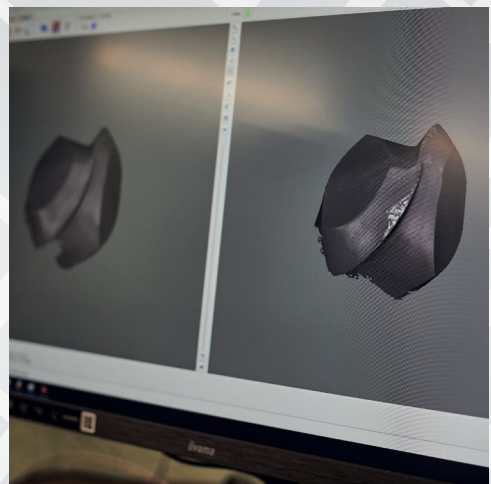
Adding value to your tooling investment

Many of our cutters are suitable for remanufacture. Our unique QuickEdge process can give you up to nine times extra usage out of your tooling, and with material (and environmental) costs increasing, the benefits of remanufacture are clear.

- Tools controlled by size, number of reissues and remanufactures
- Extremely attractive price and performance over the life of the tool
- Reduces the need for virgin raw material, a limited resource

Remanufacture doesn't mean compromising on quality. It has always been our policy to produce tools of such high quality that they can be used more than once. Which means that even after nine remanufactures you will continue to enjoy new tool performance, and a clear conscience.

Ask
about our
introductory
offer today



24/7 control of your tooling inventory



Compact table top vending machine with 24 locations equipped with a range of our solid carbide tools

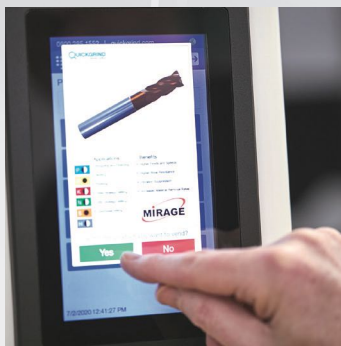
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Is your tooling inventory reduced to a minimum? Is it secure?
Are your re-stocking orders generated automatically and on time?
Do you want to reduce your tool purchase administration costs?

Quickgrind's robust, proven tool vending solutions are the answer to all these issues and more. Once we have audited your tooling requirements and consumption levels, we will supply you with a fully stocked machine (our machines can hold from 300 to 1,680+ individual tools). Usage and stock levels are then automatically monitored and replacement tools sent before your stock runs out.

And because your tooling inventory and usage levels are pre-determined, you regain complete control of your purchase administration time, and costs – to as little as one purchase order and one invoice per month.

Save time and money. Take control of your tooling with a vending solution from Quickgrind.



Benefits

- 24/7 secure access
- Allows minimum stock holding
- Automatic re-ordering
- User-friendly operation
- Tailor access to specific users and times
- Easy access to stock information and statistics
- Audit your tooling stock at the push of a button
- Suitable for new and remanufactured tools
- Stocks a wide range of tools types and sizes, and for high or low stock turnover
- Reduces purchase administration costs

Improving your machining performance

Quickgrind's state-of-the-art Technical Centre offers a comfortable and technologically advanced environment to discuss all of your cutting tool requirements, challenges and ambitions.

Our experts will work with you to conduct trials whilst generating and running tool paths and machining strategies. Our investment in the Centre enables us to demonstrate what is possible with our ground-breaking tooling and tool management solutions.

The Centre is fully equipped with a seminar theatre and training room, meeting rooms and machining Centres. Visitors can take a guided tour of our production facility, undergo technical training and discuss their specific requirements.



Call us
today to
arrange
your visit



MX

AlTiN Coating

The coating for moderate cutting speeds

MX AlTiN is designed to handle high levels of shear stress and impact fatigue. It can cope with cutting temperatures of up to 850°C.

Crystallite size and internal stress levels are controlled by a selected PVD Arc deposition process.

MX's optimum cutting performance is ensured by its unique composition modulation and stress gradient formula.

Performance is predictable across a wide range of materials including mild steels to tool steels with up to 50Hrc.

Cutting speeds range from 40 to 250 M/min depending on conditions and work piece material.

The coating can be applied to virtually any of our solid carbide tools and will be offered where applicable.



Technical data	
Coating material	AlTiN
Coating thickness	2-4µm
Deposition process	PVD Arc
Hardness HV 0.05	3300
Oxidation temperature	850°C
Coefficient of friction	<0.6
Process temperature	450-500°C
Colour	Blue/black

Cutting speed M/min	40	60	80	100	120	140	160	180	200	220	250	300
Steels up to 700 N/mm ²												
Steels 800-1000 N/mm ²												
Steels >1400 N/mm ²												
Tool steels >45-55Hrc												
Tool steels >55-60Hrc												
Cast iron												
Martensitic stainless steels												
Austenitic stainless steels												
Titanium up to 900 N/mm ²												
Titanium alloys >900 N/mm ²												
Nickel alloys up to 900 N/mm ²												
Nickel alloys >1200 N/mm ²												

Cutting data is subject to application and machining parameters. Please contact our Technical Support team for advice.

XRed

TiSiN Coating

The coating for **challenging conditions**

XRed TiSiN is engineered to withstand temperatures of up to 1100°C at the cutting edge, making it perfect for the machining of hard materials at high speeds and with low or no lubrication.

Its multi-layer coating, with crystalline TiN matrix/Si₃N₄ nano crystallite outer layer, is designed to protect the cutting edge from excess wear, oxidation and heat transfer.

XRed is ideal for machining titanium, stainless steels, super alloys and steels up to 60Hrc. It is very capable in applications such as roughing, trochoidal milling, semi-finishing and finishing where there are high temperatures at the cutting edge.

Quickgrind's high quality grinding and expertise allows for excellent chip formation and evacuation at high speed and feed without fear of damage to the tool or the component.



Technical data

Coating material	TiSiN
Coating thickness	2-4µm
Deposition process	PVD Arc
Hardness HV 0.05	3500
Oxidation temperature	1100°C
Coefficient of friction	<0.4
Process temperature	450-550°C
Colour	Copper

Cutting speed M/min	40	60	80	100	120	140	160	180	200	220	250	300
Steels up to 700 N/mm ²												
Steels 800-1000 N/mm ²												
Steels >1400 N/mm ²												
Tool steels >45-55Hrc												
Tool steels >55-60Hrc												
Cast iron												
Martensitic stainless steels												
Austenitic stainless steels												
Titanium up to 900 N/mm ²												
Titanium alloys >900 N/mm ²												
Nickel alloys up to 900 N/mm ²												
Nickel alloys >1200 N/mm ²												

Cutting data is subject to application and machining parameters. Please contact our Technical Support team for advice.

TX-R

ta-C Coating

A smooth ta-C coating

Our TX-R coating has been developed for the machining of non-ferrous metals, composite structures and plastic materials. With an sp³ content of 60%-70% it reaches a hardness of over 5000HV.

This thin, smooth and extremely hard coating is designed to maintain maximum cutting edge sharpness when machining abrasive materials such as graphite, composite materials with glass or carbon fibre, glass-reinforced PCB materials and high Si content aluminium alloys.

The TX range also excels in cutting soft noble metals like gold, silver and copper as well as lead-containing and lead-free bronzes and brass alloys. Their variable thickness, very low coefficient of friction and anti-stick properties makes them excellent for machining a wide range of plastics and sticky materials where they avoid the build-up of material on the sharp cutting edge.

TX coatings supersede the conventional DLC coatings and are available on almost all of our solid carbide cutting tools.

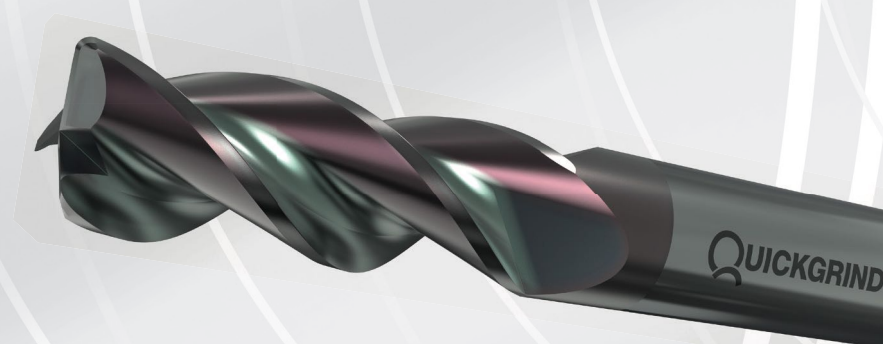
Combined with our special grinding knowledge and techniques TX-R coatings have proven to be a very economical solution for machining difficult materials, reducing the need for expensive PCD inserts and diamond-coated tools.

TX-R coated tools are also suitable for remanufacture and recoating thereby bringing even greater savings.

Technical data

Coating material	ta-C*
Coating thickness	0.5-3µm
Deposition process	PVD Arc
Hardness HV 0.02	>5000
Oxidation temperature	500°C
Coefficient of friction	<0.1
Process temperature	Below 180°C
Adhesion	Very good, typically class 1
Colour	Rainbow

**Tetrahedral amorphous carbon
(also known as diamond-like carbon)*



XTF

AlTiN/TiSiXN Coating

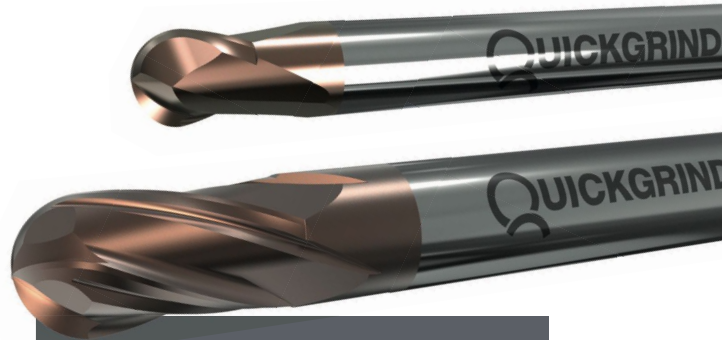
A dual-layer coating for hardened materials

Mould-making, aerospace and 3C (computers, communications and consumer electronics) operations push tooling to the limit when machining titanium, nickel-based alloys, stainless steel and hardened steel.

Quickgrind's new dual-layer XTF coating provides outstanding oxidation resistance, high thermal stability and excellent wear resistance and is the perfect solution for machining these demanding materials.

The AlTiN based layer offers high degree of ductility while the TiSiXN hardened layer resists oxidation and wear.

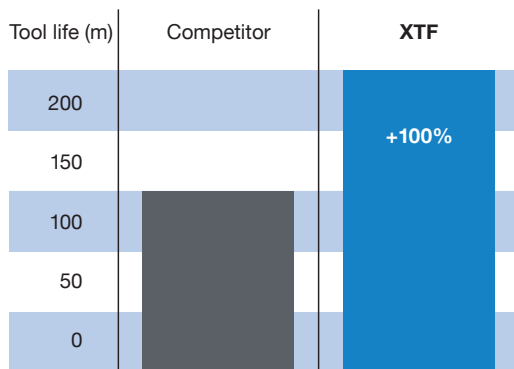
Other benefits include reduced crack formation and improved resistance to chipping, maintenance of high temperatures at the cutting edge and significant reductions in adhesive wear resulting in extended tool life.



Technical data

Coating materials	AlTiN / TiSiXN
Coating hardness HIT	38 +/-5 GPa
Deposition process	Arc
Intrinsic stress	-5 +/-1 GPa
Max service temperature	1100°C
Process temperature	<600°C
Colour	Bronze

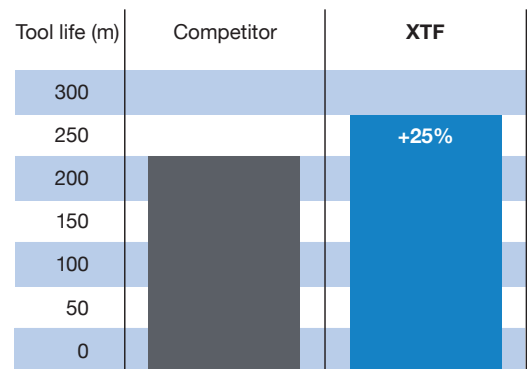
Nickel alloy



16mm Ø end mill / Nickel alloy 2.4650, NiCo20Cr20MoT (UNS N07263, Nimonic® C-263) / V_c 45m/min / f_t 0.09 mm/tooth / a_p 0.50mm
a_e variable

Cutting data is subject to application and machining parameters. Please contact our Technical Support team for advice.

Hardened steel



10mm Ø end mill / Steel 1.2344, X40CrMoV5-1 (AISI H13, JIS SKD61) 45Hrc / V_c 220m/min / f_t 0.10 mm/tooth / a_p 10.00mm / a_e 0.50mm
Wet

Cutting data is subject to application and machining parameters. Please contact our Technical Support team for advice.

CXPlus

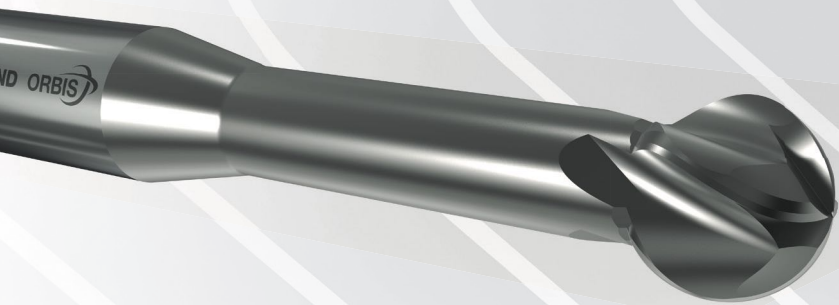
AlCrN Coating

Smoother, harder, **stronger**

CXPlus's AlCrN advanced arc deposition process deposits coatings at far higher energy levels than conventional processes.

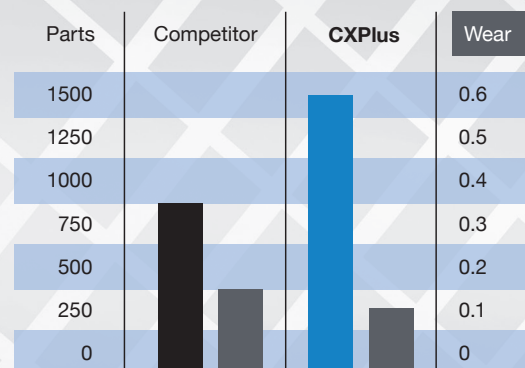
This results in increased density, a higher resistance to wear and a reduction in chipping on cutting edges. Its smooth surface and the controlled coating composition ensures improved tool performance.

CXPlus is suitable for wet and dry machining at medium to high speeds in milling and drilling operations with temperatures reaching up to 1050°C. Its versatility makes it suitable for a wide range of materials including low to high tensile steels, cast irons, tool steels, stainless steels, titanium and nickel alloys.



Technical data

Coating material	AlCrN
Coating thickness	2-4µm
Deposition process	PVD Arc
Microhardness HV 0.02	3200
Friction vs steel (dry)	0.55
Max service temp	1050°C
Process temperature	450-500°C
Colour	Grey



Technical data

Milling formula

$$\text{Cutting speed (Vc)} \\ \frac{d \times \pi \times n \text{ (M/min)}}{1000}$$

$$\text{Spindle speed (n)} \\ \frac{Vc \times 1000 \text{ (rpm)}}{\pi \times d}$$

$$\text{Feed per tooth (Fz)} \\ \frac{Vf \text{ (mm)}}{z \times n}$$

$$\text{Table feed (Vf)} \\ Fz \times z \times n \text{ (mm/min)}$$

Vc = cutting speed (m/min); z = number of flutes; Fz = feed per tooth (mm); n = spindle speed (rpm); d = tool diameter (mm); π = 3.142
 a_p = depth of cut (mm); a_e = width of cut

Calculation of average chip thickness

$$hm = Fz \sqrt{\frac{a_e}{d}}$$

$$Fz = hm \sqrt{\frac{d}{a_e}}$$

a_e max = maximum lateral infeed depending on the material to be machined (mm); Fz = feed per tooth (mm); hm = average chip thickness (mm);
 d = tool diameter (mm)

Workpiece materials key

Steels	P1	Low carbon	EN1A, EN8, 1006, 1008, 1015, 1018, 1020, 1022, 1025, 1117, 1140, 1141, 11L08, 11L14, 1213, 12L13, 1215, 133
	P2	Medium carbon, Alloy steels	1030, 1035, 1040, 1045, 1050, 1052, 1055, 1060, 1085, 1095, 1541, 1551, 9255, 2515, 3135, 3415, 4130, 4140, 4150, 4320, 4340, 4520, 5015, 5115, 5120, 5162, 5140, 5155, 6150, 8620, 9262, 9840, 52100, O1, O2, O6, S2, W1 to W310
	P3	Die/tool steels	O7, M1, M2, M3, M4, M7, T1, T2, T4, T5, T8, T15, A2, A3, A6, A7, H10, H11, H12, H13, H19, H21, L3, L6, L7, P2, P20, S1, S5, S7, 52100, A120, D2, D3, D4, D5, D7
Stainless steels	M1	Free machining	430F, 301, 303, 410, 416 Annealed, 420F, 430, 430F
	M2	Austenitic, Martensitic, PH stainless	301, 302, High Tensile, 304, 304L, 305, 316, 420, 15-5PH, 17-4PH, 17-7PH
	M3	Cobalt chrome alloys, Duplex 22%, Super Duplex 25%	302B, 304B, 309, 310, 316b, 316L, 316Ti, 317, 317L, PH13-8Mo, Nitronics
Cast irons	K1	Grey cast iron (GG) <180HB	ASTM A48, CLASS 20, 25, 30, 35, SAE J431C, Grades G1800, G3000, G3500, GG10, 15, 20, 25, 30, 35, 40
	K2	Ductile cast iron	-
	K3	Malleable cast iron (SG) 180>260HB	60-40-18, 65-45-12, D4018, D4512, D5506, 32510, 35108, M3210, M4504, M5503, 250, 300, 350, 400, 450
Non-ferrous	N1	Aluminium < 10% Si	Aluminium/Aluminium Alloys < 10% Si
	N2	Aluminium > 10% Si	Aluminium/Aluminium Alloys > 10% Si
	N3	Copper/copper alloys, Brass/bronze	Brass, Cu/Cu Alloys/Magnesium
Special alloys	S1	High temp alloys	Nimonic, Inconel 625, 718, 925, Monel, Hastelloy
	S2	Titanium alloys	6Al-4V, 5Al-2.5 Sn, 6Al-2 Sn-4Zr-6Mo, 3Al-8V-6Cr4Mo-4Zr, 10V-2Fe-3Al, 13V-11Cr-3Al
Hardened steels	H	Hardened steels (44-55Hrc)	H10, H11, H12, H13, H19, H21, L3, L6, L7, P2, P20, D2, D3, D4, D5, D7

Cutting speeds by material group

Tool diameter (mm)		Feed recommendations					
		3.00	4.00	5.00	6.00	8.00	
		Vc (M/min)	Feed per tooth (mm)				
Steels	P1	180-220	0.013-0.020	0.020-0.030	0.040-0.050	0.040-0.055	0.050-0.060
	P2	160-180	0.010-0.015	0.012-0.018	0.015-0.020	0.018-0.022	0.020-0.026
	P3	90-140	0.008-0.013	0.010-0.015	0.012-0.017	0.015-0.020	0.018-0.022
Stainless steels	M1	70-90	0.013-0.015	0.013-0.018	0.014-0.020	0.020-0.028	0.028-0.038
	M2	55-70	0.010-0.015	0.012-0.016	0.013-0.018	0.018-0.023	0.024-0.034
	M3	40-50	0.008-0.013	0.009-0.015	0.010-0.016	0.015-0.021	0.019-0.029
Cast irons	K1	160-180	0.013-0.020	0.020-0.030	0.040-0.050	0.040-0.055	0.050-0.060
	K2	120-150	0.013-0.020	0.020-0.030	0.040-0.050	0.040-0.055	0.050-0.060
	K3	70-120	0.008-0.013	0.010-0.015	0.018-0.025	0.015-0.020	0.018-0.022
Non-ferrous	N1	300-550	0.028-0.042	0.030-0.044	0.045-0.050	0.050-0.060	0.065-0.072
	N2	200-350	0.025-0.040	0.028-0.042	0.025-0.040	0.045-0.052	0.058-0.065
	N3	120-220	0.020-0.032	0.022-0.035	0.025-0.032	0.030-0.038	0.036-0.046
Special alloys	S1	35-55	0.003-0.005	0.003-0.006	0.005-0.008	0.006-0.009	0.008-0.015
	S2	50-70	0.008-0.010	0.008-0.010	0.010-0.015	0.015-0.020	0.020-0.030
Hardened steels	H	40-50	0.008-0.013	0.008-0.013	0.010-0.015	0.015-0.020	0.020-0.030

Tool diameter (mm)		10.00	12.00	16.00	20.00	-	
		Vc (M/min)	Feed per tooth (mm)				
Steels	P1	180-220	0.060-0.070	0.065-0.075	0.070-0.080	0.080-0.090	-
	P2	160-180	0.030-0.035	0.040-0.045	0.050-0.060	0.060-0.070	-
	P3	90-140	0.025-0.030	0.028-0.035	0.040-0.050	0.050-0.060	-
Stainless steels	M1	70-90	0.045-0.055	0.058-0.065	0.075-0.080	0.082-0.090	-
	M2	55-70	0.035-0.047	0.045-0.058	0.060-0.065	0.066-0.075	-
	M3	40-50	0.030-0.041	0.039-0.054	0.054-0.060	0.059-0.065	-
Cast irons	K1	160-180	0.013-0.021	0.020-0.031	0.040-0.060	0.040-0.065	-
	K2	120-150	0.013-0.021	0.020-0.031	0.040-0.060	0.040-0.065	-
	K3	70-120	0.025-0.030	0.028-0.035	0.040-0.050	0.050-0.060	-
Non-ferrous	N1	300-550	0.068-0.076	0.080-0.100	0.100-0.200	0.200-0.300	-
	N2	200-350	0.065-0.072	0.068-0.085	0.080-0.095	0.100-0.200	-
	N3	120-220	0.046-0.051	0.052-0.063	0.068-0.085	0.080-0.100	-
Special alloys	S1	35-55	0.015-0.030	0.020-0.030	0.030-0.040	0.045-0.050	-
	S2	50-70	0.025-0.035	0.030-0.040	0.040-0.045	0.045-0.050	-
Hardened steels	H	40-50	0.025-0.035	0.030-0.040	0.035-0.045	0.040-0.050	-

Note: Cutting data recommendations are guidelines only and are based on ideal cutting conditions.

Cutting data – Warrior 2 flute ball nose end mills

Hardened steels 50-55Hrc		H						
Diameter (mm)	Radius (mm)	Vc (M/min)	n (rpm)	Fz (mm)	F (mm/min)	ap (mm)	ae (mm)	Teeth
2.00	1.00	180-205	30000	0.040	2400	0.15 - 0.25	0.25	2
3.00	1.50	170-195	19800	0.050	1980	0.20 - 0.35	0.38	2
4.00	2.00	170-185	14500	0.060	1740	0.25 - 0.40	0.50	2
5.00	2.50	175-185	12000	0.080	1920	0.28 - 0.45	0.63	2
6.00	3.00	165-185	9800	0.100	1960	0.35 - 0.50	0.75	2
8.00	4.00	165-180	7500	0.120	1800	0.40 - 0.57	1.00	2
10.00	5.00	160-175	5700	0.140	1596	0.50 - 0.63	1.25	2
12.00	6.00	150-170	5400	0.160	1728	0.60 - 0.75	1.50	2

Hardened steels 55-65Hrc		H						
Diameter (mm)	Radius (mm)	Vc (M/min)	n (rpm)	Fz (mm)	F (mm/min)	ap (mm)	ae (mm)	Teeth
2.00	1.00	145-155	24000	0.058	2800	0.08	0.25	2
3.00	1.50	145-155	16000	0.088	2800	0.10	0.38	2
4.00	2.00	145-155	12000	0.111	2660	0.15	0.45	2
5.00	2.50	145-155	9600	0.133	2550	0.19	0.68	2
6.00	3.00	145-155	8000	0.153	2440	0.24	0.80	2
8.00	4.00	145-155	6000	0.140	1680	0.60	1.00	2
10.00	5.00	145-155	4800	0.171	1640	0.75	1.25	2
12.00	6.00	145-155	4000	0.186	1490	0.90	1.50	2

Cutting data – Samurai 4 flute ball nose end mills

Hardened steels 50-55Hrc		H						
Diameter (mm)	Radius (mm)	Vc (M/min)	n (rpm)	Fz (mm)	F (mm/min)	ap (mm)	ae (mm)	Teeth
1.00	0.50	130-140	41375	0.020	3310	0.06	0.13	4
2.00	1.00	130-140	20687	0.030	2482	0.10	0.25	4
3.00	1.50	130-140	13792	0.040	2207	0.13	0.38	4
4.00	2.00	130-140	10344	0.050	2069	0.15	0.50	4
5.00	2.50	130-140	8275	0.060	1820	0.20	0.63	4
6.00	3.00	130-140	6896	0.080	2069	0.25	0.75	4
8.00	4.00	130-140	5172	0.100	2069	0.30	1.00	4
10.00	5.00	130-140	4137	0.140	2317	0.50	1.25	4
12.00	6.00	130-140	3448	0.160	2207	0.60	1.50	4

Hardened steels 55-65Hrc		H						
Diameter (mm)	Radius (mm)	Vc (M/min)	n (rpm)	Fz (mm)	F (mm/min)	ap (mm)	ae (mm)	Teeth
1.00	0.50	100-110	31827	0.020	2546	0.06	0.12	4
2.00	1.00	100-110	15913	0.032	2037	0.08	0.25	4
3.00	1.50	100-110	10609	0.048	2037	0.10	0.38	4
4.00	2.00	100-110	7957	0.058	1846	0.15	0.45	4
5.00	2.50	100-110	6365	0.070	1782	0.19	0.68	4
6.00	3.00	100-110	5304	0.080	1697	0.24	0.80	4
8.00	4.00	100-110	3978	0.151	2400	0.60	1.00	4
10.00	5.00	100-110	3183	0.189	2400	0.75	1.25	4
12.00	6.00	100-110	2652	0.207	2200	0.90	1.50	4

Note: Cutting data recommendations are guidelines only and are based on ideal cutting conditions.

Cutting data – trochoidal milling

			Feed recommendations						
Tool diameter (mm)			6.00	6.00	8.00	8.00	10.00	10.00	
			a _e	a _e	a _e	a _e	a _e	a _e	
a _p			≤ 0.9 x L2	0.05 x D	0.1 x D	0.05 x D	0.1 x D	0.05 x D	0.1 x D
Steels	P1	Vc	200-300	200-300	200-300	200-300	200-300	200-300	
		Fz	0.130	0.090	0.160	0.110	0.200	0.140	
	P2	Vc	240-260	240-260	240-260	240-260	240-260	240-260	
		Fz	0.110	0.080	0.140	0.100	0.180	0.130	
	P3	Vc	200-220	200-220	200-220	200-220	200-220	200-220	
		Fz	0.110	0.080	0.140	0.100	0.180	0.130	
Stainless steels	M1	Vc	180-200	180-200	180-200	180-200	180-200	180-200	
		Fz	0.080	0.060	0.100	0.070	0.130	0.090	
	M2	Vc	140-160	140-160	140-160	140-160	140-160	140-160	
		Fz	0.080	0.060	0.100	0.070	0.130	0.090	
	M3	Vc	120-140	120-140	120-140	120-140	120-140	120-140	
		Fz	0.040	0.030	0.050	0.040	0.130	0.090	
Cast irons	K1	Vc	250-280	250-280	250-280	250-280	250-280	250-280	
		Fz	0.080	0.060	0.090	0.070	0.130	0.100	
	K2	Vc	160-220	160-220	160-220	160-220	160-220	160-220	
		Fz	0.080	0.060	0.090	0.070	0.130	0.100	
	K3	Vc	90-130	90-130	90-130	90-130	90-130	90-130	
		Fz	0.080	0.060	0.090	0.070	0.130	0.100	
Special alloys	S1	Vc	50-60	50-60	50-60	50-60	50-60	50-60	
		Fz	0.040	0.030	0.050	0.040	0.070	0.050	
	S2	Vc	80-110	80-110	80-110	80-110	80-110	80-110	
		Fz	0.040	0.030	0.050	0.040	0.070	0.050	
Hardened steels	H	Vc	60-90	60-90	60-90	60-90	60-90	60-90	
		Fz	0.050	0.040	0.060	0.050	0.090	0.070	
Tool diameter (mm)			12.00	12.00	16.00	16.00	20.00	20.00	
			a _e	a _e	a _e	a _e	a _e	a _e	
a _p			≤ 0.9 x L2	0.05 x D	0.1 x D	0.05 x D	0.1 x D	0.05 x D	0.1 x D
Steels	P1	Vc	200-300	200-300	200-300	200-300	200-300	200-300	
		Fz	0.250	0.180	0.290	0.210	0.340	0.240	
	P2	Vc	240-260	240-260	240-260	240-260	240-260	240-260	
		Fz	0.230	0.160	0.270	0.190	0.290	0.210	
	P3	Vc	200-220	200-220	200-220	200-220	200-220	200-220	
		Fz	0.230	0.160	0.270	0.190	0.290	0.210	
Stainless steels	M1	Vc	180-200	180-200	180-200	180-200	180-200	180-200	
		Fz	0.160	0.110	0.190	0.130	0.270	0.190	
	M2	Vc	140-160	140-160	140-160	140-160	140-160	140-160	
		Fz	0.160	0.110	0.190	0.130	0.270	0.190	
	M3	Vc	120-140	120-140	120-140	120-140	120-140	120-140	
		Fz	0.160	0.110	0.190	0.130	0.270	0.190	
Cast irons	K1	Vc	250-280	250-280	250-280	250-280	250-280	250-280	
		Fz	0.160	0.140	0.180	0.160	0.240	0.200	
	K2	Vc	160-220	160-220	160-220	160-220	160-220	160-220	
		Fz	0.160	0.140	0.180	0.160	0.240	0.200	
	K3	Vc	90-130	90-130	90-130	90-130	90-130	90-130	
		Fz	0.160	0.140	0.180	0.160	0.240	0.200	
Special alloys	S1	Vc	50-60	50-60	50-60	50-60	50-60	50-60	
		Fz	0.080	0.060	0.117	0.083	0.160	0.120	
	S2	Vc	80-110	80-110	80-110	80-110	80-110	80-110	
		Fz	0.080	0.060	0.117	0.083	0.160	0.120	
Hardened steels	H	Vc	60-90	60-90	60-90	60-90	60-90	60-90	
		Fz	0.100	0.080	0.120	0.100	0.160	0.140	

Note: Cutting data recommendations are guidelines only and are based on ideal cutting conditions.

Cutting speeds – Spectre and Phantom high feed end mills

Radial cut a_e 60-75% x D							
Spectre a_p		0.150-0.250	0.200-0.300	0.250-0.400	0.300-0.450	0.400-0.600	
Phantom a_p		-	-	-	0.400-0.600	0.500-0.700	
Tool diameter (mm)		3.00	4.00	5.00	6.00	8.00	
		Vc (M/min)		Feed per tooth (mm)			
Steels	P1	150-200	0.090	0.100	0.150	0.200	0.300
	P2	140-190	0.080	0.090	0.120	0.180	0.250
	P3	120-160	0.060	0.080	0.100	0.100	0.120
Stainless steels	M1	90-130	0.080	0.090	0.100	0.150	0.200
	M2	60-100	0.060	0.070	0.090	0.100	0.120
	M3	60-70	0.040	0.055	0.060	0.070	0.080
Cast irons	K1	120-150	0.090	0.090	0.150	0.200	0.300
	K2	110-130	0.090	0.090	0.150	0.200	0.250
	K3	100-130	0.080	0.080	0.100	0.150	0.120
Special alloys	S1	25-40	0.060	0.070	0.090	0.100	0.120
	S2	50-90	0.040	0.055	0.060	0.070	0.080
Hardened steels	H	80-140	0.040	0.055	0.060	0.070	0.080

Radial cut a_e 60-75% x D							
Spectre a_p		0.500-0.700	0.600-0.800	0.700-1.000	-	-	
Phantom a_p		0.600-0.800	0.700-1.000	0.750-1.100	0.800-1.250	-	
Tool diameter (mm)		10.00	12.00	16.00	20.00	-	
		Vc (M/min)		Feed per tooth (mm)			
Steels	P1	150-200	0.360	0.450	0.480	0.510	-
	P2	140-190	0.280	0.320	0.360	0.380	-
	P3	120-160	0.180	0.220	0.220	0.240	-
Stainless steels	M1	90-130	0.240	0.260	0.280	0.320	-
	M2	60-100	0.140	0.190	0.220	0.280	-
	M3	60-70	0.090	0.120	0.140	0.180	-
Cast irons	K1	120-150	0.360	0.450	0.480	0.510	-
	K2	110-130	0.280	0.320	0.320	0.380	-
	K3	100-130	0.180	0.220	0.220	0.240	-
Special alloys	S1	25-40	0.140	0.190	0.220	0.280	-
	S2	50-90	0.090	0.120	0.140	0.180	-
Hardened steels	H	80-140	0.090	0.120	0.140	0.180	-

Notes: Cutting data recommendations are guidelines only and are based on ideal cutting conditions. Subject to material group – use lower values for harder materials.

Cutting speeds – Bulldog and Reaper high feed end mills

Radial cut a_e 60-75% x D							
Bulldog a_p^1		0.300-0.450	0.400-0.600	0.500-0.700	0.600-0.800	0.700-1.00	
Tool diameter (mm)		6.00	8.00	10.00	12.00	16.00	
		Vc ² (M/min)		Feed per tooth (mm)			
Steels	P1	120-250	0.200	0.300	0.360	0.550	0.600
	P2	110-200	0.180	0.250	0.280	0.360	0.400
	P3	90-160	0.060	0.120	0.180	0.250	0.300
Cast irons	K1	120-250	0.200	0.300	0.360	0.550	0.600
	K2	110-200	0.200	0.250	0.280	0.360	0.400
	K3	90-160	0.150	0.120	0.180	0.250	0.300
Hardened steels	H	80-140	0.050	0.090	0.120	0.150	0.190

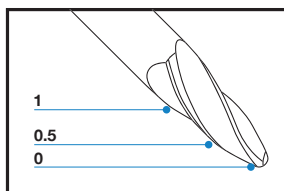
Radial cut a_e 60-75% x D							
Reaper a_p		0.200-0.350	0.300-0.400	0.350-0.500	0.400-0.650	-	
Tool diameter (mm)		6.00	8.00	10.00	12.00	-	
		Vc (M/min)		Feed per tooth ³ (mm)			
Steels	P1	160-300	0.125	0.170	0.220	0.280	-
	P2	140-200	0.130	0.170	0.220	0.280	-
	P3	120-160	0.110	0.140	0.160	0.200	-
Hardened steels	H	80-140	0.100	0.140	0.180	0.220	-

Notes: Cutting data recommendations are guidelines only and are based on ideal cutting conditions. Subject to material group – use lower values for harder materials. Bulldog: (1) Reduce a_p for HXL -10% and HXLL -20%; (2) reduce Vc for HXL -20% and HXLL -25%. Reaper Long Series: (3) Reduce Fz -20%.

Cutting data – Eliminator barrel tools

Feed recommendations							
Tool diameter (mm)		6.00	8.00	10.00	12.00	16.00	
		Vc (M/min)		Feed per tooth (mm)			
Steels	P1	170-200	0.030-0.050	0.050-0.070	0.070-0.095	0.100-0.115	0.120-0.155
	P2	140-170	0.030-0.050	0.050-0.070	0.070-0.095	0.100-0.115	0.120-0.155
	P3	90-120	0.010-0.030	0.030-0.050	0.050-0.070	0.070-0.090	0.090-0.135
Stainless steels	M1	110-140	0.030-0.050	0.050-0.070	0.070-0.095	0.100-0.115	0.120-0.155
	M2	60-90	0.030-0.050	0.050-0.070	0.070-0.095	0.100-0.115	0.120-0.155
	M3	40-70	0.025-0.045	0.035-0.060	0.055-0.080	0.090-0.100	0.100-0.120
Cast irons	K1	130-150	0.030-0.050	0.050-0.070	0.070-0.085	0.100-0.115	0.120-0.155
	K2	110-135	0.030-0.050	0.050-0.070	0.070-0.085	0.100-0.115	0.120-0.155
	K3	70-120	0.010-0.030	0.030-0.050	0.050-0.070	0.070-0.090	0.090-0.135
Non-ferrous	N1	250-500	0.045-0.060	0.060-0.075	0.065-0.090	0.085-0.110	0.090-0.120
	N2	150-350	0.045-0.060	0.060-0.075	0.065-0.090	0.085-0.110	0.090-0.120
	N3	130-275	0.035-0.050	0.050-0.065	0.055-0.080	0.080-0.100	0.090-0.115
Special alloys	S1	25-40	0.020-0.030	0.030-0.050	0.050-0.070	0.070-0.100	0.100-0.120
	S2	55-80	0.020-0.030	0.030-0.050	0.050-0.070	0.070-0.100	0.100-0.120
Hardened steels	H	60-90	0.025-0.035	0.035-0.055	0.055-0.075	0.080-0.110	0.120-0.150

Notes: Lower Vc needs to be chosen for the small end diameter and higher Vc on the larger diameters. Data shown is based on the shank diameter.



Barrel tool contact area options

Your CAM system will provide options as to where the barrel tool engages with the workpiece, thereby the effective diameter will change. Some CAM providers call this the 'contact point' and will have in-built functions to enable the cutting data at this point to be compensated for.

There are three possible engagement points (effective diameters) as shown, represented at 1 (largest diameter), 0.5 (middle diameter) and 0 (smallest diameter).

Cutting speeds – ball nose end mills

				Feed recommendations					
Tool diameter (mm)				3.00	4.00	5.00	6.00	8.00	
		a_p	a_e	V_c (M/min)	Feed per tooth (mm)				
Steels	P1	0.1 x D	0.5 x D	150-200	0.025	0.025	0.036	0.044	0.060
	P2	0.1 x D	0.5 x D	140-190	0.028	0.028	0.036	0.044	0.060
	P3	0.1 x D	0.5 x D	120-160	0.030	0.030	0.030	0.036	0.050
Stainless steels	M1	0.1 x D	0.5 x D	90-115	0.023	0.030	0.030	0.036	0.050
	M2	0.1 x D	0.5 x D	60-80	0.020	0.024	0.024	0.029	0.040
	M3	0.1 x D	0.5 x D	60-70	0.018	0.020	0.020	0.025	0.034
Cast irons	K1	0.1 x D	0.5 x D	120-150	0.036	0.036	0.036	0.044	0.060
	K2	0.1 x D	0.5 x D	110-130	0.030	0.030	0.030	0.036	0.050
	K3	0.1 x D	0.5 x D	100-130	0.024	0.024	0.024	0.029	0.040
Non-ferrous	N1	0.1 x D	0.5 x D	300-500	0.075	0.080	0.100	0.120	0.150
	N2	0.1 x D	0.5 x D	250-300	0.060	0.070	0.080	0.100	0.125
	N3	0.1 x D	0.5 x D	250-300	0.060	0.070	0.080	0.100	0.125
Special alloys	S1	0.1 x D	0.3 x D	25-40	0.030	0.030	0.030	0.036	0.050
	S2	0.1 x D	0.3 x D	50-90	0.016	0.016	0.016	0.019	0.026
Hardened steels	H	0.1 x D	0.5 x D	80-140	0.027	0.027	0.027	0.033	0.045

Tool diameter (mm)				10.00	12.00	16.00	20.00	-	
		a_p	a_e	V_c (M/min)	Feed per tooth (mm)				
Steels	P1	0.1 x D	0.5 x D	150-200	0.072	0.083	0.101	0.114	-
	P2	0.1 x D	0.5 x D	140-190	0.072	0.083	0.101	0.114	-
	P3	0.1 x D	0.5 x D	120-160	0.061	0.070	0.087	0.101	-
Stainless steels	M1	0.1 x D	0.5 x D	90-115	0.061	0.070	0.087	0.101	-
	M2	0.1 x D	0.5 x D	60-80	0.048	0.056	0.070	0.081	-
	M3	0.1 x D	0.5 x D	60-70	0.040	0.047	0.057	0.065	-
Cast irons	K1	0.1 x D	0.5 x D	120-150	0.072	0.083	0.101	0.114	-
	K2	0.1 x D	0.5 x D	110-130	0.061	0.070	0.087	0.101	-
	K3	0.1 x D	0.5 x D	100-130	0.048	0.056	0.070	0.081	-
Non-ferrous	N1	0.1 x D	0.5 x D	300-500	0.175	0.200	0.250	0.280	-
	N2	0.1 x D	0.5 x D	250-300	0.150	0.175	0.200	0.250	-
	N3	0.1 x D	0.5 x D	250-300	0.150	0.175	0.200	0.250	-
Special alloys	S1	0.1 x D	0.3 x D	25-40	0.061	0.070	0.087	0.101	-
	S2	0.1 x D	0.3 x D	50-90	0.032	0.037	0.046	0.054	-
Hardened steels	H	0.1 x D	0.5 x D	80-140	0.054	0.062	0.077	0.088	-

Note: Cutting data recommendations are guidelines only and are based on ideal cutting conditions.

Cutting data – aluminium conventional milling

		Feed recommendations					
Tool diameter (mm)		3.00	4.00	5.00	6.00	8.00	
		Vc (M/min)	Feed per tooth (mm)				
Non-ferrous	N1	300-550	0.028-0.042	0.028-0.050	0.050-0.063	0.052-0.065	0.070-0.082
	N2	200-350	0.028-0.042	0.028-0.050	0.050-0.063	0.052-0.065	0.070-0.082
	N3	120-220	0.020-0.032	0.022-0.034	0.025-0.038	0.040-0.058	0.065-0.078
Tool diameter (mm)		10.00	12.00	16.00	20.00	-	
		Vc (M/min)	Feed per tooth (mm)				
Non-ferrous	N1	300-550	0.100-0.140	0.120-0.152	0.170-0.182	0.185-0.220	-
	N2	200-350	0.100-0.140	0.120-0.152	0.170-0.182	0.185-0.220	-
	N3	120-220	0.090-0.120	0.100-0.130	0.132-0.150	0.145-0.180	-

Note: Cutting data recommendations are guidelines only and are based on ideal cutting conditions.

Cutting data – trochoidal milling

		Feed recommendations						
Tool diameter (mm)		6.00	6.00	6.00	8.00	8.00	8.00	
		ae	ae	ae	ae	ae	ae	
ap		≤ 0.9 x L2	0.05 x D	0.1 x D	0.3 x D	0.05 x D	0.1 x D	0.3 x D
Non-ferrous	N1	Vc	300-500	300-500	300-500	300-500	300-500	300-500
		Fz	0.420	0.310	0.205	0.450	0.350	0.250
	N2	Vc	300-400	300-400	300-400	300-400	300-400	300-400
		Fz	0.350	0.250	0.175	0.380	0.270	0.190
	N3	Vc	250-350	250-350	250-350	250-350	250-350	250-350
		Fz	0.350	0.250	0.175	0.380	0.270	0.190
Tool diameter (mm)		10.00	10.00	10.00	12.00	12.00	12.00	
		ae	ae	ae	ae	ae	ae	
ap		≤ 0.9 x L2	0.05 x D	0.1 x D	0.3 x D	0.05 x D	0.1 x D	0.3 x D
Non-ferrous	N1	Vc	300-500	300-500	300-500	300-500	300-500	300-500
		Fz	0.450	0.350	0.250	0.500	0.360	0.250
	N2	Vc	300-400	300-400	300-400	300-400	300-400	300-400
		Fz	0.400	0.300	0.205	0.430	0.320	0.220
	N3	Vc	250-350	250-350	250-350	250-350	250-350	250-350
		Fz	0.400	0.300	0.205	0.430	0.300	0.230
Tool diameter (mm)		16.00	16.00	16.00	20.00	20.00	20.00	
		ae	ae	ae	ae	ae	ae	
ap		≤ 0.9 x L2	0.05 x D	0.1 x D	0.3 x D	0.05 x D	0.1 x D	0.3 x D
Non-ferrous	N1	Vc	300-500	300-500	300-500	300-500	300-500	300-500
		Fz	0.600	0.450	0.310	0.700	0.550	0.380
	N2	Vc	300-400	300-400	300-400	300-400	300-400	300-400
		Fz	0.550	0.400	0.290	0.600	0.450	0.320
	N3	Vc	250-350	250-350	250-350	250-350	250-350	250-350
		Fz	0.570	0.430	0.290	0.600	0.450	0.320

Note: Cutting data recommendations are guidelines only and are based on ideal cutting conditions.





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