

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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Features key

	Centre cutting
	Helix angle
	End angle
	Coating type
	Variable index
	Variable helix
	Number of teeth
	Ball nose
	Coated ball nose
	Coated chamfer
	Coated corner radius
	Chip breaker
	Step down
	Orbis 270°
	Chamfer milling
	Slot milling
	Side finishing
	Side roughing
	Profile milling
	Ramping
	Trochoidal milling
	Plunge milling
	Pocket milling
	Helical milling
	3D milling
	Remanufacture compatible

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.

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.

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 42 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 41 to 44 to find out more.

Whether it's Infinite Possibilities® or our 18 new standard designs with almost 400 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](tel:+44201684294090)
or visit quickgrind.com



Tool shown 499035

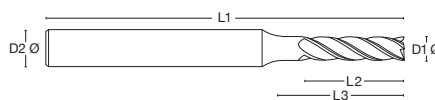
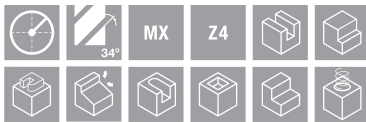
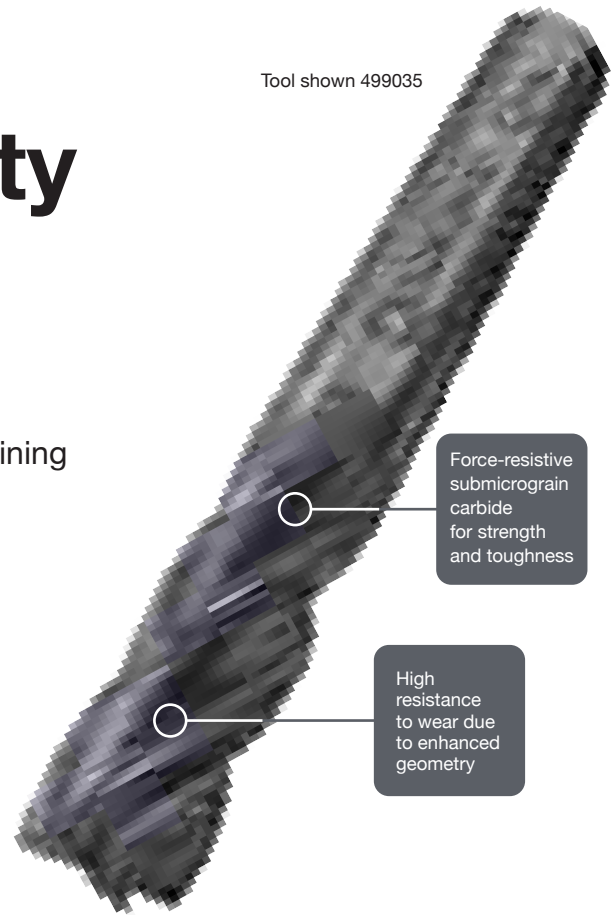
High productivity

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
3.00	6.00	58.00	12.00	20.00	-	4	499010
4.00	6.00	58.00	14.00	20.00	-	4	499015
5.00	6.00	58.00	16.00	22.00	-	4	499020
6.00	6.00	58.00	19.00	-	0.25	4	499025
8.00	8.00	64.00	22.00	-	0.25	4	499030
10.00	10.00	73.00	25.00	-	0.25	4	499035
12.00	12.00	84.00	30.00	-	0.25	4	499040
16.00	16.00	100.00	40.00	-	0.25	4	499045
20.00	20.00	105.00	45.00	-	0.25	4	499050

Tool shown 499010



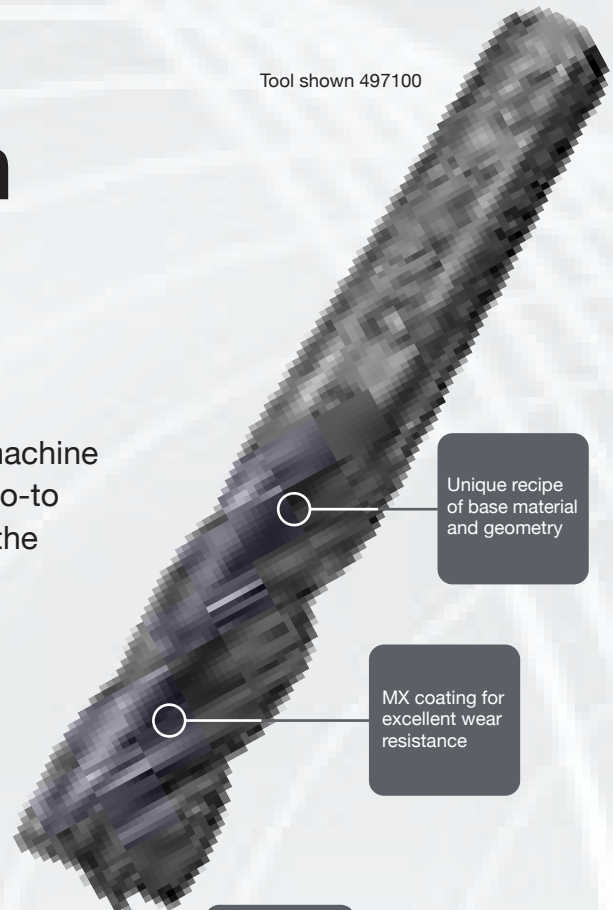
Tool shown 497100

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.

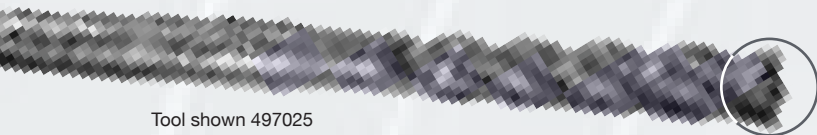
Designed with sharp corner geometry this tool is very useful when looking to achieve square corners in manufactured parts.



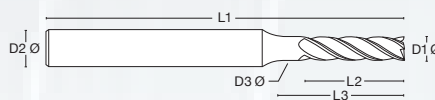
Unique recipe of base material and geometry

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
1.00	3.00	0.95	39.00	3.00	8.00	4	497010
1.50	3.00	1.45	39.00	6.00	11.00	4	497015
2.00	3.00	1.95	39.00	9.00	15.00	4	497020
2.50	3.00	2.45	39.00	12.00	18.00	4	497025
3.00	3.00	-	39.00	12.00	-	4	497030
3.50	6.00	3.45	58.00	12.00	20.00	4	497035
4.00	6.00	3.95	58.00	14.00	20.00	4	497040
4.50	6.00	4.45	58.00	14.00	20.00	4	497045
5.00	6.00	4.95	58.00	16.00	22.00	4	497050
5.50	6.00	5.45	58.00	16.00	22.00	4	497055
6.00	6.00	-	58.00	19.00	-	4	497060
8.00	8.00	-	64.00	22.00	-	4	497080
10.00	10.00	-	73.00	25.00	-	4	497100
12.00	12.00	-	84.00	30.00	-	4	497120
16.00	16.00	-	93.00	40.00	-	4	497160
20.00	20.00	-	105.00	45.00	-	4	497200



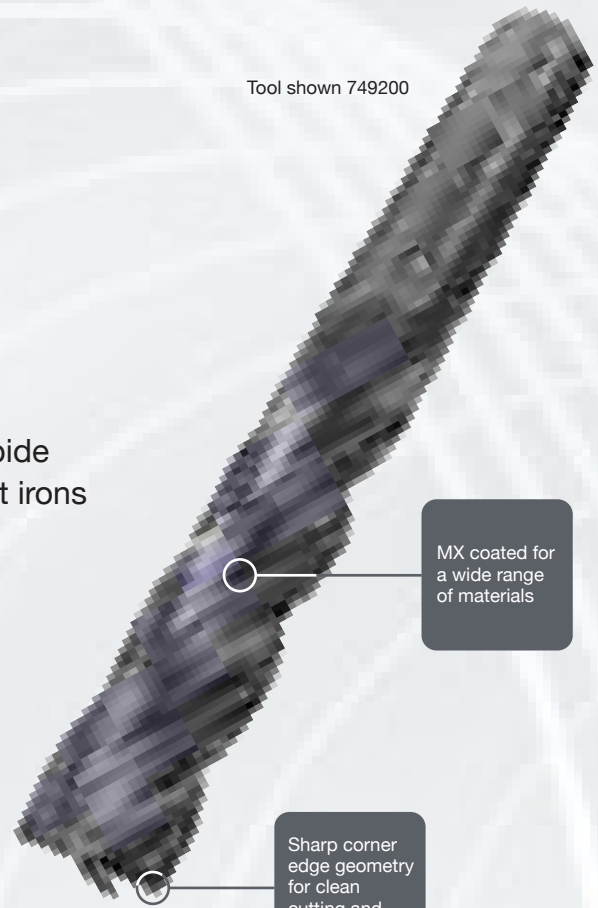
Tool shown 749200

Long Series

for improved access

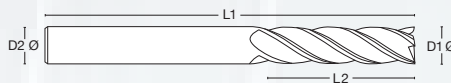
The QPlus2-LS (Long Series) 4 flute universal carbide end mill with MX coating is suitable for steels, cast irons and some stainless steels.

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®



MX coated for a wide range of materials

Sharp corner edge geometry for clean cutting and finishing



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
3.00	3.00	60.00	25.00	4	749030
4.00	4.00	60.00	25.00	4	749040
5.00	5.00	75.00	25.00	4	749050
6.00	6.00	80.00	30.00	4	749060
8.00	8.00	100.00	35.00	4	749080
10.00	10.00	100.00	40.00	4	749100
12.00	12.00	100.00	50.00	4	749120
16.00	16.00	125.00	65.00	4	749160
20.00	20.00	165.00	80.00	4	749200



Tool shown 749030



Tool shown 189080

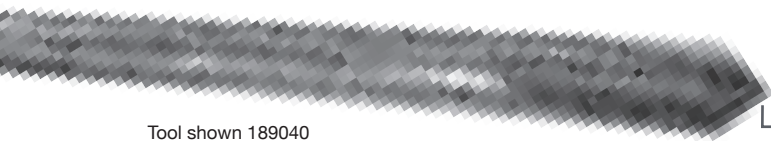
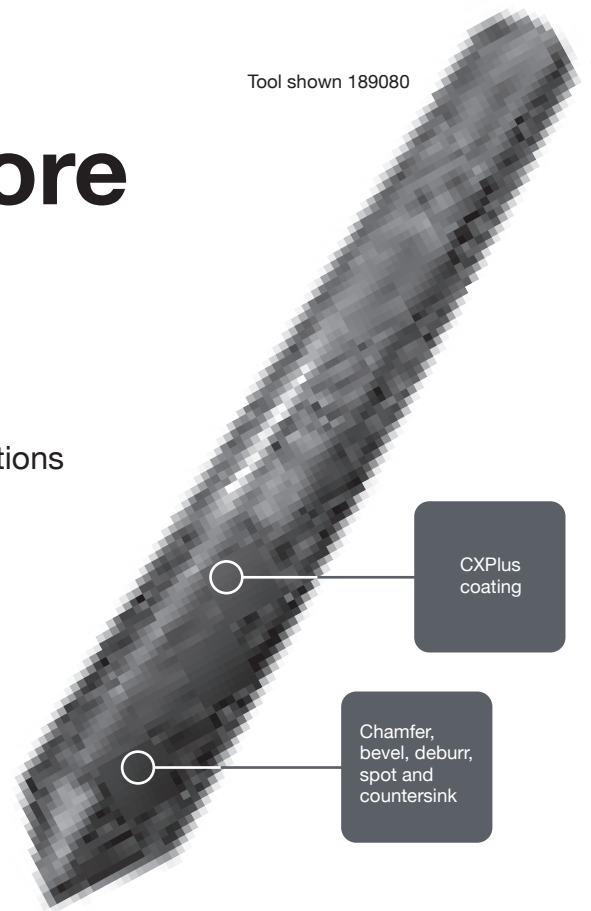
Chamfer and more

in all materials

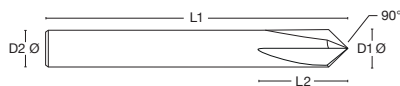
QChamfer can be used for many machining operations from chamfering to bevelling, deburring, spotting and countersinking.

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.



Tool shown 189040



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
4.00	4.00	51.00	11.00	4	189040
6.00	6.00	58.00	13.00	4	189060
8.00	8.00	64.00	19.00	4	189080
10.00	10.00	73.00	22.00	4	189100
12.00	12.00	84.00	26.00	4	189120



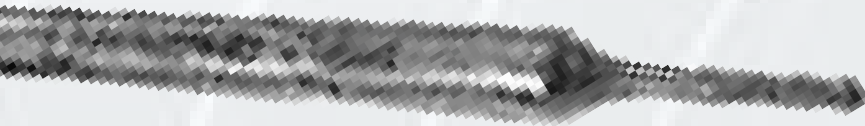
High Performance Ball Nose End Mills



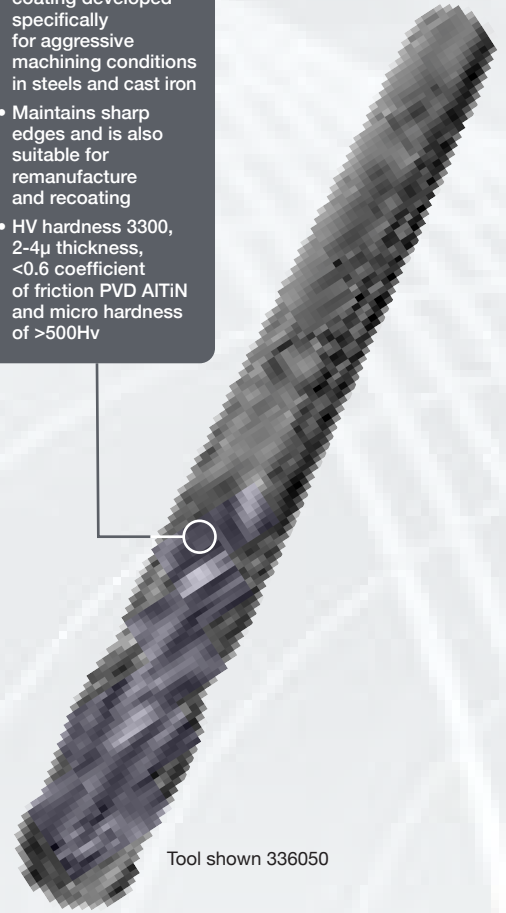
Unique geometry for most applications

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.

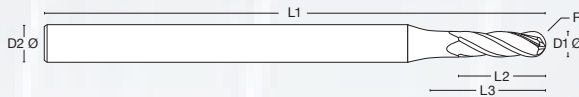
- Latest MX PVD coating developed specifically for aggressive machining conditions in steels and cast iron
- Maintains sharp edges and is also suitable for remanufacture and recoating
- HV hardness 3300, 2-4µ thickness, <0.6 coefficient of friction PVD AlTiN and micro hardness of >500Hv



Tool shown 336010



Tool shown 336050



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

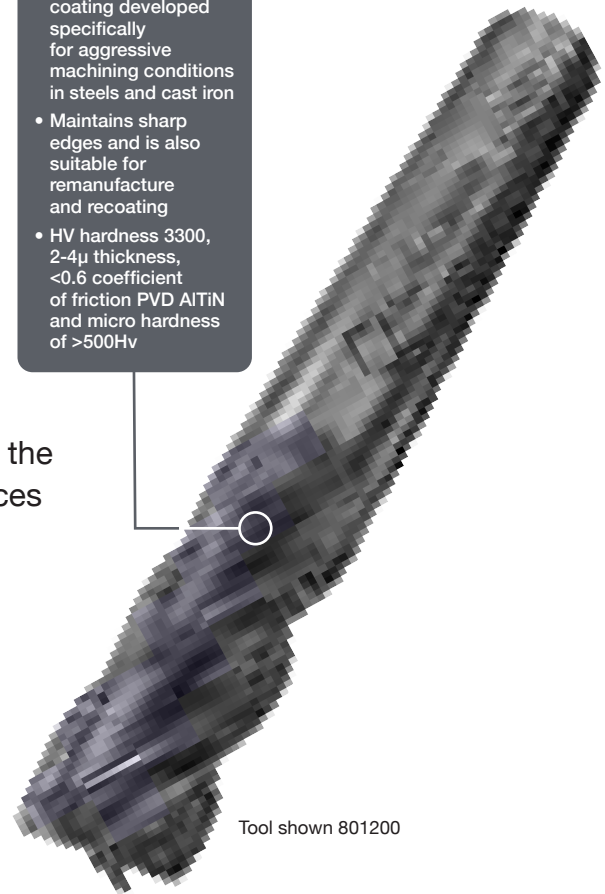
D1 Ø mm	D2 Ø mm	L1 mm	L2 mm	L3 mm	R mm	Teeth Z	Stock code
1.00	3.00	39.00	4.00	5.00	0.50	4	336010
1.50	3.00	39.00	4.50	5.00	0.75	4	336015
2.00	3.00	39.00	6.50	8.00	1.00	4	336020
2.50	3.00	39.00	9.50	11.50	1.25	4	336025
3.00	3.00	39.00	12.00	-	1.50	4	336030
4.00	4.00	51.00	12.00	-	2.00	4	336040
5.00	5.00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



High MRR

with longer tool life

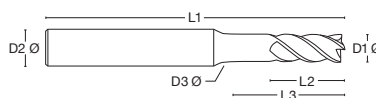
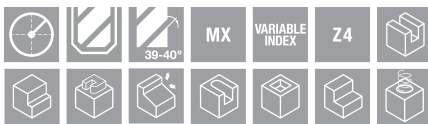
- Latest MX PVD coating developed specifically for aggressive machining conditions in steels and cast iron
- Maintains sharp edges and is also suitable for remanufacture and recoating
- HV hardness 3300, 2-4 μ thickness, <0.6 coefficient of friction PVD AlTiN and micro hardness of >500Hv



Tool shown 801200

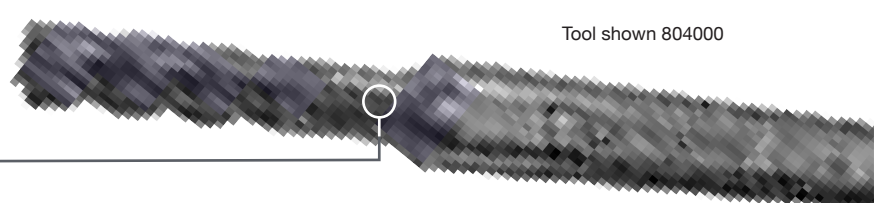
QCut is a high performance end mill designed for the machining of steels, cast iron and in some instances free machining stainless steel.

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.



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
3.00	6.00	2.80	58.00	11.00	16.00	0.15	4	803000
4.00	6.00	3.80	58.00	11.00	18.00	0.15	4	804000
5.00	6.00	4.80	58.00	13.00	18.00	0.25	4	805000
6.00	6.00	-	58.00	13.00	-	0.25	4	806000
8.00	8.00	-	64.00	19.00	-	0.25	4	808000
10.00	10.00	-	73.00	22.00	-	0.25	4	801000
12.00	12.00	-	84.00	26.00	-	0.25	4	801200
16.00	16.00	-	93.00	32.00	-	0.35	4	801600
20.00	20.00	-	105.00	38.00	-	0.35	4	802000



Tool shown 804000

Neck relieved to overcome reach issues

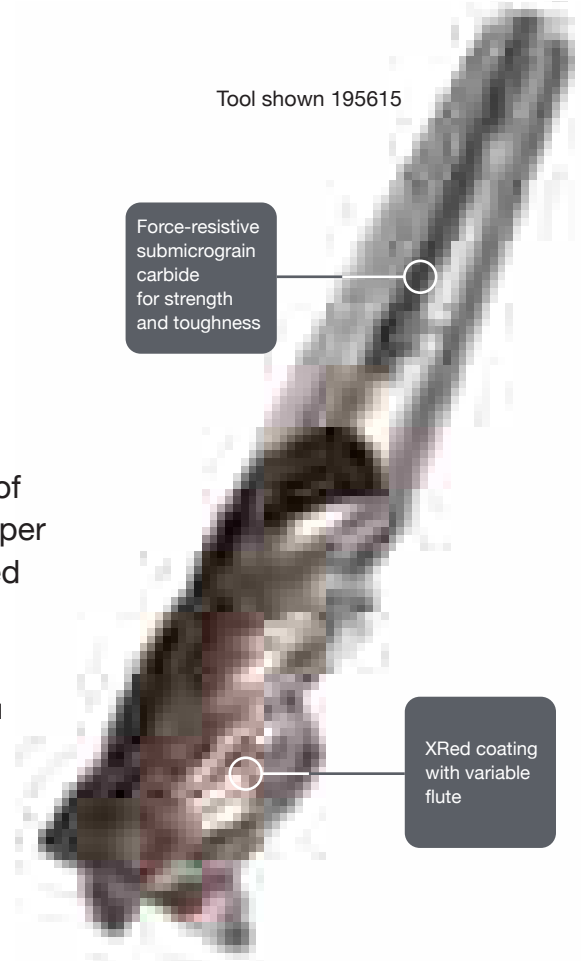
A cut above the rest

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.

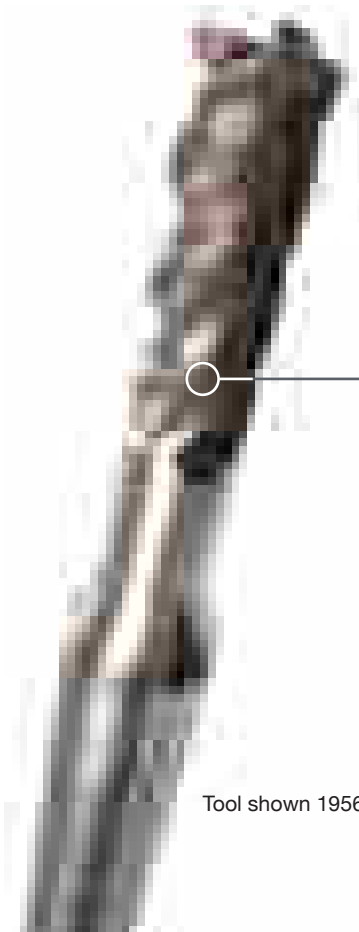
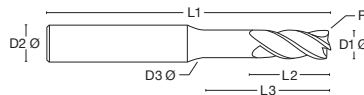
Contact our technical team for assistance – please call +44 (0) 1684 294090 or email contact@quickgrind.com

Tool shown 195615



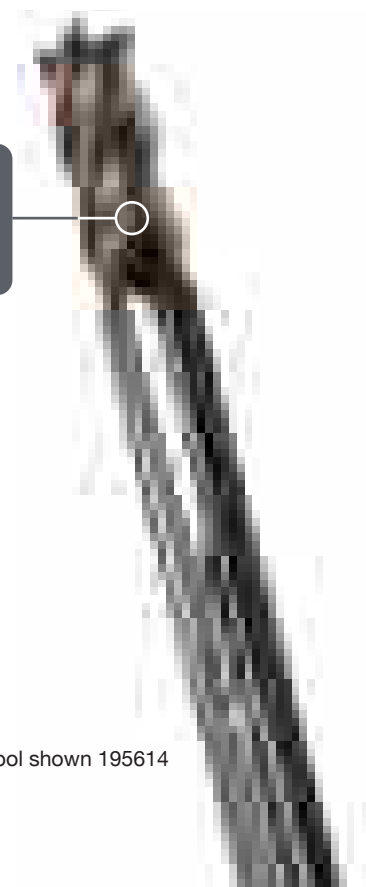
Force-resistive submicrograin carbide for strength and toughness

XRed coating with variable flute



Full flute engagement

Tool shown 195609



Suitable for trochoidal milling

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
3.00	6.00	2.80	58.00	10.00	20.00	-	4	195605
3.00	6.00	2.80	58.00	10.00	20.00	0.25	4	195606
4.00	6.00	3.80	58.00	11.00	20.00	-	4	195608
4.00	6.00	3.80	58.00	11.00	20.00	0.25	4	195609
5.00	6.00	4.80	58.00	14.00	22.00	-	4	195611
5.00	6.00	4.80	58.00	14.00	22.00	0.25	4	195612
6.00	6.00	-	58.00	13.00	-	-	4	195614
6.00	6.00	-	58.00	13.00	-	0.25	4	195615
6.00	6.00	-	58.00	13.00	-	1.00	4	195618
8.00	8.00	-	64.00	18.00	-	-	4	195621
8.00	8.00	-	64.00	18.00	-	0.50	4	195622
8.00	8.00	-	64.00	18.00	-	1.00	4	195624
10.00	10.00	-	73.00	22.00	-	-	4	195628
10.00	10.00	-	73.00	22.00	-	0.50	4	195629
10.00	10.00	-	73.00	22.00	-	1.00	4	195631
12.00	12.00	-	84.00	26.00	-	-	4	195635
12.00	12.00	-	84.00	26.00	-	0.50	4	195636
12.00	12.00	-	84.00	26.00	-	1.00	4	195638
12.00	12.00	-	84.00	26.00	-	2.00	4	195640
12.00	12.00	-	84.00	26.00	-	3.00	4	195641
16.00	16.00	-	93.00	32.00	-	-	4	195644
16.00	16.00	-	93.00	32.00	-	0.50	4	195645
16.00	16.00	-	93.00	32.00	-	1.00	4	195647
16.00	16.00	-	93.00	32.00	-	1.50	4	195648
16.00	16.00	-	93.00	32.00	-	2.00	4	195649
16.00	16.00	-	93.00	32.00	-	3.00	4	195650
20.00	20.00	-	105.00	38.00	-	-	4	195652
20.00	20.00	-	105.00	38.00	-	1.00	4	195655

Designed for multiple applications



Tool shown 195652

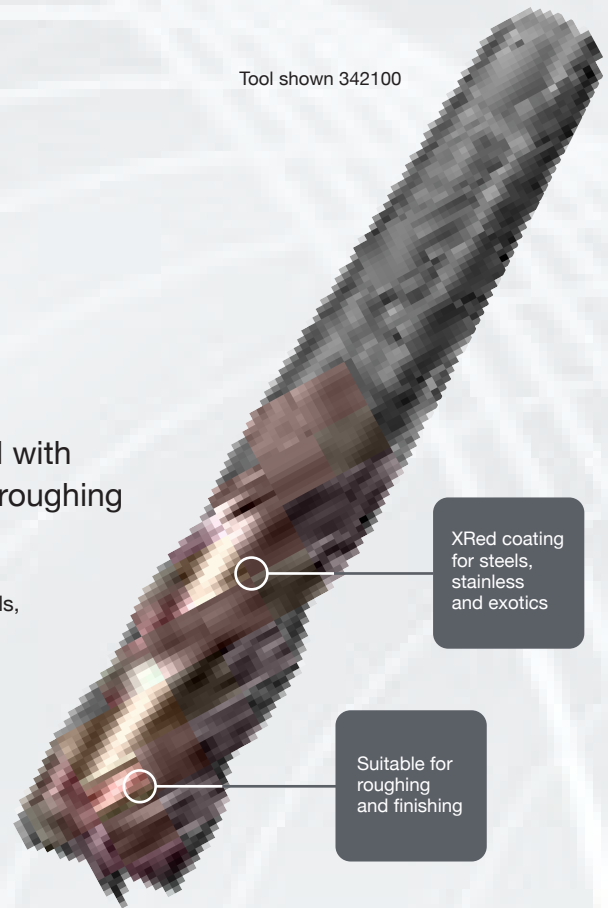


Tool shown 342100

Two tools in one

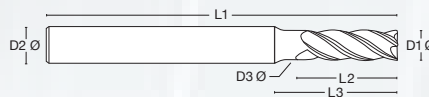
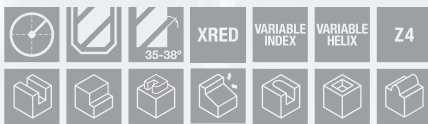
QVari is high performance 4 flute carbide end mill with variable helix and index design, suitable for both roughing and finishing, where applicable, with one tool.

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
3.00	6.00	2.90	58.00	8.00	14.00	0.05	4	342030
4.00	6.00	3.90	58.00	11.00	16.00	0.05	4	342040
5.00	6.00	4.90	58.00	13.00	18.00	0.05	4	342050
6.00	6.00	-	58.00	15.00	-	0.08	4	342060
8.00	8.00	-	64.00	22.00	-	0.10	4	342080
10.00	10.00	-	73.00	25.00	-	0.15	4	342100
12.00	12.00	-	84.00	28.00	-	0.15	4	342120
16.00	16.00	-	93.00	35.00	-	0.20	4	342160
20.00	20.00	-	105.00	40.00	-	0.20	4	342200

Neck relieved to overcome reach issues

Tool shown 342040



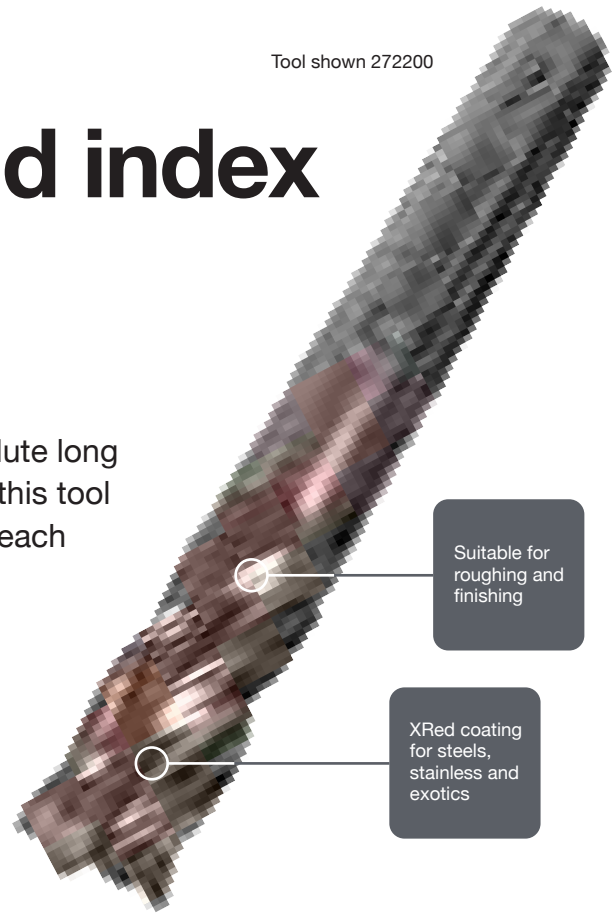


Variable helix and index

with extended reach

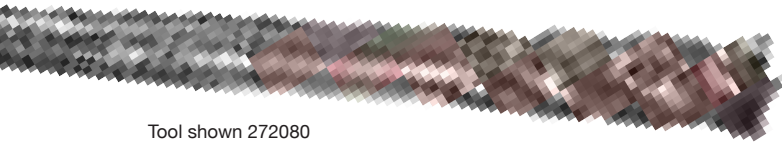
QVari-LR (Long Reach) is a high performance 4 flute long reach end mill. Its variable helix and index make this tool suitable for both roughing and finishing on long reach applications.

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.

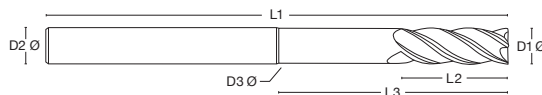
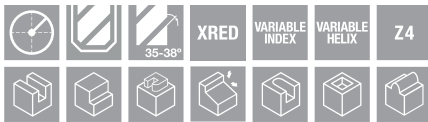


Suitable for roughing and finishing

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
6.00	6.00	5.50	80.00	17.00	35.00	0.08	4	272060
8.00	8.00	7.50	100.00	25.00	50.00	0.10	4	272080
10.00	10.00	9.50	100.00	28.00	50.00	0.15	4	272100
12.00	12.00	11.50	100.00	30.00	50.00	0.15	4	272120
16.00	16.00	15.50	145.00	38.00	75.00	0.20	4	272160
20.00	20.00	19.30	165.00	45.00	75.00	0.20	4	272200



QVari-5 QVari-5CR

High Performance End Mills

Tool shown 172200

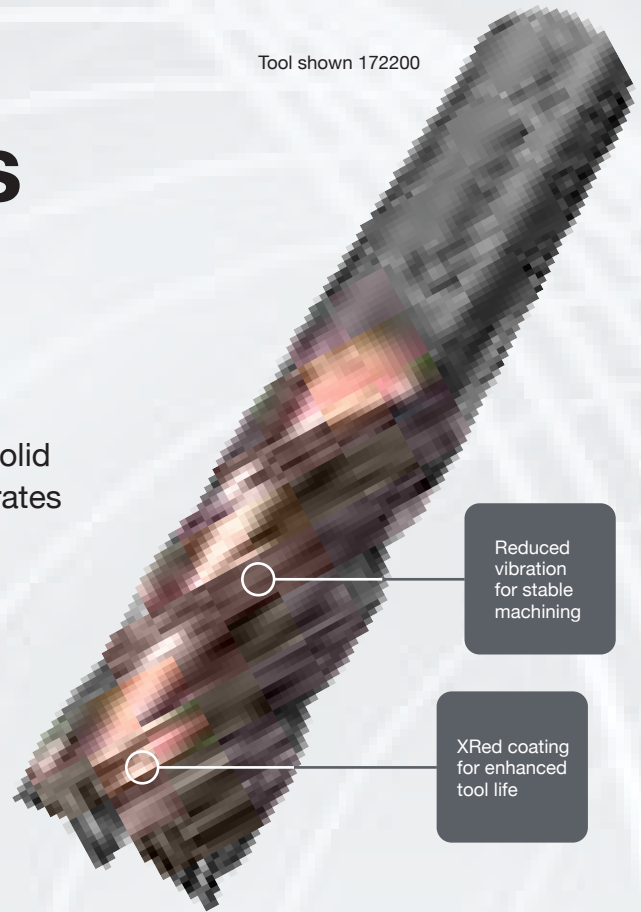
High feed rates with reduced vibration

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.

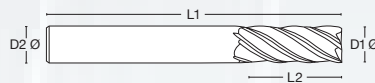
The XRed coating enhances tool life and makes this tool very suitable for steels, stainless steel, titanium and super alloys. QVari-5 is an excellent tool for applying trochoidal machining strategies.



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
6.00	6.00	58.00	13.00	0.08	-	5	172060
6.00	6.00	58.00	13.00	-	0.50	5	172061
6.00	8.00	58.00	13.00	-	1.00	5	172062
8.00	8.00	64.00	20.00	0.10	-	5	172080
8.00	8.00	64.00	20.00	-	0.50	5	172081
8.00	8.00	64.00	20.00	-	1.00	5	172082
10.00	10.00	73.00	22.00	0.15	-	5	172100
10.00	10.00	73.00	22.00	-	0.50	5	172101
10.00	10.00	73.00	22.00	-	1.00	5	172102
12.00	12.00	84.00	28.00	0.15	-	5	172120
12.00	12.00	84.00	28.00	-	0.50	5	172121
12.00	12.00	84.00	28.00	-	1.00	5	172122
16.00	16.00	93.00	34.00	0.20	-	5	172160
16.00	16.00	93.00	34.00	-	0.50	5	172161
16.00	16.00	93.00	34.00	-	1.00	5	172162
20.00	20.00	105.00	45.00	0.20	-	5	172200



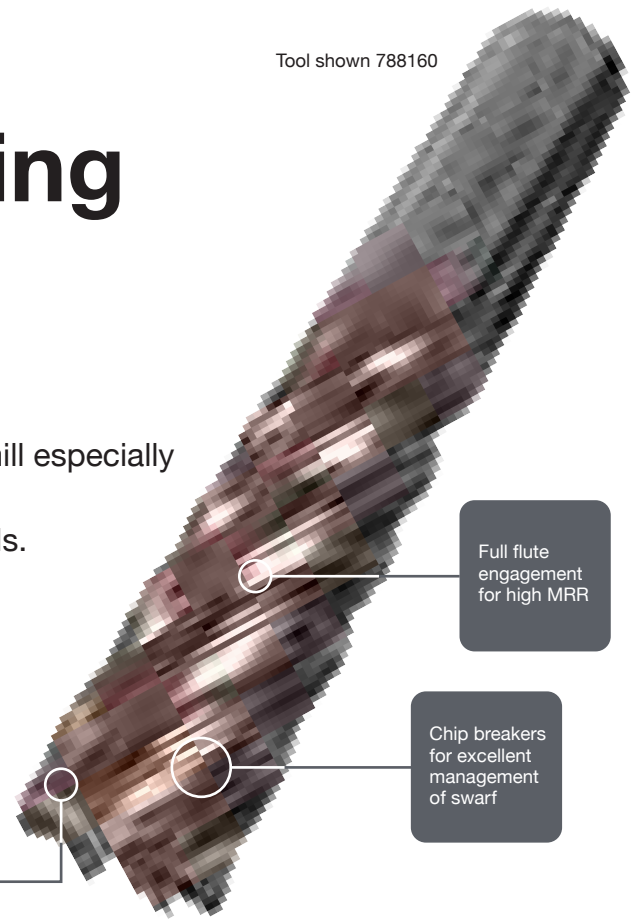
Trochoidal milling

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.

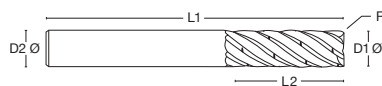
QVari-7 comes with chip breakers as standard for excellent swarf management.



Full flute engagement for high MRR

Chip breakers for excellent management of swarf

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



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
6.00	6.00	58.00	18.00	0.50	7	788060
8.00	8.00	64.00	24.00	0.50	7	788080
10.00	10.00	73.00	30.00	0.50	7	788100
10.00	10.00	73.00	30.00	1.00	7	788105
12.00	12.00	84.00	36.00	0.50	7	788120
12.00	12.00	84.00	36.00	1.00	7	788125
16.00	16.00	93.00	48.00	0.50	7	788160
16.00	16.00	93.00	48.00	1.00	7	788165



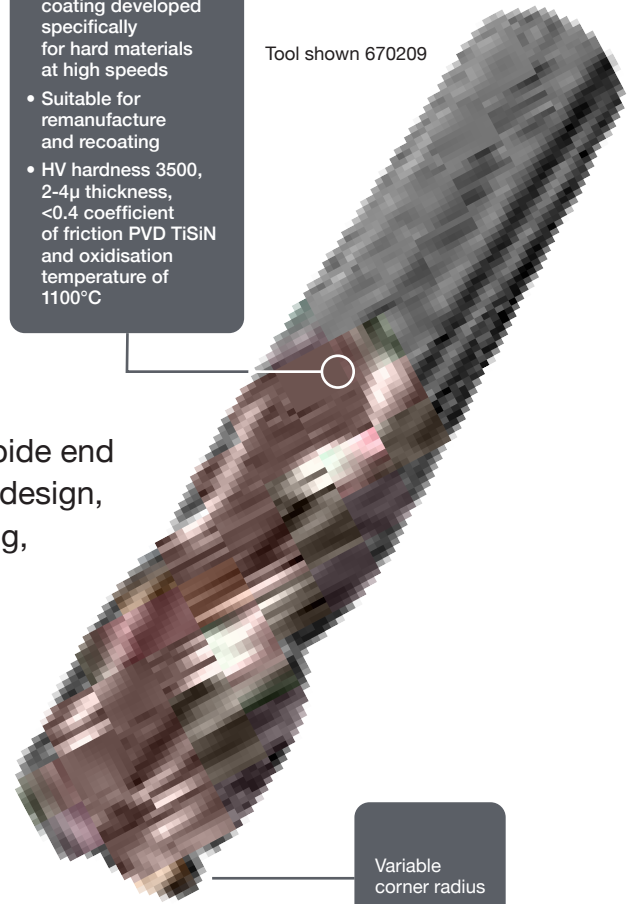
Core strength for highly stable cutting

Tool shown 788080

Conventional and trochoidal milling

- 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

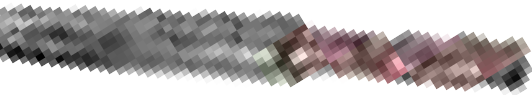
Tool shown 670209



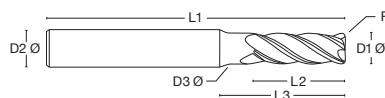
Variable corner radius

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.



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
3.00	6.00	2.90	58.00	8.00	14.00	0.50	4	670030
3.00	6.00	2.90	58.00	8.00	14.00	1.00	4	670031
4.00	6.00	3.90	58.00	11.00	16.00	0.50	4	670040
4.00	6.00	3.90	58.00	11.00	16.00	1.00	4	670041
5.00	6.00	4.90	58.00	13.00	18.00	0.50	4	670050
5.00	6.00	4.90	58.00	13.00	18.00	1.00	4	670051
6.00	6.00	-	58.00	15.00	-	0.50	4	670060
6.00	6.00	-	58.00	15.00	-	0.80	4	670061
6.00	6.00	-	58.00	15.00	-	1.00	4	670062
6.00	6.00	-	58.00	15.00	-	1.20	4	670063
6.00	6.00	-	58.00	15.00	-	1.50	4	670064
6.00	6.00	-	58.00	15.00	-	2.00	4	670065
8.00	8.00	-	64.00	22.00	-	0.50	4	670080
8.00	8.00	-	64.00	22.00	-	0.80	4	670081
8.00	8.00	-	64.00	22.00	-	1.00	4	670082



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
8.00	8.00	-	64.00	22.00	-	1.20	4	670083
8.00	8.00	-	64.00	22.00	-	1.50	4	670084
8.00	8.00	-	64.00	22.00	-	2.00	4	670085
8.00	8.00	-	64.00	22.00	-	2.50	4	670086
8.00	8.00	-	64.00	22.00	-	3.00	4	670087
10.00	10.00	-	73.00	25.00	-	0.50	4	670100
10.00	10.00	-	73.00	25.00	-	0.80	4	670101
10.00	10.00	-	73.00	25.00	-	1.00	4	670102
10.00	10.00	-	73.00	25.00	-	1.20	4	670103
10.00	10.00	-	73.00	25.00	-	1.50	4	670104
10.00	10.00	-	73.00	25.00	-	2.00	4	670105
10.00	10.00	-	73.00	25.00	-	2.50	4	670106
10.00	10.00	-	73.00	25.00	-	3.00	4	670107
12.00	12.00	-	84.00	28.00	-	0.50	4	670120
12.00	12.00	-	84.00	28.00	-	0.80	4	670121
12.00	12.00	-	84.00	28.00	-	1.00	4	670122
12.00	12.00	-	84.00	28.00	-	1.20	4	670123
12.00	12.00	-	84.00	28.00	-	1.50	4	670124
12.00	12.00	-	84.00	28.00	-	2.00	4	670125
12.00	12.00	-	84.00	28.00	-	2.50	4	670126
12.00	12.00	-	84.00	28.00	-	3.00	4	670127
16.00	16.00	-	93.00	35.00	-	0.50	4	670160
16.00	16.00	-	93.00	35.00	-	0.80	4	670161
16.00	16.00	-	93.00	35.00	-	1.00	4	670162
16.00	16.00	-	93.00	35.00	-	1.20	4	670163
16.00	16.00	-	93.00	35.00	-	1.50	4	670164
16.00	16.00	-	93.00	35.00	-	2.00	4	670165
16.00	16.00	-	93.00	35.00	-	2.50	4	670166
16.00	16.00	-	93.00	35.00	-	3.00	4	670167
20.00	20.00	-	105.00	40.00	-	0.50	4	670200
20.00	20.00	-	105.00	40.00	-	0.80	4	670201
20.00	20.00	-	105.00	40.00	-	1.00	4	670202
20.00	20.00	-	105.00	40.00	-	1.20	4	670203
20.00	20.00	-	105.00	40.00	-	1.50	4	670204
20.00	20.00	-	105.00	40.00	-	2.00	4	670205
20.00	20.00	-	105.00	40.00	-	2.50	4	670206
20.00	20.00	-	105.00	40.00	-	3.00	4	670207
20.00	20.00	-	105.00	40.00	-	4.00	4	670208
20.00	20.00	-	105.00	40.00	-	5.00	4	670209



Tool shown 198477

High feed

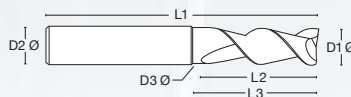
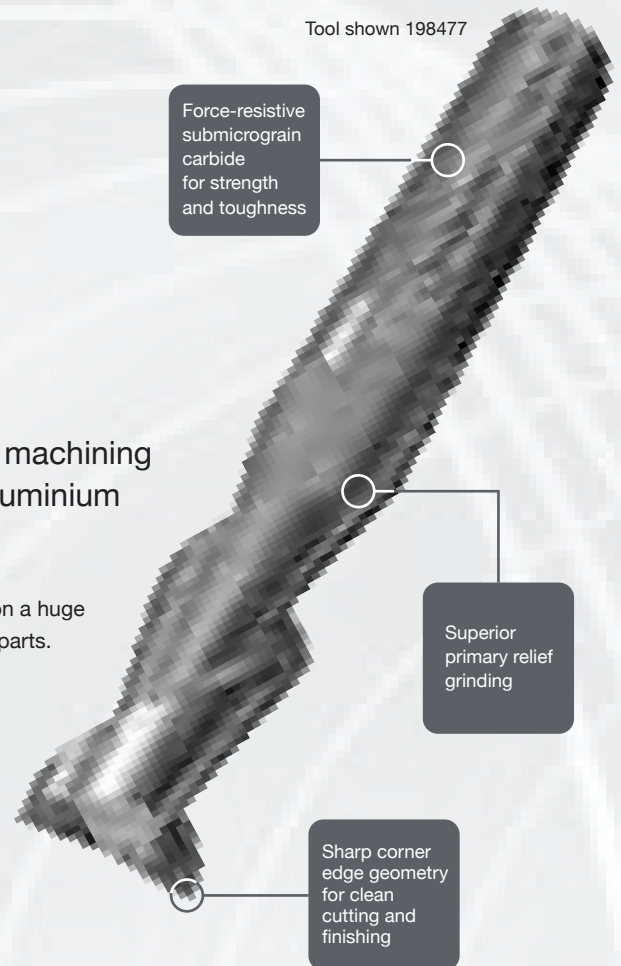
with excellent finish

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
3.00	6.00	2.80	58.00	12.00	20.00	Yes	2	198405
4.00	6.00	3.80	58.00	12.00	20.00	Yes	2	198408
5.00	6.00	4.80	58.00	18.00	24.00	Yes	2	198411
6.00	6.00	5.80	58.00	18.00	30.00	Yes	2	198414
8.00	8.00	7.80	64.00	18.00	30.00	Yes	2	198474
10.00	10.00	9.80	73.00	22.00	35.00	Yes	2	198480
12.00	12.00	11.80	84.00	26.00	45.00	Yes	2	198477
16.00	16.00	15.80	93.00	32.00	50.00	Yes	2	198486
20.00	20.00	19.80	105.00	38.00	55.00	Yes	2	198484



Tool shown 198474

End geometry allows for high speeds and feeds



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

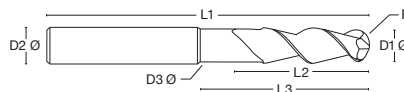
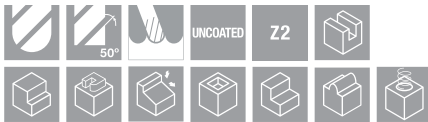
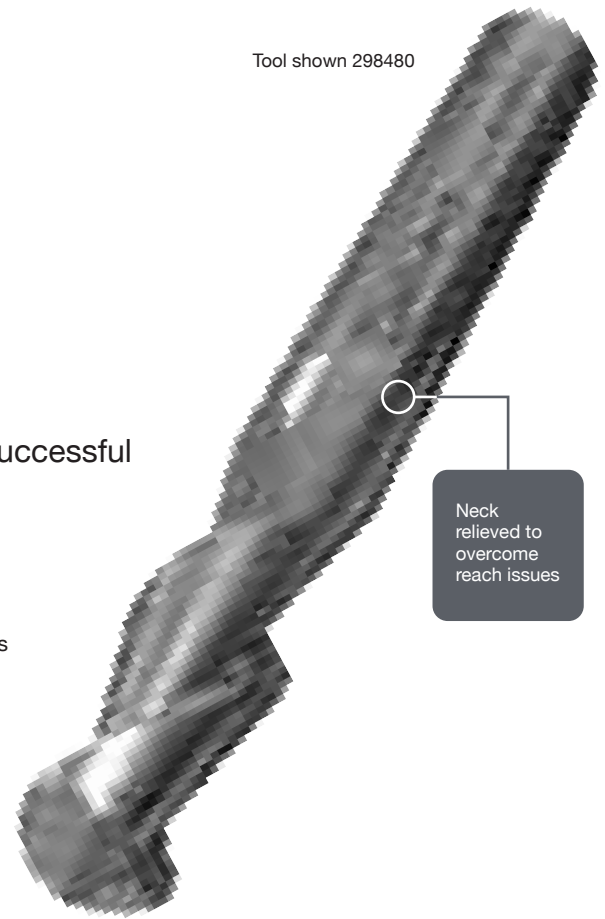
Tool shown 298480

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.

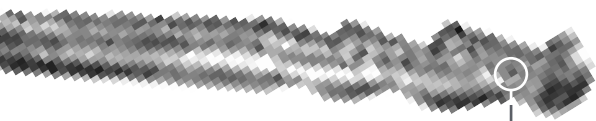
Copy milling, contour milling and profile milling are all strategies where this tool excels, providing a high degree of swarf removal and resistance to tool wear.

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.



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
6.00	6.00	5.80	58.00	18.00	30.00	3.00	2	298415
8.00	8.00	7.80	64.00	18.00	30.00	4.00	2	298475
10.00	10.00	9.80	73.00	22.00	35.00	5.00	2	298481
12.00	12.00	11.80	84.00	26.00	45.00	6.00	2	298479
16.00	16.00	15.80	93.00	32.00	50.00	8.00	2	298480



Tool shown 298415

Uncoated
for most
applications

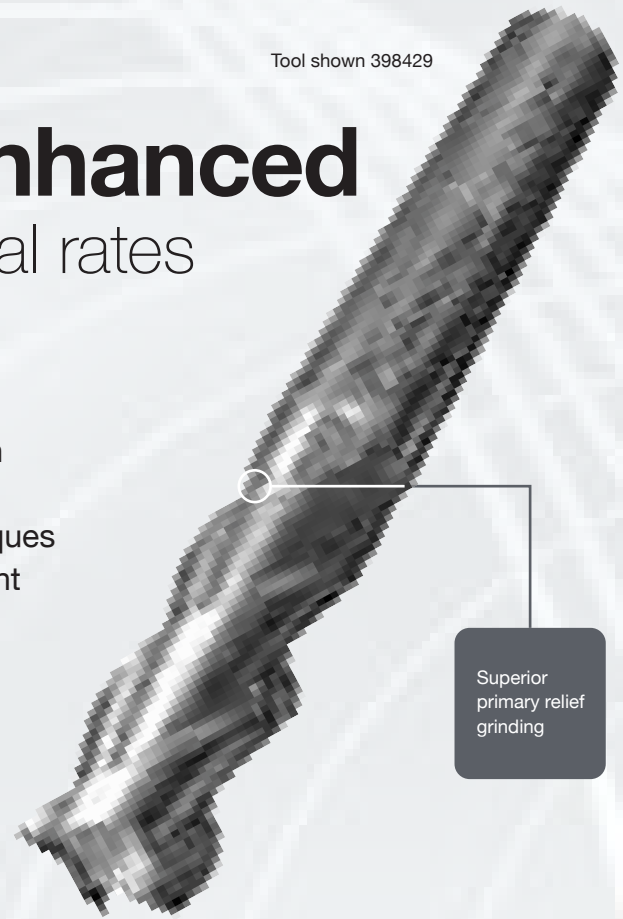


Performance enhanced

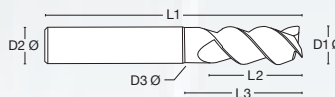
with high material removal rates

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.

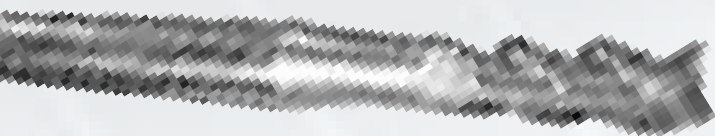


Superior primary relief grinding



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
3.00	6.00	2.80	58.00	8.00	16.00	0.05	3	398405
4.00	6.00	3.80	58.00	11.00	18.00	0.06	3	398408
5.00	6.00	4.70	58.00	13.00	20.00	0.06	3	398411
6.00	6.00	5.60	58.00	13.00	20.00	0.08	3	398414
8.00	8.00	7.50	64.00	19.00	25.00	0.10	3	398421
10.00	10.00	9.50	73.00	22.00	30.00	0.15	3	398429
12.00	12.00	11.50	84.00	26.00	36.00	0.15	3	398435
16.00	16.00	15.50	93.00	32.00	42.00	0.20	3	398444
20.00	20.00	19.50	105.00	38.00	50.00	0.25	3	398452



Tool shown 398411



High Performance End Mills

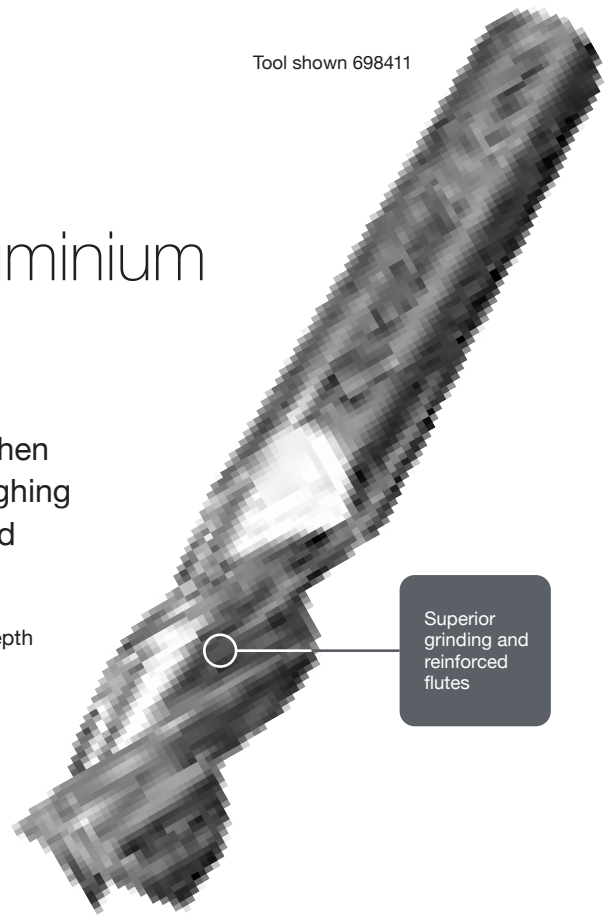
Tool shown 698411

The choice

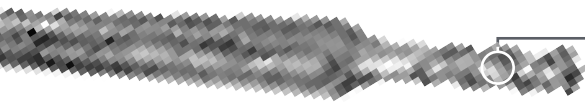
for 6000/7000 series aluminium

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.

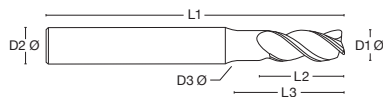
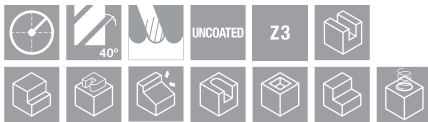


Superior grinding and reinforced flutes



Optimised flute design for maximum chip space and swarf evacuation

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
3.00	6.00	2.80	58.00	8.00	13.00	Yes	3	698405
4.00	6.00	3.80	58.00	12.00	18.00	Yes	3	698406
5.00	6.00	4.70	58.00	14.00	20.00	Yes	3	698407
6.00	6.00	-	58.00	14.00	-	Yes	3	698408
8.00	8.00	-	64.00	19.00	-	Yes	3	698409
10.00	10.00	-	73.00	22.00	-	Yes	3	698410
12.00	12.00	-	84.00	26.00	-	Yes	3	698411
16.00	16.00	-	93.00	32.00	-	Yes	3	698412
20.00	20.00	-	105.00	38.00	-	Yes	3	698413



Tool shown 721160

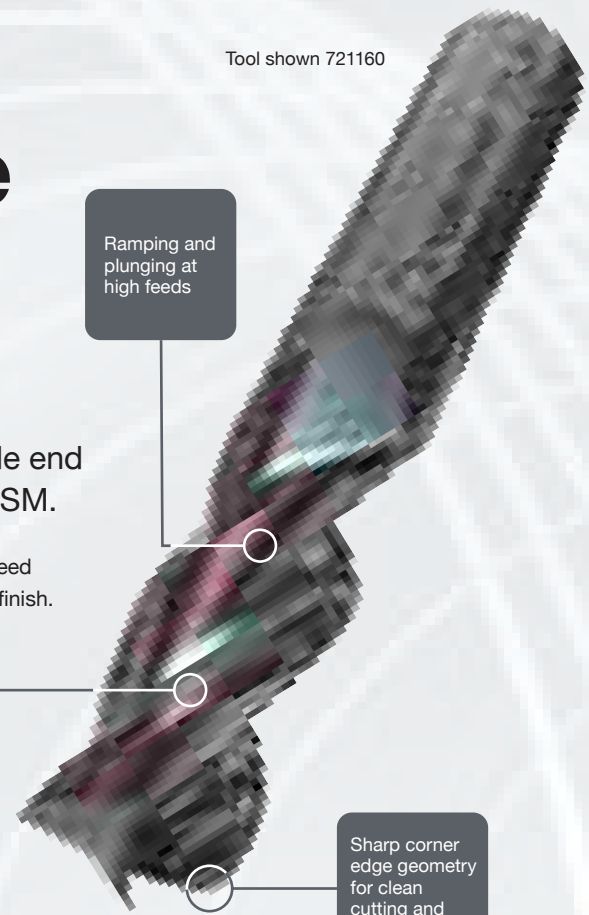
Balanced 3 flute

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.

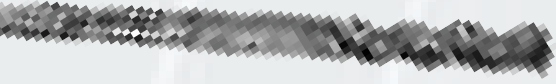
Open gullets within the geometry allow for ramping and plunging at higher feed rates while the TX-R coating and polished flutes enhance performance and finish. QAlu is excellent for roughing and finishing.

Designed with sharp corner geometry QAlu is ideal for machining square corners in manufactured parts.

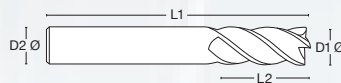


- TX-R is a ta-C PVD Arc coating with a thickness of <math><0.5\mu\text{m}</math>
- Hardness HV 0.02 >5000
- Oxidation temperature 500°C
- Coefficient of friction <math><0.1</math>
- Process temperature below 180°C
- Very good, typically class 1 adhesion

Sharp corner edge geometry for clean cutting and finishing



Tool shown 721030



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
3.00	3.00	50.00	12.00	3	721030
4.00	4.00	51.00	16.00	3	721040
5.00	5.00	51.00	20.00	3	721050
6.00	6.00	58.00	24.00	3	721060
8.00	8.00	64.00	25.00	3	721080
10.00	10.00	73.00	27.00	3	721100
12.00	12.00	84.00	32.00	3	721120
16.00	16.00	93.00	39.00	3	721160
20.00	20.00	105.00	42.00	3	721200



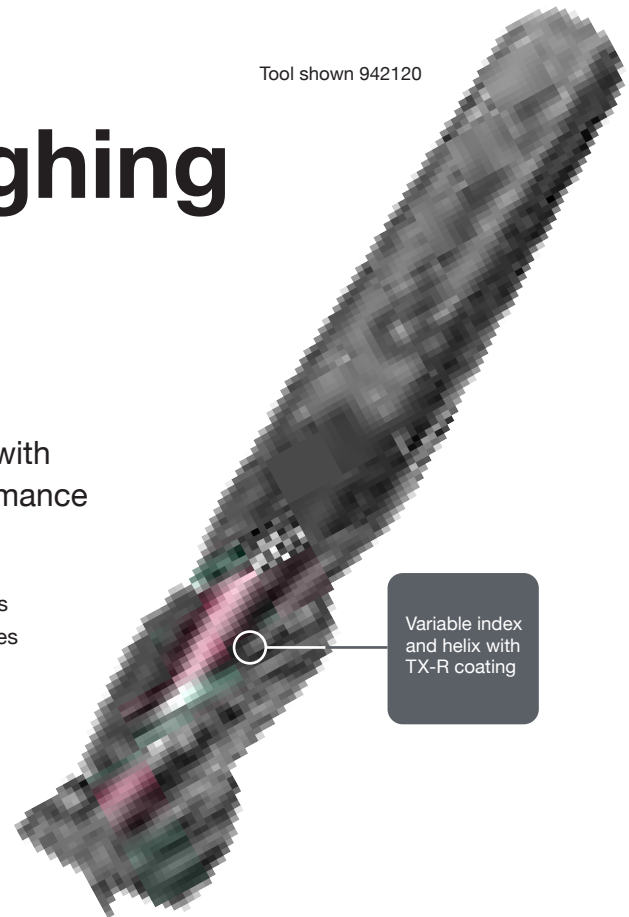
High Performance Roughing End Mills

Tool shown 942120

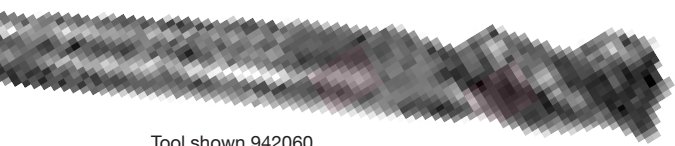
Trochoidal roughing of aluminium

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

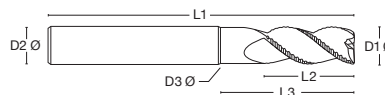
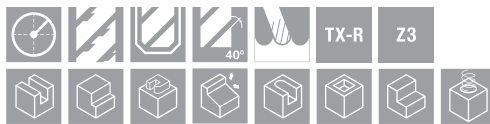
QAlu-R can be used in conventional and trochoidal machining strategies with lower power requirements. It has variable index and helix and comes with TX-R coating.



Variable index and helix 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
6.00	6.00	5.70	58.00	13.00	23.00	0.10	3	942060
8.00	8.00	7.70	64.00	18.00	28.00	0.20	3	942080
10.00	10.00	9.50	73.00	21.00	31.00	0.25	3	942100
12.00	12.00	11.50	84.00	25.00	35.00	0.30	3	942120
16.00	16.00	15.30	93.00	32.00	50.00	0.45	3	942160
20.00	20.00	19.30	105.00	40.00	60.00	0.50	3	942200

A coated 3 flute

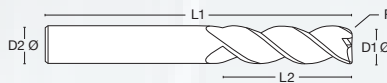
for excellent surface finishes

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 124204

Corner radii for machining aluminium and non-ferrous

Tool shown 124030

TX-R coating for extended tool life



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
3.00	3.00	50.00	12.00	0.25	3	124030
3.00	3.00	50.00	12.00	0.50	3	124031
3.00	3.00	50.00	12.00	0.75	3	124032
4.00	4.00	51.00	16.00	0.25	3	124040
4.00	4.00	51.00	16.00	0.50	3	124041
4.00	4.00	51.00	16.00	0.75	3	124042
5.00	5.00	51.00	20.00	0.25	3	124050
5.00	5.00	51.00	20.00	0.50	3	124051
5.00	5.00	51.00	20.00	0.75	3	124052
6.00	6.00	58.00	24.00	0.50	3	124060
6.00	6.00	58.00	24.00	1.00	3	124061
6.00	6.00	58.00	24.00	1.50	3	124062
6.00	6.00	58.00	24.00	2.00	3	124063
8.00	8.00	64.00	25.00	0.50	3	124080
8.00	8.00	64.00	25.00	1.00	3	124081
8.00	8.00	64.00	25.00	1.50	3	124082
8.00	8.00	64.00	25.00	2.00	3	124083
8.00	8.00	64.00	25.00	3.00	3	124084
10.00	10.00	73.00	27.00	0.50	3	124100
10.00	10.00	73.00	27.00	1.00	3	124101
10.00	10.00	73.00	27.00	1.50	3	124102
10.00	10.00	73.00	27.00	2.00	3	124103
10.00	10.00	73.00	27.00	3.00	3	124104
12.00	12.00	84.00	32.00	0.50	3	124120
12.00	12.00	84.00	32.00	1.00	3	124121
12.00	12.00	84.00	32.00	1.50	3	124122
12.00	12.00	84.00	32.00	2.00	3	124123
12.00	12.00	84.00	32.00	3.00	3	124124
16.00	16.00	93.00	39.00	0.50	3	124160
16.00	16.00	93.00	39.00	1.00	3	124161
16.00	16.00	93.00	39.00	1.50	3	124162
16.00	16.00	93.00	39.00	2.00	3	124163
16.00	16.00	93.00	39.00	3.00	3	124164
20.00	20.00	105.00	42.00	0.50	3	124200
20.00	20.00	105.00	42.00	1.00	3	124201
20.00	20.00	105.00	42.00	1.50	3	124202
20.00	20.00	105.00	42.00	2.00	3	124203
20.00	20.00	105.00	42.00	3.00	3	124204



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.

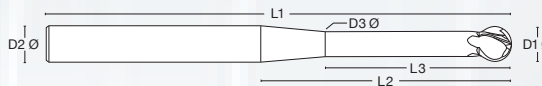
Lollipop tools are often only used for undercuts and de-burring. Orbis, with its new CXPlus coating, is setting new standards of unrivalled high performance and surface finish in applications and component features that have previously caused many issues.

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

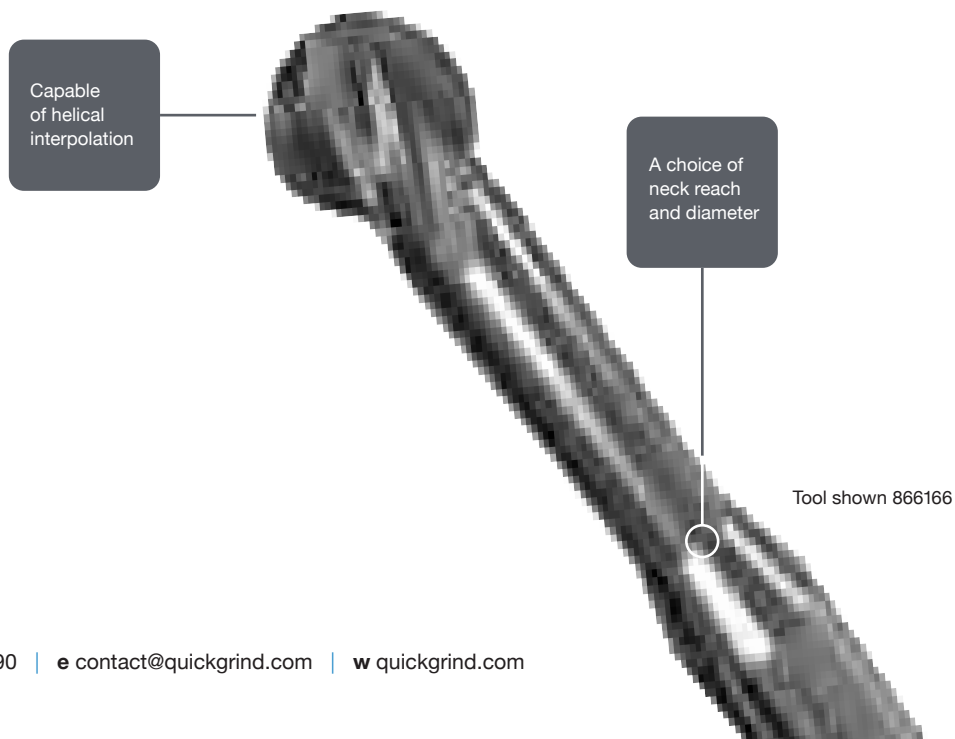
Applications and features

- 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
2.00	6.00	1.30	80.00	30.00	6.00	270°	4	866020
2.00	6.00	1.30	80.00	36.00	10.00	270°	4	866023
2.00	6.00	1.30	80.00	42.00	16.00	270°	4	866026
3.00	6.00	2.00	80.00	30.00	9.00	270°	4	866030
3.00	6.00	2.00	80.00	36.00	15.00	270°	4	866033
3.00	6.00	2.00	80.00	42.00	21.00	270°	4	866036
4.00	6.00	2.70	80.00	30.00	12.00	270°	4	866040
4.00	6.00	2.70	80.00	36.00	20.00	270°	4	866043
4.00	6.00	2.70	100.00	42.00	32.00	270°	4	866046
6.00	6.00	4.00	80.00	28.00	18.00	270°	4	866060
6.00	6.00	4.00	80.00	40.00	30.00	270°	4	866063
6.00	6.00	4.00	100.00	44.00	32.00	270°	4	866066
8.00	8.00	5.40	100.00	38.00	24.00	270°	4	866080
8.00	8.00	5.40	100.00	54.00	40.00	270°	4	866083
8.00	8.00	5.40	100.00	68.00	55.00	270°	4	866086
10.00	10.00	6.70	100.00	48.00	30.00	270°	4	866100
10.00	10.00	6.70	100.00	58.00	40.00	270°	4	866103
10.00	10.00	6.70	100.00	68.00	55.00	270°	4	866106
12.00	12.00	8.00	100.00	58.00	36.00	270°	4	866120
12.00	12.00	8.00	100.00	68.00	55.00	270°	4	866126
16.00	16.00	10.70	100.00	54.00	48.00	270°	4	866160
16.00	16.00	10.70	100.00	68.00	55.00	270°	4	866166



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

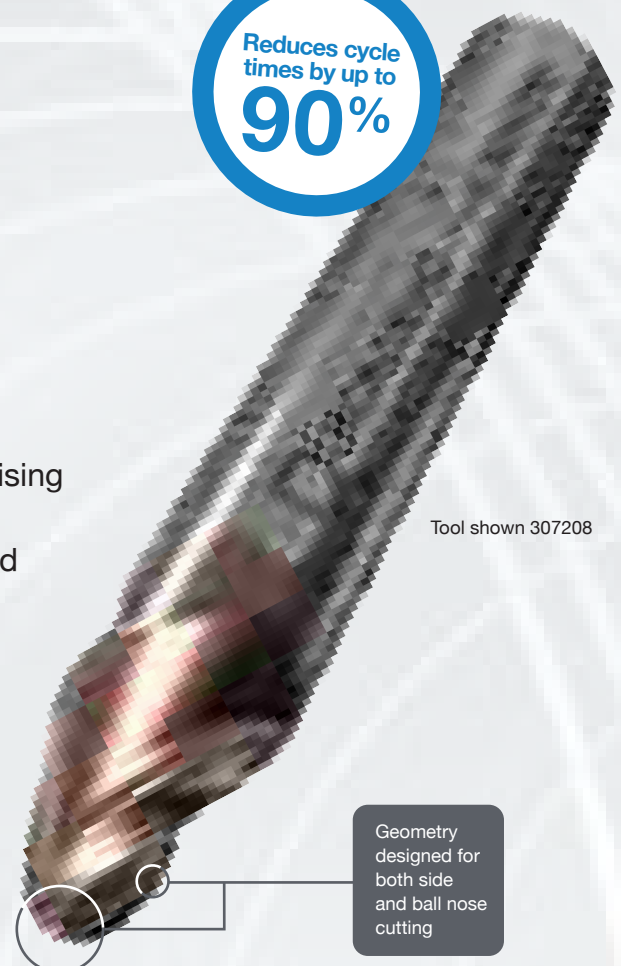
Two tools in one

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

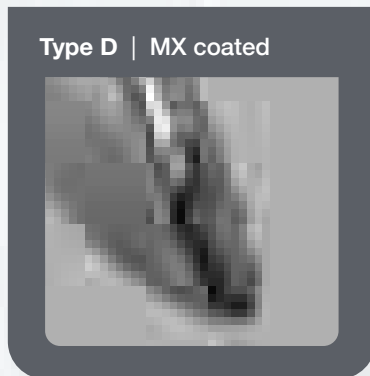
Geometry designed for both side and ball nose cutting

A choice of coatings for a wide range of materials



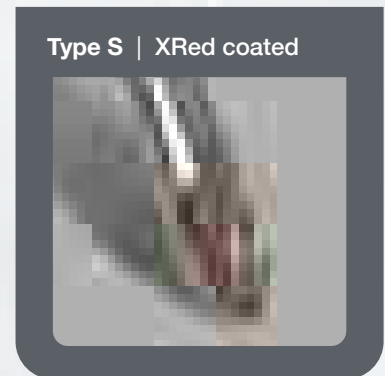
Type A | Uncoated

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



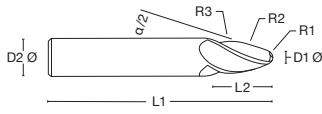
Type D | MX coated

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 45-55 Hrc	



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
2.00	6.00	58.00	8.50	1.00	250	2.00	3	20.00	A	852503
2.00	6.00	58.00	8.50	1.00	250	2.00	3	20.00	D	862503
2.00	6.00	58.00	8.50	1.00	250	2.00	3	20.00	S	872503
3.00	8.00	64.00	10.50	1.50	250	4.00	3	20.00	A	197202
3.00	8.00	64.00	14.50	1.50	1000	4.00	3	12.50	A	797202
3.00	8.00	64.00	10.50	1.50	250	4.00	3	20.00	D	207202
3.00	8.00	64.00	14.50	1.50	1000	4.00	3	12.50	D	897202
3.00	8.00	64.00	10.50	1.50	250	4.00	3	20.00	S	307202
3.00	8.00	64.00	14.50	1.50	1000	4.00	3	12.50	S	997202
4.00	10.00	73.00	12.50	2.00	250	5.00	3	20.00	A	197203
4.00	10.00	73.00	16.50	2.00	1000	5.00	3	12.50	A	797203
4.00	10.00	73.00	12.50	2.00	250	5.00	3	20.00	D	207203
4.00	10.00	73.00	16.50	2.00	1000	5.00	3	12.50	D	897203
4.00	10.00	73.00	12.50	2.00	250	5.00	3	20.00	S	307203
4.00	10.00	73.00	16.50	2.00	1000	5.00	3	12.50	S	997203
6.00	12.00	84.00	13.50	3.00	250	6.00	3	20.00	A	197204
6.00	12.00	84.00	19.50	3.00	1000	6.00	3	12.50	A	797204
6.00	12.00	84.00	13.50	3.00	250	6.00	3	20.00	D	207204
6.00	12.00	84.00	19.50	3.00	1000	6.00	3	12.50	D	897204
6.00	12.00	84.00	13.50	3.00	250	6.00	3	20.00	S	307204
6.00	12.00	84.00	19.50	3.00	1000	6.00	3	12.50	S	997204
8.00	16.00	93.00	18.50	4.00	500	8.00	3	20.00	A	197205
8.00	16.00	93.00	18.50	4.00	500	8.00	3	20.00	D	207205
8.00	16.00	93.00	18.50	4.00	500	8.00	3	20.00	S	307205
8.00	16.00	93.00	18.50	4.00	1500	8.00	3	20.00	A	197208
8.00	16.00	93.00	18.50	4.00	1500	8.00	3	20.00	D	207208
8.00	16.00	93.00	18.50	4.00	1500	8.00	3	20.00	S	307208

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 next 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 pages 41 and 44 for more information.

Eliminator barrel tools are suitable for sharpening and recoating multiple times with our QuickEdge programme (see page 42), increasing your profitability while at the same time reducing your carbon footprint.



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
1.00	6.00	58.00	22.00	0.50	95	3	S	230060
1.00	8.00	64.00	25.00	0.50	90	3	S	230080
2.00	10.00	73.00	26.00	1.00	85	3	S	230010
2.00	12.00	84.00	28.00	1.00	80	3	S	230012
3.00	16.00	93.00	31.00	1.50	75	3	S	230016
4.00	10.00	73.00	26.00	2.00	85	6	S	260010
4.00	12.00	84.00	28.00	2.00	80	6	S	260012
6.00	16.00	93.00	31.00	3.00	75	6	S	260016

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 that can eliminate the need for polishing or other time consuming finishing techniques.



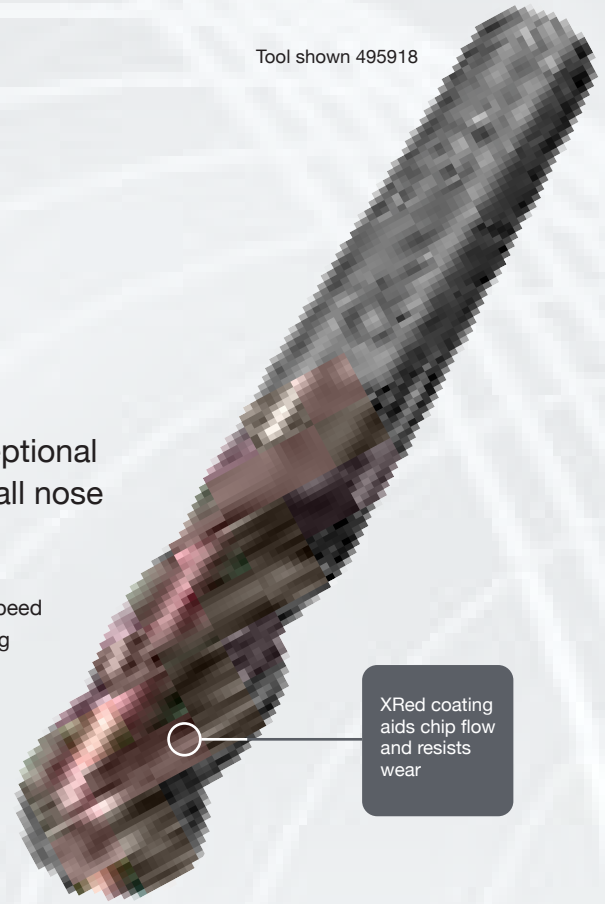
High Performance Ball Nose End Mills

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.

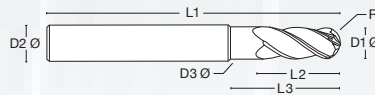
Four flutes provide for highly efficient swarf evacuation and enable high speed and feed machining with great stability. Whether contour milling or profiling this tool excels at roughing, semi-finishing, finishing and super-finishing in a wide range of materials.



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
3.00	6.00	2.80	58.00	10.00	15.00	1.50	4	495906
4.00	6.00	3.80	58.00	11.00	16.00	2.00	4	495908
5.00	6.00	4.70	58.00	13.00	18.00	2.50	4	495914
6.00	6.00	5.60	58.00	13.00	20.00	3.00	4	495915
8.00	8.00	7.50	64.00	18.00	27.00	4.00	4	495916
10.00	10.00	9.50	73.00	22.00	32.00	5.00	4	495917
12.00	12.00	11.50	84.00	26.00	38.00	6.00	4	495918
16.00	16.00	15.50	93.00	32.00	44.00	8.00	4	495944



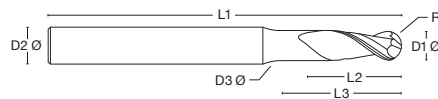
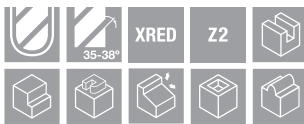
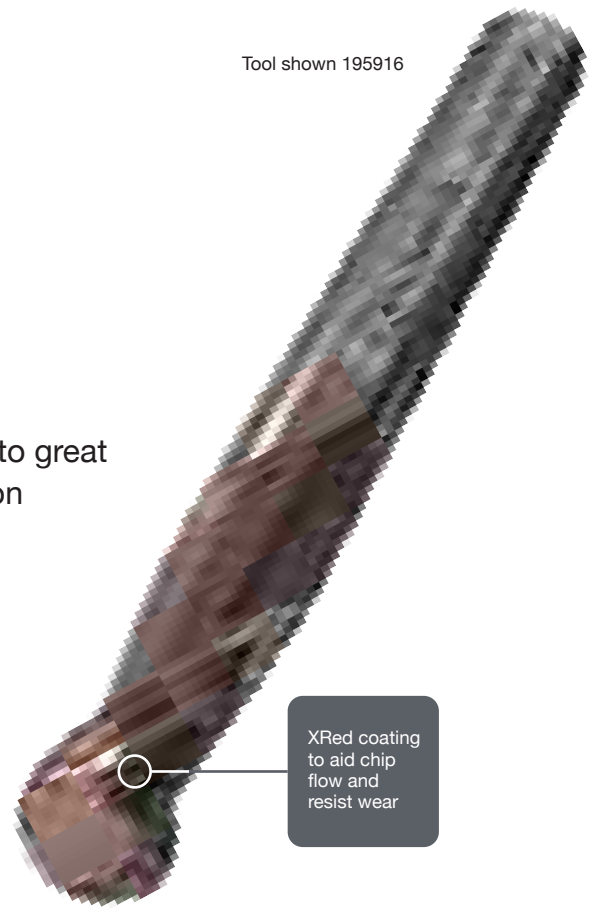
High Performance Ball Nose End Mills

Tool shown 195916

A real winner

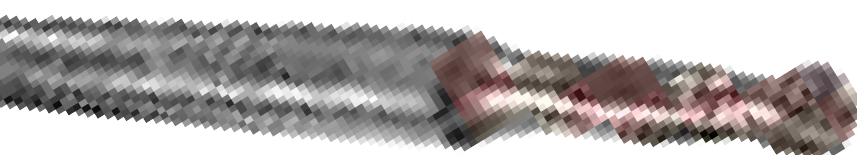
This world beating 2 flute ball nose cutter is used to great effect in mould and die, general engineering and on components such as turbine blades.

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
3.00	6.00	2.80	58.00	5.00	14.00	1.50	2	195912
4.00	6.00	3.80	58.00	8.00	14.00	2.00	2	195913
5.00	6.00	4.80	58.00	10.00	17.00	2.50	2	195914
6.00	6.00	-	58.00	12.00	-	3.00	2	195915
8.00	8.00	-	64.00	16.00	-	4.00	2	195916
10.00	10.00	-	73.00	20.00	-	5.00	2	195917
12.00	12.00	-	84.00	25.00	-	6.00	2	195918



Tool shown 195913



Tool shown 196206

High feed, high ROI

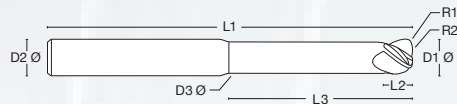
This solid carbide coated high feed tool was initially developed with 3 flutes to machine deep pockets for a UK-based Formula 1 team.

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 196201



Spectre 3 flute high feed end mill

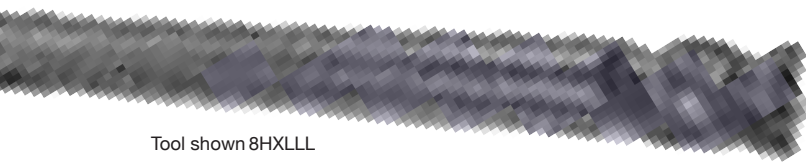
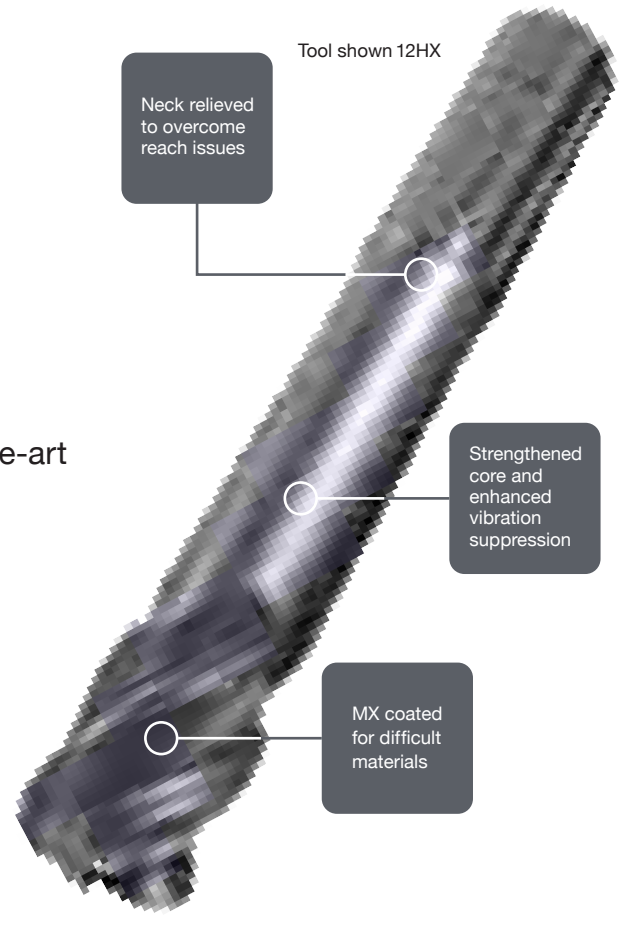
D1 Ø mm	D2 Ø mm	D3 Ø mm	L1 mm	L2 mm	L3 mm	R1/R2 mm	Teeth Z	Stock code
3.00	6.00	2.75	58.00	1.20	32.00	0.25/2.00	3	196201
6.00	6.00	5.20	58.00	4.00	26.00	0.50/4.00	3	196202
6.00	6.00	5.20	80.00	4.00	34.00	0.50/4.00	3	196203
8.00	8.00	7.00	80.00	6.00	40.00	0.67/5.33	3	196204
8.00	8.00	7.00	64.00	6.00	30.00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



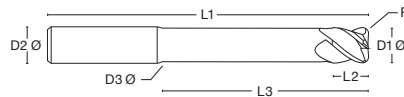
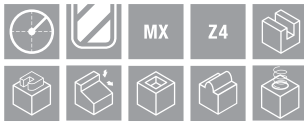
The very best of British

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
6.00	6.00	5.50	58.00	8.00	20.00	0.50	4	6HX
6.00	6.00	5.50	66.00	8.00	30.00	0.50	4	6HXL
8.00	8.00	7.50	64.00	10.00	35.00	1.00	4	8HX
8.00	8.00	7.50	90.00	10.00	50.00	1.00	4	8HXL
8.00	8.00	7.50	110.00	10.00	70.00	1.00	4	8HXLLL
10.00	10.00	9.30	73.00	10.00	35.00	2.00	4	10HX
10.00	10.00	9.30	90.00	10.00	50.00	2.00	4	10HXL
10.00	10.00	9.30	100.00	10.00	60.00	2.00	4	10HXLL
12.00	12.00	11.00	84.00	15.00	50.00	3.00	4	12HX
12.00	12.00	11.00	100.00	15.00	60.00	3.00	4	12HXL
12.00	12.00	11.00	125.00	15.00	80.00	3.00	4	12HXLL
16.00	16.00	15.00	100.00	15.00	60.00	3.50	4	16HX
16.00	16.00	15.00	125.00	15.00	80.00	3.50	4	16HXL
16.00	16.00	15.00	145.00	15.00	100.00	3.50	4	16HXLL



High Performance High Feed End Mills

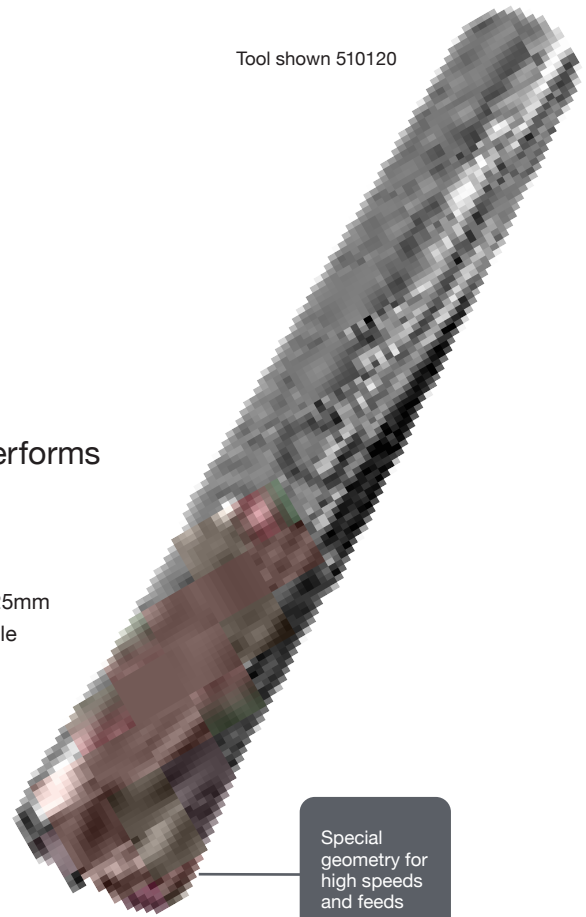
Tool shown 510120

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.

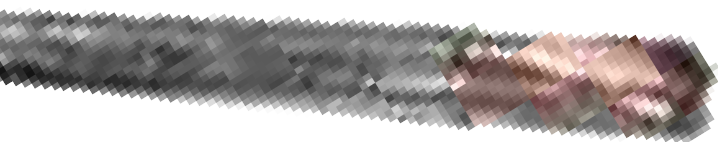


Special geometry for high speeds and feeds



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
6.00	6.00	5.40	58.00	6.00	12.00	1.50	4	510060
8.00	8.00	7.50	64.00	8.00	16.00	2.00	4	510080
10.00	10.00	9.50	73.00	10.00	20.00	2.00	4	510100
12.00	12.00	11.05	84.00	12.00	24.00	3.00	4	510120



Tool shown 510060



Longer reach

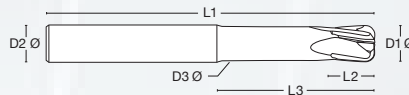
for improved access

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



Tool shown 530060

End design
for flat bottom
finishing



Reaper Long 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
6.00	6.00	5.40	66.00	6.00	24.00	1.50	4	530060
8.00	8.00	7.50	70.00	8.00	32.00	2.00	4	530080
10.00	10.00	9.50	85.00	10.00	40.00	2.00	4	530100
12.00	12.00	11.05	100.00	12.00	48.00	3.00	4	530120



High Feed End Mills

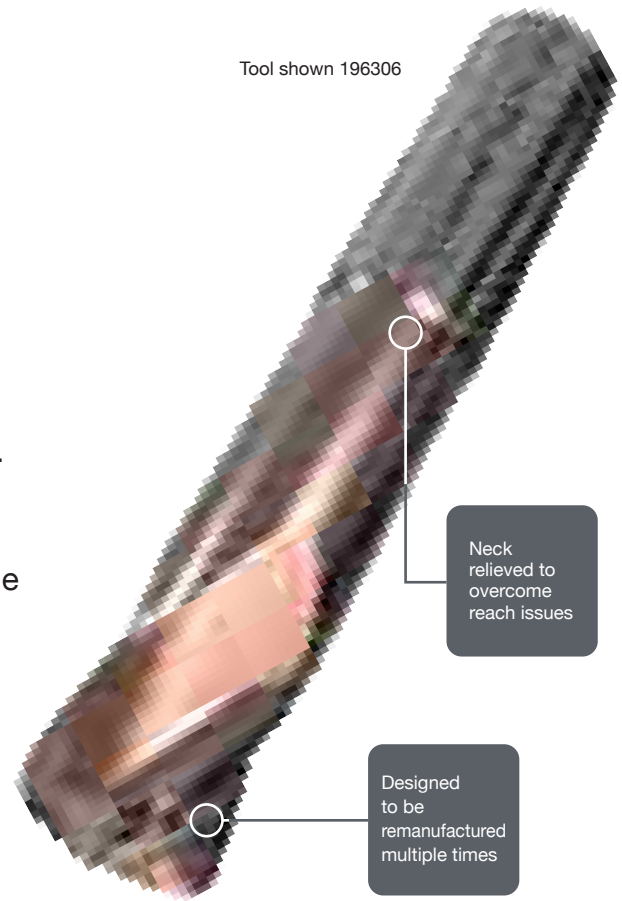
Tool shown 196306

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.

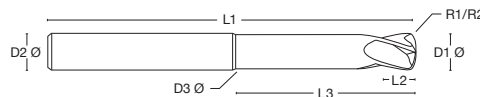
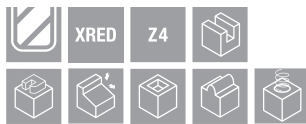
Phantoms achieve 5-6x tool life over normal end mills in roughing operations and have become firm favourites in motorsport and aerospace, where they are used to machine titanium and stainless steel.

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



Neck relieved to overcome reach issues

Designed to be remanufactured multiple times



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
6.00	6.00	5.75	58.00	6.00	24.00	1.20/9.00	4	196360
8.00	8.00	7.50	64.00	8.00	26.00	1.60/12.00	4	196380
10.00	10.00	9.50	73.00	10.00	30.00	2.00/15.00	4	196301
12.00	12.00	11.00	84.00	6.00	50.00	2.00/20.00	4	196312
16.00	16.00	15.00	93.00	8.00	50.00	2.50/25.00	4	196306
20.00	20.00	19.00	105.00	20.00	50.00	3.00/32.00	4	196320



Tool shown 196312



High Performance End Mills

The strong finisher

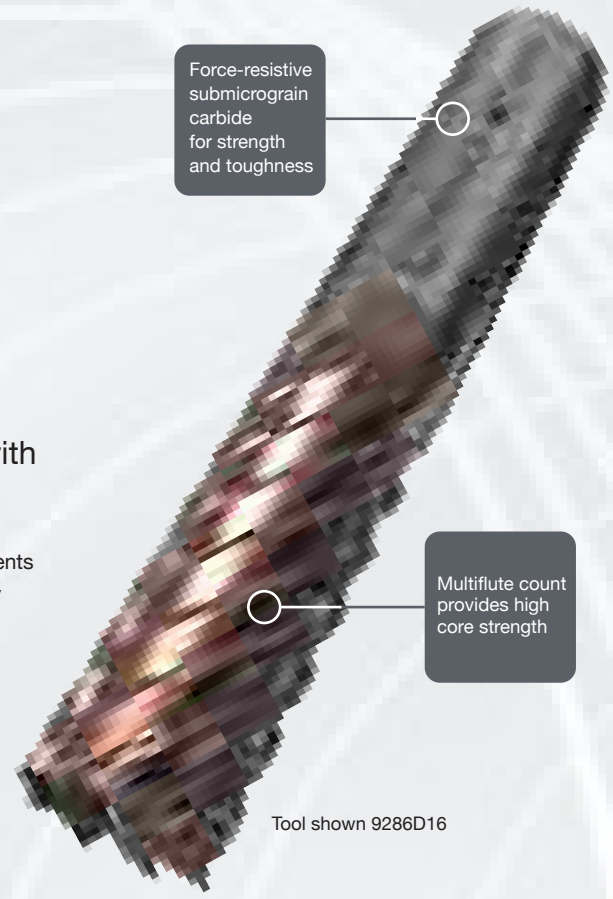
The Demon multiflute end mill will provide you with unrivalled high performance.

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.

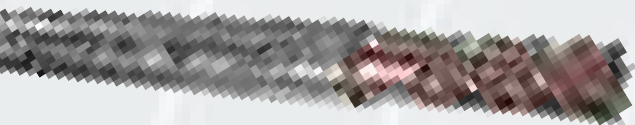
Ideal for profile milling in steels, hardened steels and exotics, Demon's higher speeds and feeds rates deliver increased productivity and high material removal rates.

Force-resistant submicrograin carbide for strength and toughness

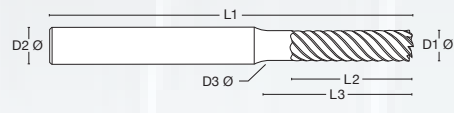
Multiflute count provides high core strength



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
3.00	6.00	2.95	58.00	5.00	10.00	Yes	6	9286D3
4.00	6.00	3.95	58.00	8.00	13.50	Yes	6	9286D4
5.00	6.00	4.95	58.00	10.00	15.00	Yes	6	9286D5
6.00	6.00	-	58.00	12.00	-	Yes	6	9286D6
8.00	8.00	-	64.00	20.00	-	Yes	8	9286D8
10.00	10.00	-	73.00	25.00	-	Yes	8	9286D10
12.00	12.00	-	84.00	30.00	-	Yes	8	9286D12
16.00	16.00	-	93.00	40.00	-	Yes	8	9286D16



Tool shown 395636

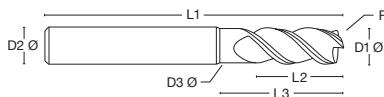
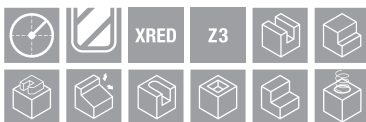
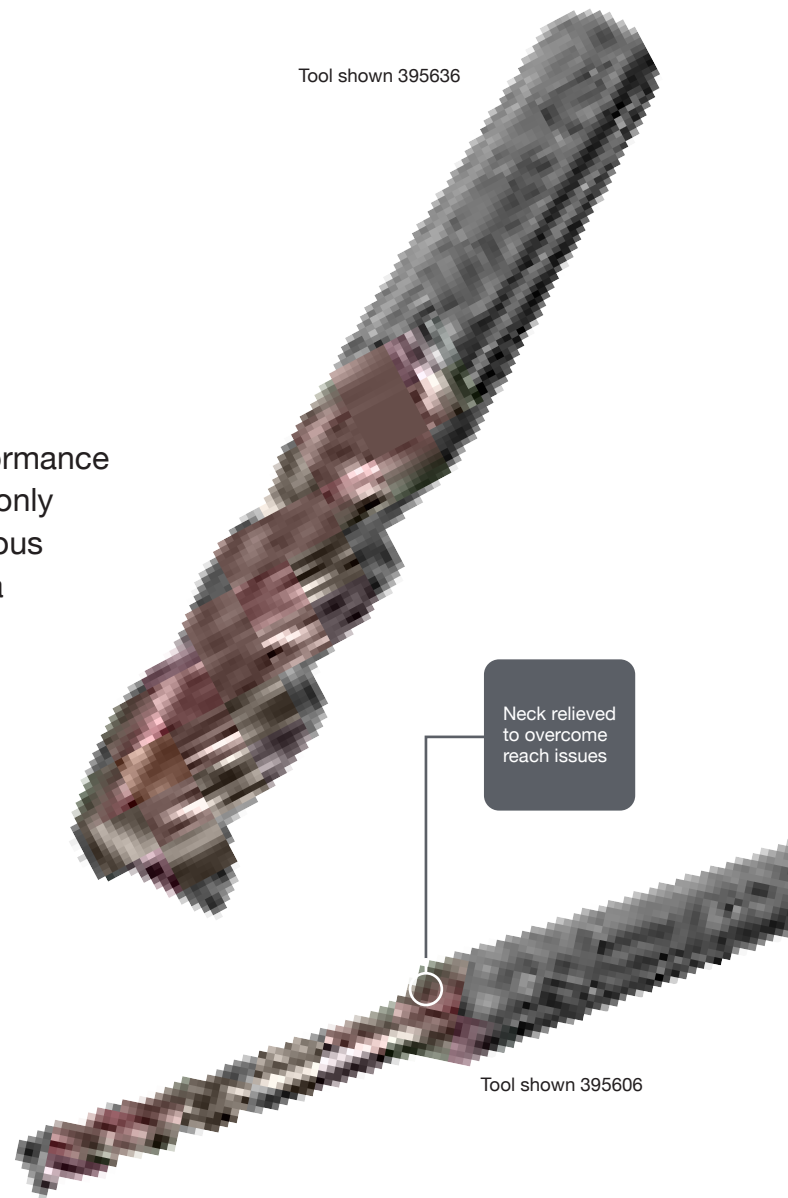
Three flutes can be better than four

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.



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
3.00	6.00	2.80	58.00	10.00	20.00	0.25	3	395606
4.00	6.00	3.80	58.00	12.00	20.00	0.25	3	395609
5.00	6.00	4.75	58.00	14.00	22.00	0.25	3	395612
6.00	6.00	5.75	58.00	15.00	24.00	0.25	3	395614
8.00	8.00	7.50	64.00	18.00	26.00	0.50	3	395621
10.00	10.00	9.50	73.00	22.00	30.00	0.50	3	395629
12.00	12.00	11.50	84.00	32.00	40.00	0.50	3	395636
16.00	16.00	15.50	93.00	32.00	50.00	0.50	3	395645

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.

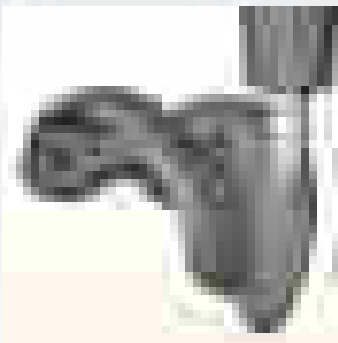
Implementing QuickCam in your business will give you reduced cycle times, leading to reduced tooling costs, increased output and improved capacity.

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

Remanufacture

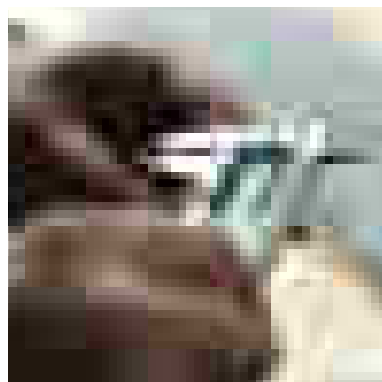
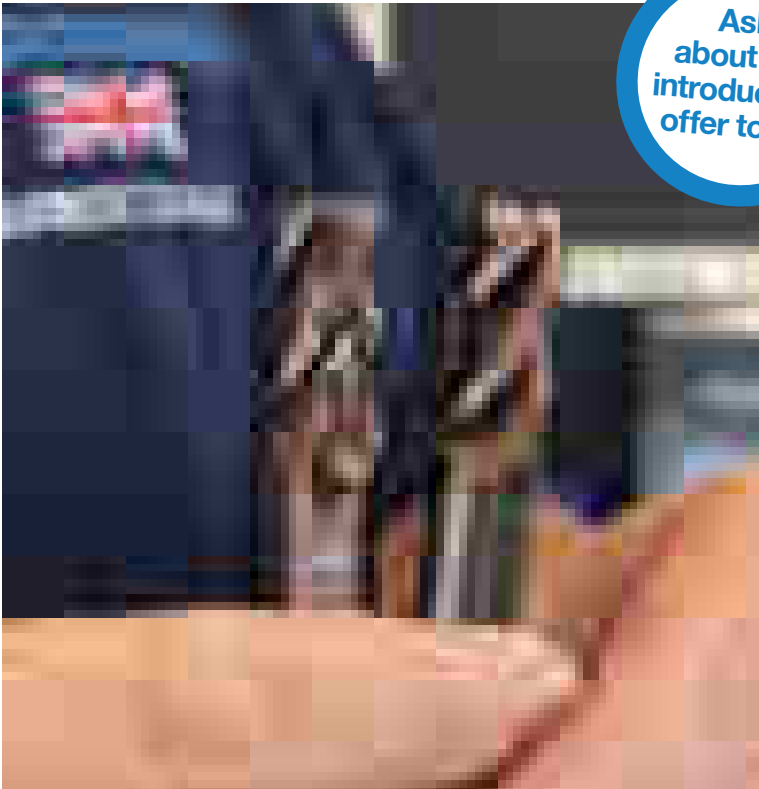
adds value to your tooling investment

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

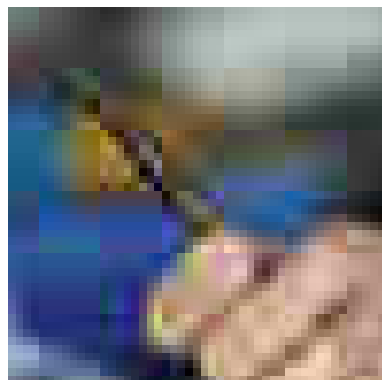
Remanufacture doesn't mean compromising on quality. It has always been our policy to produce tools of such high quality that they can be used more than once. Which means that even after nine remanufactures you will continue to enjoy new tool performance, and a clear conscience.

Ask
about our
introductory
offer today

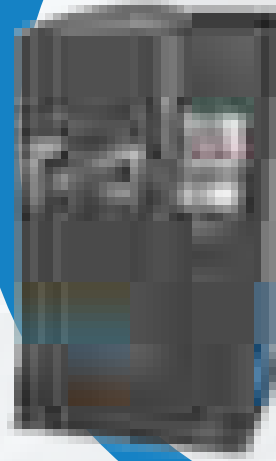


We happily accept solid carbide cutting tools made by other manufacturers and apply the same expertise to remanufacturing them.

Call us today for more information –
+44 (0) 1684 294090



24/7 control of your tooling inventory



Special Offer

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

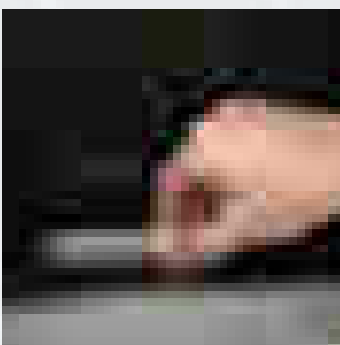
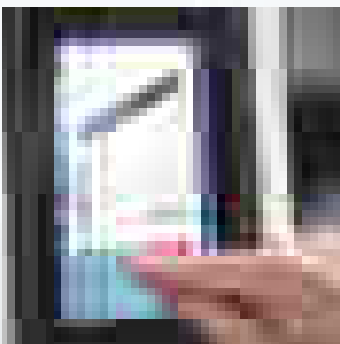
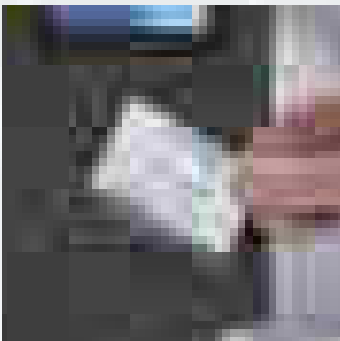
Call today
+44 (0) 1684 294090

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

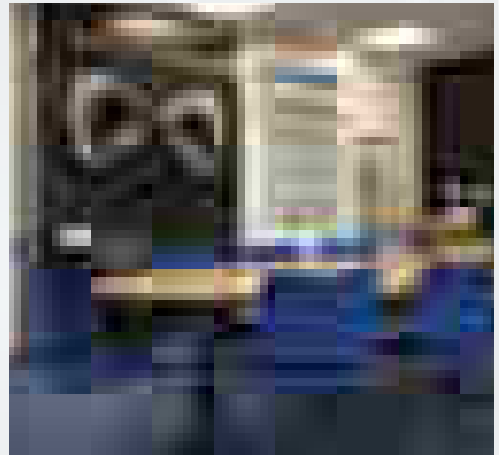
- 24/7 secure access
- Allows minimum stock holding
- Automatic re-ordering
- User-friendly operation
- Tailor access to specific users
- Easy access to stock information and statistics
- Audit your tooling stock at the push of a button
- Suitable for new and remanufactured tools
- Stocks a wide range of tool 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.

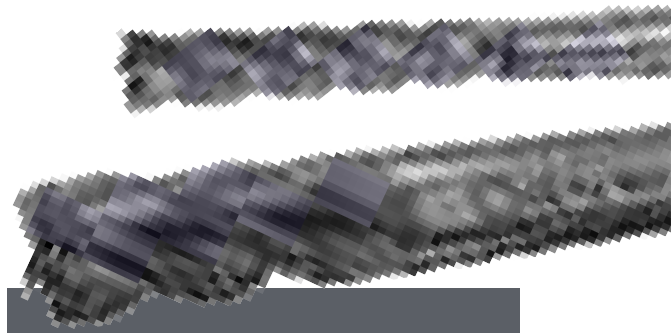
Crystallite size and internal stress levels are controlled by a selected PVD Arc deposition process.

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 50 HRC.

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 >45-55 HRC												
Tool steels >55-60 HRC												
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 60 HRC. 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 >45-55 HRC												
Tool steels >55-60 HRC												
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.

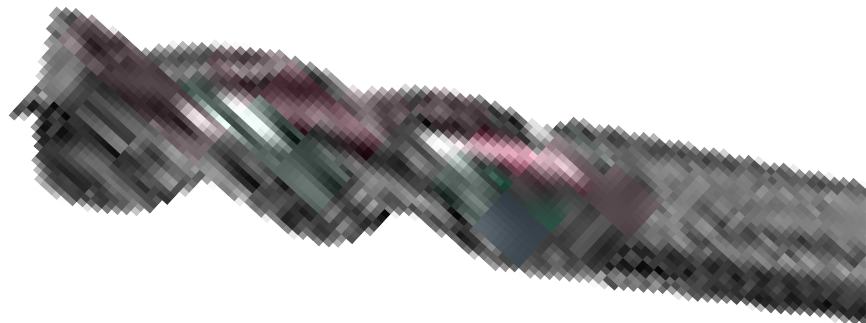
TX-R coated tools are also suitable for remanufacture and recoating thereby bringing even greater savings.



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)



CXPlus

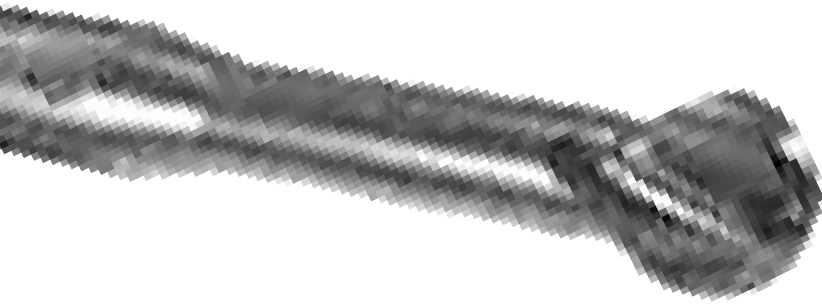
AlCrN Coating

Smoother, harder, **stronger**

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

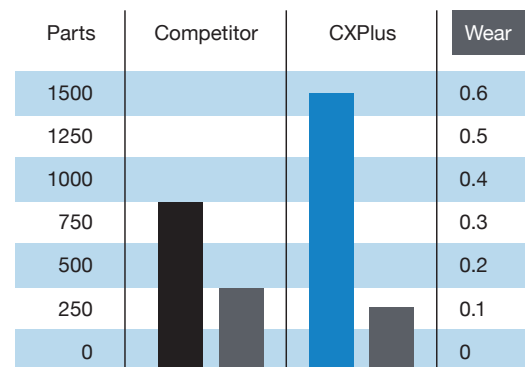
This results in increased density, a higher resistance to wear and a reduction in chipping on cutting edges. Its smooth surface and the controlled coating composition ensures improved tool performance.

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 (44-55 HRC)	H10, H11, H12, H13, H19, H21, L3, L6, L7, P2, P20, D2, D3, D4, D5, D7

Cutting speeds by material group

Feed recommendations

Tool diameter (mm)		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 – 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	
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

		Feed recommendations						
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	
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

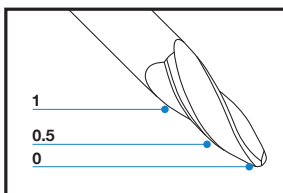
Radial cut a_e 60-75% x D							
Reaper a_p		0.200-0.350	0.300-0.400	0.350-0.500	0.400-0.650	-	
Tool diameter (mm)		6.00	8.00	10.00	12.00	-	
		Vc (M/min)		Feed per tooth ³ (mm)			
Steels	P1	160-300	0.125	0.170	0.220	0.280	-
	P2	140-200	0.130	0.170	0.220	0.280	-
	P3	120-160	0.110	0.140	0.160	0.200	-
Hardened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