

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

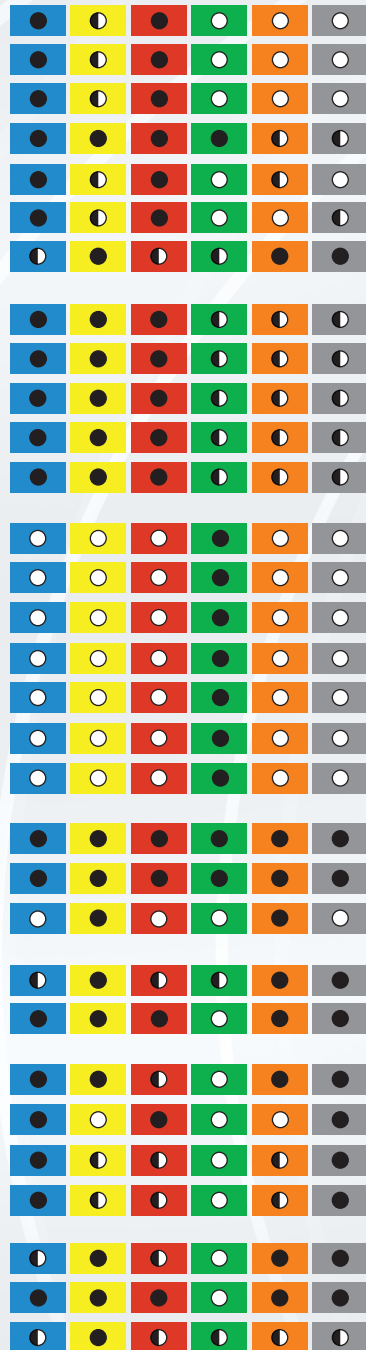
Multiflute cutters



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
or visit quickgrind.com**



High Performance End Mills

High productivity in steels and cast iron

Tool shown 499035

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

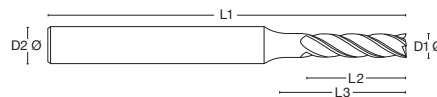
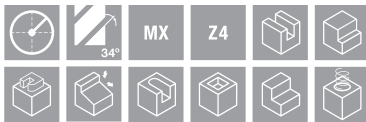
Competitively priced it is ideal for general use and comes with extended flute length as standard, and delivers high material removal due to its design recipe and superior coating.

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.



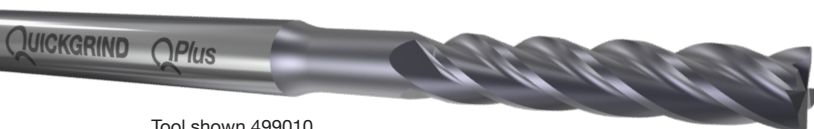
Force-resistant submicrograin carbide for strength and toughness

High resistance to wear due to enhanced geometry



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

D1 Ø mm	D2 Ø mm	L1 mm	L2 mm	L3 mm	Chamfer	Teeth Z	Stock code	List £
3.00	6.00	58.00	12.00	20.00	-	4	499010	22.02
4.00	6.00	58.00	14.00	20.00	-	4	499015	22.02
5.00	6.00	58.00	16.00	22.00	-	4	499020	22.02
6.00	6.00	58.00	19.00	-	0.25	4	499025	22.02
8.00	8.00	64.00	22.00	-	0.25	4	499030	28.31
10.00	10.00	73.00	25.00	-	0.25	4	499035	38.54
12.00	12.00	84.00	30.00	-	0.25	4	499040	51.12
16.00	16.00	100.00	40.00	-	0.25	4	499045	83.37
20.00	20.00	105.00	45.00	-	0.25	4	499050	170.79



Tool shown 499010

**QPlus2**

High Performance End Mills

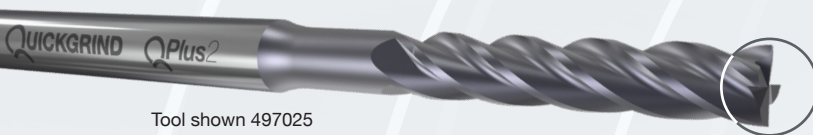
Tool shown 497100

Extended reach

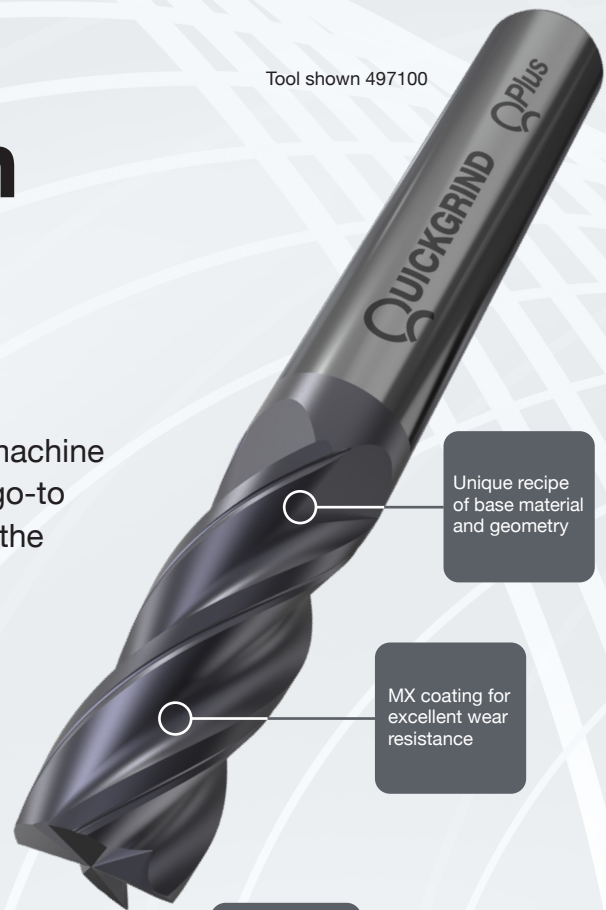
reduced costs

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.

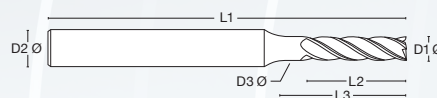
Designed with sharp corner geometry this tool is very useful when looking to achieve square corners in manufactured parts.



Tool shown 497025



Sharp corner geometry



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

D1 Ø mm	D2 Ø mm	D3 Ø mm	L1 mm	L2 mm	L3 mm	Teeth Z	Stock code	List £
1.00	3.00	0.95	39.00	3.00	8.00	4	497010	23.54
1.50	3.00	1.45	39.00	6.00	11.00	4	497015	21.71
2.00	3.00	1.95	39.00	9.00	15.00	4	497020	19.72
2.50	3.00	2.45	39.00	12.00	18.00	4	497025	19.72
3.00	3.00	-	39.00	12.00	-	4	497030	18.60
3.50	6.00	3.45	58.00	12.00	20.00	4	497035	25.35
4.00	6.00	3.95	58.00	14.00	20.00	4	497040	25.52
4.50	6.00	4.45	58.00	14.00	20.00	4	497045	26.21
5.00	6.00	4.95	58.00	16.00	22.00	4	497050	25.52
5.50	6.00	5.45	58.00	16.00	22.00	4	497055	32.12
6.00	6.00	-	58.00	19.00	-	4	497060	22.30
8.00	8.00	-	64.00	22.00	-	4	497080	29.57
10.00	10.00	-	73.00	25.00	-	4	497100	38.80
12.00	12.00	-	84.00	30.00	-	4	497120	51.36
16.00	16.00	-	93.00	40.00	-	4	497160	83.52
20.00	20.00	-	105.00	45.00	-	4	497200	124.21



Long Series

for improved access

Tool shown 749200

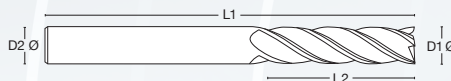
The QPlus2-LS (Long Series) 4 flute universal carbide end mill with MX coating is suitable for steels, cast irons and some stainless steels.

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	List £
3.00	3.00	60.00	25.00	4	749030	33.71
4.00	4.00	60.00	25.00	4	749040	31.92
5.00	5.00	75.00	25.00	4	749050	34.74
6.00	6.00	80.00	30.00	4	749060	41.61
8.00	8.00	100.00	35.00	4	749080	63.37
10.00	10.00	100.00	40.00	4	749100	82.42
12.00	12.00	100.00	50.00	4	749120	87.06
16.00	16.00	125.00	65.00	4	749160	176.32
20.00	20.00	165.00	80.00	4	749200	256.83



Tool shown 749030



High Performance Chamfer Mills

Tool shown 189080

Chamfer and more

in all materials

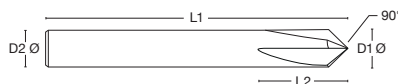
QChamfer can be used for many machining operations from chamfering to bevelling, deburring, spotting and countersinking.

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

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



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	List £
4.00	4.00	51.00	11.00	4	189040	16.52
6.00	6.00	58.00	13.00	4	189060	23.78
8.00	8.00	64.00	19.00	4	189080	31.29
10.00	10.00	73.00	22.00	4	189100	50.73
12.00	12.00	84.00	26.00	4	189120	67.71



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.

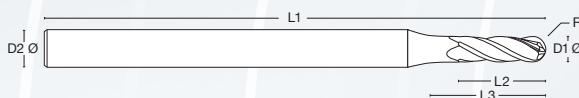
- Latest MX PVD coating developed specifically for aggressive machining conditions in steels and cast iron
- Maintains sharp edges and is also suitable for remanufacture and recoating
- HV hardness 3300, 2-4 μ thickness, <0.6 coefficient of friction PVD AlTiN and micro hardness of >500Hv



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	List £
1.00	3.00	39.00	4.00	5.00	0.50	4	336010	21.11
1.50	3.00	39.00	4.50	5.00	0.75	4	336015	20.48
2.00	3.00	39.00	6.50	8.00	1.00	4	336020	21.11
2.50	3.00	39.00	9.50	11.50	1.25	4	336025	21.11
3.00	3.00	39.00	12.00	-	1.50	4	336030	17.51
4.00	4.00	51.00	12.00	-	2.00	4	336040	21.37
5.00	5.00	51.00	14.00	-	2.50	4	336050	27.96
6.00	6.00	58.00	16.00	-	3.00	4	336060	32.39
8.00	8.00	64.00	20.00	-	4.00	4	336080	42.97
10.00	10.00	73.00	22.00	-	5.00	4	336100	54.51
12.00	12.00	84.00	26.00	-	6.00	4	336120	70.67
16.00	16.00	93.00	32.00	-	8.00	4	336160	115.81
20.00	20.00	105.00	35.00	-	10.00	4	336200	166.78



High Performance End Mills

High MRR

with longer tool life

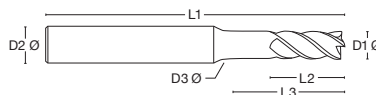
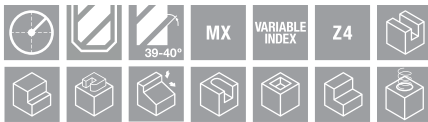
QCut is a high performance end mill designed for the machining of steels, cast iron and in some instances free machining stainless steel.

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

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

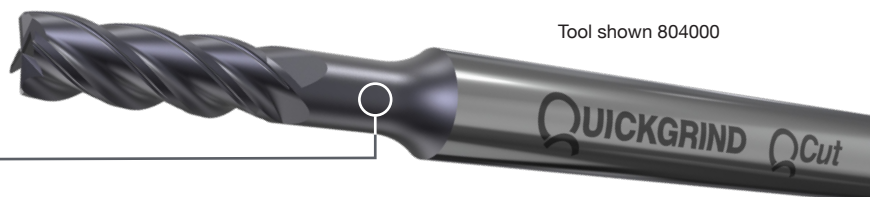


Tool shown 801200



QCut 4 flute variable end mill for steels

D1 Ø mm	D2 Ø mm	D3 Ø mm	L1 mm	L2 mm	L3 mm	Chamfer x 45°	Teeth Z	Stock code	List £
3.00	6.00	2.80	58.00	11.00	16.00	0.15	4	803000	32.26
4.00	6.00	3.80	58.00	11.00	18.00	0.15	4	804000	32.26
5.00	6.00	4.80	58.00	13.00	18.00	0.25	4	805000	32.26
6.00	6.00	-	58.00	13.00	-	0.25	4	806000	32.26
8.00	8.00	-	64.00	19.00	-	0.25	4	808000	40.31
10.00	10.00	-	73.00	22.00	-	0.25	4	801000	48.17
12.00	12.00	-	84.00	26.00	-	0.25	4	801200	63.98
16.00	16.00	-	93.00	32.00	-	0.35	4	801600	97.26
20.00	20.00	-	105.00	38.00	-	0.35	4	802000	143.88



Tool shown 804000

Neck relieved to overcome reach issues



High Performance End Mills

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.

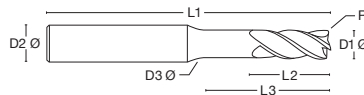
Suitable for trochoidal milling, Mirage allows for full flute engagement with step overs (a_e) of anything from $\leq 5\%$ to $\geq 15\%$ in super alloys/stainless steel depending on the CAM software and machine parameters.

**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

Suitable for
trochoidal
milling

Tool shown 195609

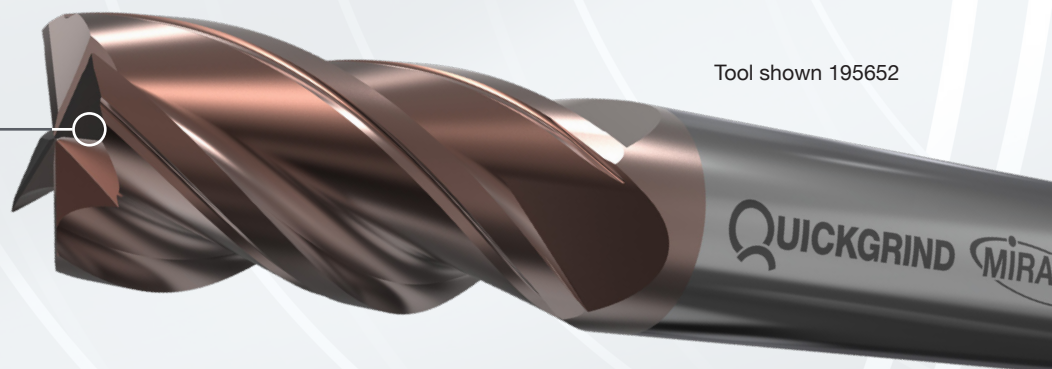
Tool shown 195614

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

D1 Ø mm	D2 Ø mm	D3 Ø mm	L1 mm	L2 mm	L3 mm	R mm	Teeth Z	Stock code	List £
3.00	6.00	2.80	58.00	10.00	20.00	-	4	195605	47.55
3.00	6.00	2.80	58.00	10.00	20.00	0.25	4	195606	47.55
4.00	6.00	3.80	58.00	11.00	20.00	-	4	195608	47.55
4.00	6.00	3.80	58.00	11.00	20.00	0.25	4	195609	47.55
5.00	6.00	4.80	58.00	14.00	22.00	-	4	195611	47.55
5.00	6.00	4.80	58.00	14.00	22.00	0.25	4	195612	47.55
6.00	6.00	-	58.00	13.00	-	-	4	195614	47.55
6.00	6.00	-	58.00	13.00	-	0.25	4	195615	47.55
6.00	6.00	-	58.00	13.00	-	1.00	4	195618	47.55
8.00	8.00	-	64.00	18.00	-	-	4	195621	55.06
8.00	8.00	-	64.00	18.00	-	0.50	4	195622	55.06
8.00	8.00	-	64.00	18.00	-	1.00	4	195624	55.06
10.00	10.00	-	73.00	22.00	-	-	4	195628	65.10
10.00	10.00	-	73.00	22.00	-	0.50	4	195629	65.10
10.00	10.00	-	73.00	22.00	-	1.00	4	195631	65.10
12.00	12.00	-	84.00	26.00	-	-	4	195635	80.47
12.00	12.00	-	84.00	26.00	-	0.50	4	195636	80.47
12.00	12.00	-	84.00	26.00	-	1.00	4	195638	80.47
12.00	12.00	-	84.00	26.00	-	2.00	4	195640	80.47
12.00	12.00	-	84.00	26.00	-	3.00	4	195641	80.47
16.00	16.00	-	93.00	32.00	-	-	4	195644	161.42
16.00	16.00	-	93.00	32.00	-	0.50	4	195645	161.42
16.00	16.00	-	93.00	32.00	-	1.00	4	195647	161.42
16.00	16.00	-	93.00	32.00	-	1.50	4	195648	161.42
16.00	16.00	-	93.00	32.00	-	2.00	4	195649	161.42
16.00	16.00	-	93.00	32.00	-	3.00	4	195650	161.42
20.00	20.00	-	105.00	38.00	-	-	4	195652	272.26
20.00	20.00	-	105.00	38.00	-	1.00	4	195655	272.26

Designed
for multiple
applications

Tool shown 195652



Two tools in one

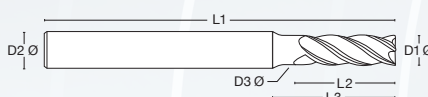
QVari is high performance 4 flute carbide end mill with variable helix and index design, suitable for both roughing and finishing, where applicable, with one tool.

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



XRed coating
for steels,
stainless
and exotics

Suitable for
roughing
and finishing

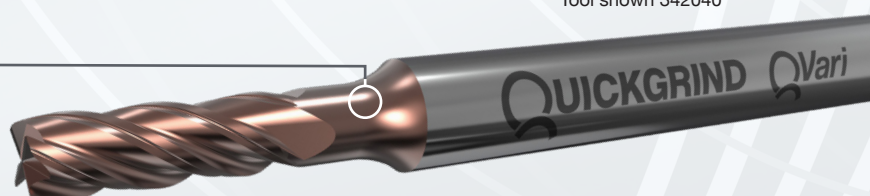


QVari 4 flute variable end mill for stainless

D1 Ø mm	D2 Ø mm	D3 Ø mm	L1 mm	L2 mm	L3 mm	Chamfer x 45°	Teeth Z	Stock code	List £
3.00	6.00	2.90	58.00	8.00	14.00	0.05	4	342030	30.49
4.00	6.00	3.90	58.00	11.00	16.00	0.05	4	342040	30.49
5.00	6.00	4.90	58.00	13.00	18.00	0.05	4	342050	30.49
6.00	6.00	-	58.00	15.00	-	0.08	4	342060	27.59
8.00	8.00	-	64.00	22.00	-	0.10	4	342080	39.34
10.00	10.00	-	73.00	25.00	-	0.15	4	342100	48.11
12.00	12.00	-	84.00	28.00	-	0.15	4	342120	64.11
16.00	16.00	-	93.00	35.00	-	0.20	4	342160	97.47
20.00	20.00	-	105.00	40.00	-	0.20	4	342200	147.92

Neck relieved
to overcome
reach issues

Tool shown 342040



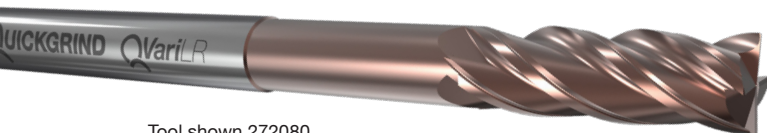


Variable helix and index

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.

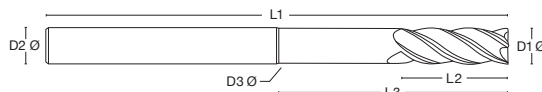
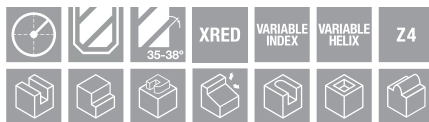


Tool shown 272080



Suitable for roughing and finishing

XRed coating for steels, stainless and exotics



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

D1 Ø mm	D2 Ø mm	D3 Ø mm	L1 mm	L2 mm	L3 mm	Chamfer x 45°	Teeth Z	Stock code	List £
6.00	6.00	5.50	80.00	17.00	35.00	0.08	4	272060	56.92
8.00	8.00	7.50	100.00	25.00	50.00	0.10	4	272080	74.06
10.00	10.00	9.50	100.00	28.00	50.00	0.15	4	272100	83.71
12.00	12.00	11.50	100.00	30.00	50.00	0.15	4	272120	95.45
16.00	16.00	15.50	145.00	38.00	75.00	0.20	4	272160	183.00
20.00	20.00	19.30	165.00	45.00	75.00	0.20	4	272200	249.22



QVari-5 QVari-5CR

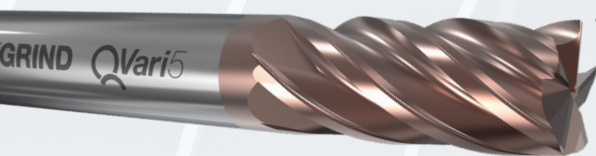
High Performance End Mills

Tool shown 172200

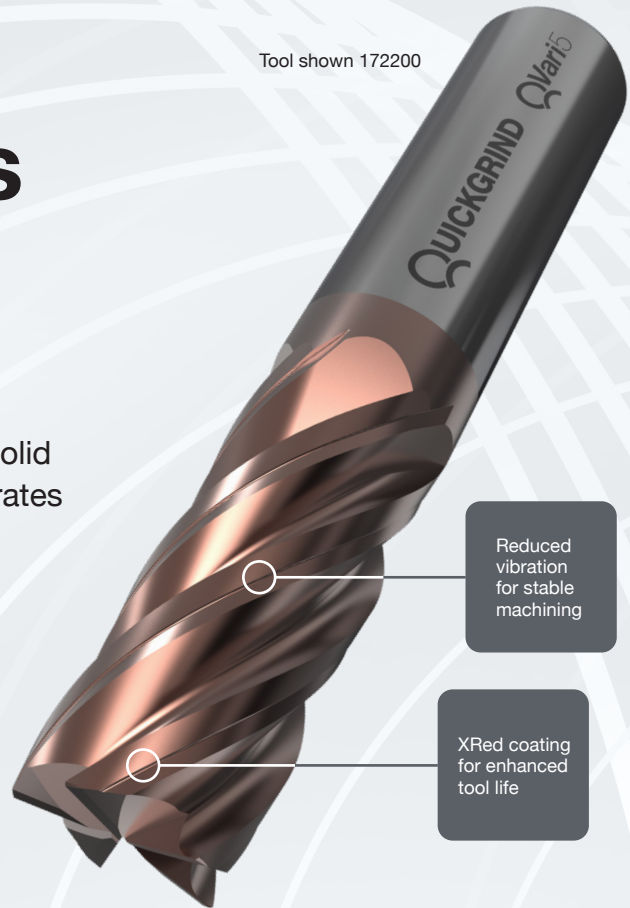
High feed rates with reduced vibration

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

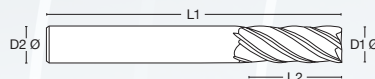
The XRed coating enhances tool life and makes this tool very suitable for steels, stainless steel, titanium and super alloys. QVari-5 is an excellent tool for applying trochoidal machining strategies.



Tool shown 172100



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



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

D1 Ø mm	D2 Ø mm	L1 mm	L2 mm	Chamfer x 45°	R mm	Teeth Z	Stock code	List £
6.00	6.00	58.00	13.00	0.08	-	5	172060	28.70
6.00	6.00	58.00	13.00	-	0.50	5	172061	28.70
6.00	8.00	58.00	13.00	-	1.00	5	172062	28.70
8.00	8.00	64.00	20.00	0.10	-	5	172080	40.92
8.00	8.00	64.00	20.00	-	0.50	5	172081	40.92
8.00	8.00	64.00	20.00	-	1.00	5	172082	40.92
10.00	10.00	73.00	22.00	0.15	-	5	172100	51.96
10.00	10.00	73.00	22.00	-	0.50	5	172101	51.96
10.00	10.00	73.00	22.00	-	1.00	5	172102	51.96
12.00	12.00	84.00	28.00	0.15	-	5	172120	69.23
12.00	12.00	84.00	28.00	-	0.50	5	172121	69.23
12.00	12.00	84.00	28.00	-	1.00	5	172122	69.23
16.00	16.00	93.00	34.00	0.20	-	5	172160	105.26
16.00	16.00	93.00	34.00	-	0.50	5	172161	105.26
16.00	16.00	93.00	34.00	-	1.00	5	172162	105.26
20.00	20.00	105.00	45.00	0.20	-	5	172200	159.75



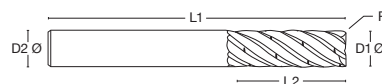
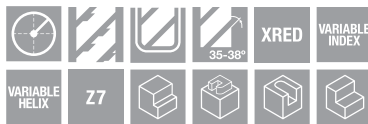
Trochoidal milling

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.



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

D1 Ø mm	D2 Ø mm	L1 mm	L2 mm	R mm	Teeth Z	Stock code	List £
6.00	6.00	58.00	18.00	0.50	7	788060	42.79
8.00	8.00	64.00	24.00	0.50	7	788080	51.11
10.00	10.00	73.00	30.00	0.50	7	788100	68.28
10.00	10.00	73.00	30.00	1.00	7	788105	68.28
12.00	12.00	84.00	36.00	0.50	7	788120	106.38
12.00	12.00	84.00	36.00	1.00	7	788125	106.38
16.00	16.00	93.00	48.00	0.50	7	788160	173.53
16.00	16.00	93.00	48.00	1.00	7	788165	173.53



Tool shown 788080

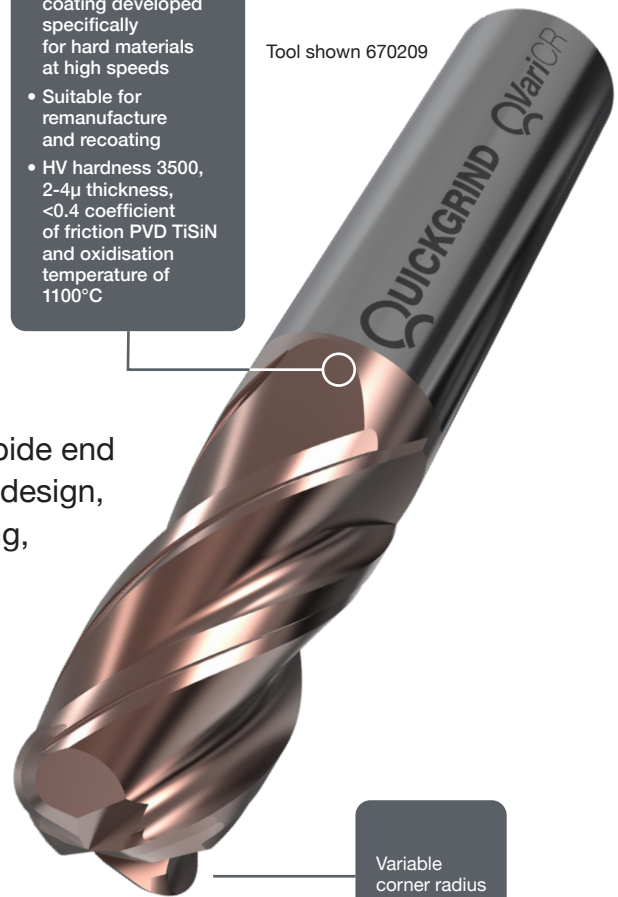
Conventional and trochoidal milling

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

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

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

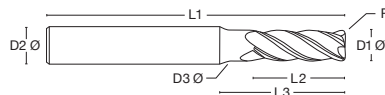
Tool shown 670209



Variable corner radius



Tool shown 670041



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

D1 Ø mm	D2 Ø mm	D3 Ø mm	L1 mm	L2 mm	L3 mm	R mm	Teeth Z	Stock code	List £
3.00	6.00	2.90	58.00	8.00	14.00	0.50	4	670030	40.40
3.00	6.00	2.90	58.00	8.00	14.00	1.00	4	670031	40.40
4.00	6.00	3.90	58.00	11.00	16.00	0.50	4	670040	39.83
4.00	6.00	3.90	58.00	11.00	16.00	1.00	4	670041	39.83
5.00	6.00	4.90	58.00	13.00	18.00	0.50	4	670050	39.83
5.00	6.00	4.90	58.00	13.00	18.00	1.00	4	670051	39.83
6.00	6.00	-	58.00	15.00	-	0.50	4	670060	35.25
6.00	6.00	-	58.00	15.00	-	0.80	4	670061	35.25
6.00	6.00	-	58.00	15.00	-	1.00	4	670062	35.25
6.00	6.00	-	58.00	15.00	-	1.20	4	670063	35.25
6.00	6.00	-	58.00	15.00	-	1.50	4	670064	35.25
6.00	6.00	-	58.00	15.00	-	2.00	4	670065	35.25
8.00	8.00	-	64.00	22.00	-	0.50	4	670080	48.60
8.00	8.00	-	64.00	22.00	-	0.80	4	670081	48.60
8.00	8.00	-	64.00	22.00	-	1.00	4	670082	48.60



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

D1 Ø mm	D2 Ø mm	D3 Ø mm	L1 mm	L2 mm	L3 mm	R mm	Teeth Z	Stock code	List £
8.00	8.00	-	64.00	22.00	-	1.20	4	670083	48.60
8.00	8.00	-	64.00	22.00	-	1.50	4	670084	48.60
8.00	8.00	-	64.00	22.00	-	2.00	4	670085	48.60
8.00	8.00	-	64.00	22.00	-	2.50	4	670086	48.60
8.00	8.00	-	64.00	22.00	-	3.00	4	670087	48.60
10.00	10.00	-	73.00	25.00	-	0.50	4	670100	58.78
10.00	10.00	-	73.00	25.00	-	0.80	4	670101	58.78
10.00	10.00	-	73.00	25.00	-	1.00	4	670102	58.78
10.00	10.00	-	73.00	25.00	-	1.20	4	670103	58.78
10.00	10.00	-	73.00	25.00	-	1.50	4	670104	58.78
10.00	10.00	-	73.00	25.00	-	2.00	4	670105	58.78
10.00	10.00	-	73.00	25.00	-	2.50	4	670106	58.78
10.00	10.00	-	73.00	25.00	-	3.00	4	670107	58.78
12.00	12.00	-	84.00	28.00	-	0.50	4	670120	75.86
12.00	12.00	-	84.00	28.00	-	0.80	4	670121	75.86
12.00	12.00	-	84.00	28.00	-	1.00	4	670122	75.86
12.00	12.00	-	84.00	28.00	-	1.20	4	670123	75.86
12.00	12.00	-	84.00	28.00	-	1.50	4	670124	75.86
12.00	12.00	-	84.00	28.00	-	2.00	4	670125	75.86
12.00	12.00	-	84.00	28.00	-	2.50	4	670126	75.86
12.00	12.00	-	84.00	28.00	-	3.00	4	670127	75.86
16.00	16.00	-	93.00	35.00	-	0.50	4	670160	107.62
16.00	16.00	-	93.00	35.00	-	0.80	4	670161	107.62
16.00	16.00	-	93.00	35.00	-	1.00	4	670162	107.62
16.00	16.00	-	93.00	35.00	-	1.20	4	670163	107.62
16.00	16.00	-	93.00	35.00	-	1.50	4	670164	107.62
16.00	16.00	-	93.00	35.00	-	2.00	4	670165	107.62
16.00	16.00	-	93.00	35.00	-	2.50	4	670166	107.62
16.00	16.00	-	93.00	35.00	-	3.00	4	670167	107.62
20.00	20.00	-	105.00	40.00	-	0.50	4	670200	156.29
20.00	20.00	-	105.00	40.00	-	0.80	4	670201	156.29
20.00	20.00	-	105.00	40.00	-	1.00	4	670202	156.29
20.00	20.00	-	105.00	40.00	-	1.20	4	670203	156.29
20.00	20.00	-	105.00	40.00	-	1.50	4	670204	156.29
20.00	20.00	-	105.00	40.00	-	2.00	4	670205	156.29
20.00	20.00	-	105.00	40.00	-	2.50	4	670206	156.29
20.00	20.00	-	105.00	40.00	-	3.00	4	670207	156.29
20.00	20.00	-	105.00	40.00	-	4.00	4	670208	156.29
20.00	20.00	-	105.00	40.00	-	5.00	4	670209	156.29

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.

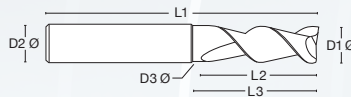
Alligator Duo is especially suitable for roughing strategies and with its sharp corner geometry and no corner breaks is very useful when machining square corners in manufactured parts.

Tool shown 198477

Force-resistive submicrograin carbide for strength and toughness

Superior primary relief grinding

Sharp corner edge geometry for clean cutting and finishing



Alligator Duo 2 flute end mill for aluminium

D1 Ø mm	D2 Ø mm	D3 Ø mm	L1 mm	L2 mm	L3 mm	Square corner	Teeth Z	Stock code	List £
3.00	6.00	2.80	58.00	12.00	20.00	Yes	2	198405	21.61
4.00	6.00	3.80	58.00	12.00	20.00	Yes	2	198408	21.61
5.00	6.00	4.80	58.00	18.00	24.00	Yes	2	198411	21.61
6.00	6.00	5.80	58.00	18.00	30.00	Yes	2	198414	21.61
8.00	8.00	7.80	64.00	18.00	30.00	Yes	2	198474	32.44
10.00	10.00	9.80	73.00	22.00	35.00	Yes	2	198480	46.07
12.00	12.00	11.80	84.00	26.00	45.00	Yes	2	198477	62.31
16.00	16.00	15.80	93.00	32.00	50.00	Yes	2	198486	96.64
20.00	20.00	19.80	105.00	38.00	55.00	Yes	2	198484	152.66



Tool shown 198474

End geometry allows for high speeds and feeds



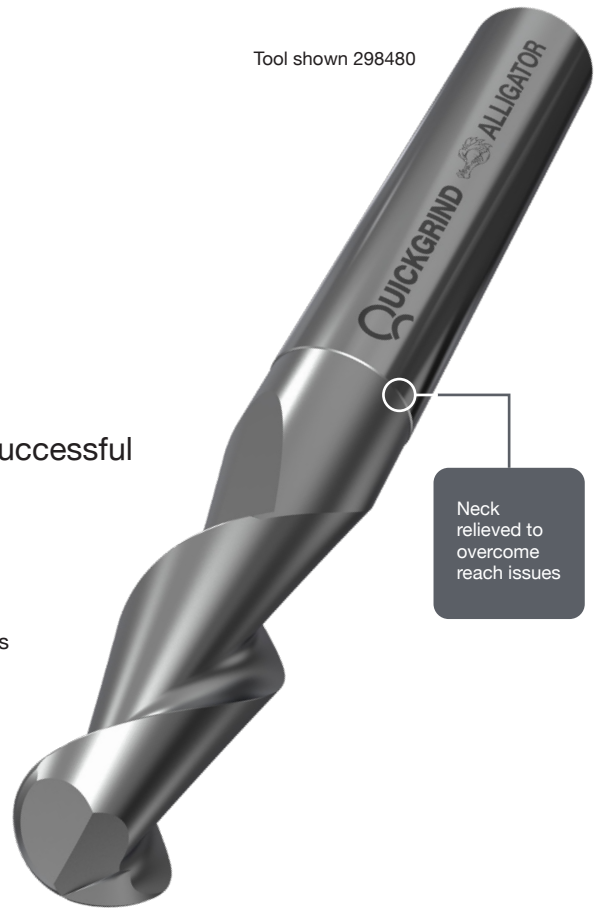
Tool shown 298480

The ball nose with bite

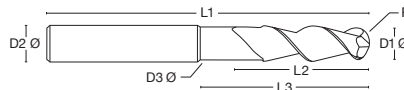
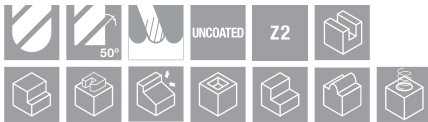
The Alligator Duo 2 flute ball nose is part of our successful Alligator end mill range and offers exceptional performance in non-ferrous materials including aluminium and aluminium alloys.

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

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



Neck relieved to overcome reach issues



Alligator Duo 2 flute ball nose for aluminium

D1 Ø mm	D2 Ø mm	D3 Ø mm	L1 mm	L2 mm	L3 mm	R mm	Teeth Z	Stock code	List £
6.00	6.00	5.80	58.00	18.00	30.00	3.00	2	298415	29.22
8.00	8.00	7.80	64.00	18.00	30.00	4.00	2	298475	43.42
10.00	10.00	9.80	73.00	22.00	35.00	5.00	2	298481	65.40
12.00	12.00	11.80	84.00	26.00	45.00	6.00	2	298479	81.86
16.00	16.00	15.80	93.00	32.00	50.00	8.00	2	298480	122.57



Tool shown 298415

Uncoated
for most
applications



Performance enhanced

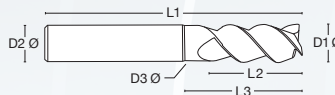
with high material removal rates

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

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



Superior
primary relief
grinding



Alligator Trio 3 flute end mill for aluminium

D1 Ø mm	D2 Ø mm	D3 Ø mm	L1 mm	L2 mm	L3 mm	Chamfer x 45°	Teeth Z	Stock code	List £
3.00	6.00	2.80	58.00	8.00	16.00	0.05	3	398405	32.37
4.00	6.00	3.80	58.00	11.00	18.00	0.06	3	398408	34.62
5.00	6.00	4.70	58.00	13.00	20.00	0.06	3	398411	40.10
6.00	6.00	5.60	58.00	13.00	20.00	0.08	3	398414	36.14
8.00	8.00	7.50	64.00	19.00	25.00	0.10	3	398421	52.49
10.00	10.00	9.50	73.00	22.00	30.00	0.15	3	398429	69.86
12.00	12.00	11.50	84.00	26.00	36.00	0.15	3	398435	89.50
16.00	16.00	15.50	93.00	32.00	42.00	0.20	3	398444	138.78
20.00	20.00	19.50	105.00	38.00	50.00	0.25	3	398452	206.36



Tool shown 398411



High Performance End Mills

Tool shown 698411

The choice

for 6000/7000 series aluminium

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

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

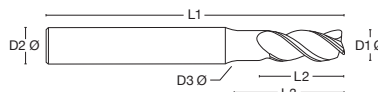


Tool shown 698405

Optimised flute design for maximum chip space and swarf evacuation



Superior grinding and reinforced flutes



Caiman 3 flute end mill for 6000/7000 series aluminium

D1 Ø mm	D2 Ø mm	D3 Ø mm	L1 mm	L2 mm	L3 mm	Square corner	Teeth Z	Stock code	List £
3.00	6.00	2.80	58.00	8.00	13.00	Yes	3	698405	30.33
4.00	6.00	3.80	58.00	12.00	18.00	Yes	3	698406	32.94
5.00	6.00	4.70	58.00	14.00	20.00	Yes	3	698407	36.83
6.00	6.00	-	58.00	14.00	-	Yes	3	698408	33.44
8.00	8.00	-	64.00	19.00	-	Yes	3	698409	47.64
10.00	10.00	-	73.00	22.00	-	Yes	3	698410	62.11
12.00	12.00	-	84.00	26.00	-	Yes	3	698411	79.93
16.00	16.00	-	93.00	32.00	-	Yes	3	698412	123.70
20.00	20.00	-	105.00	38.00	-	Yes	3	698413	186.90

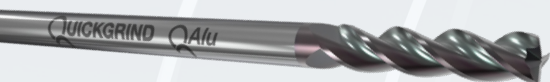
Balanced 3 flute

for high speed milling

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

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

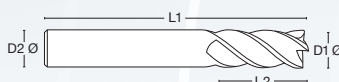
Designed with sharp corner geometry QAlu is ideal for machining square corners in manufactured parts, and the corner radius makes it suitable for aerospace projects.



Tool shown 721030



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



Ramping and plunging at high feeds

Sharp corner edge geometry for clean cutting and finishing



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

D1 Ø mm	D2 Ø mm	L1 mm	L2 mm	Teeth Z	Stock code	List £
3.00	3.00	50.00	12.00	3	721030	33.36
4.00	4.00	51.00	16.00	3	721040	36.24
5.00	5.00	51.00	20.00	3	721050	40.50
6.00	6.00	58.00	24.00	3	721060	36.79
8.00	8.00	64.00	25.00	3	721080	52.41
10.00	10.00	73.00	27.00	3	721100	68.32
12.00	12.00	84.00	32.00	3	721120	87.93
16.00	16.00	93.00	39.00	3	721160	136.06
20.00	20.00	105.00	42.00	3	721200	205.60



QAlu-R

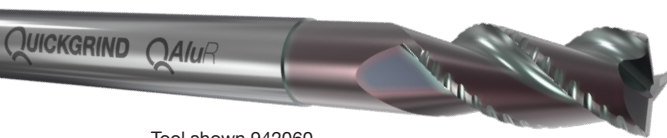
High Performance Roughing End Mills

Tool shown 942120

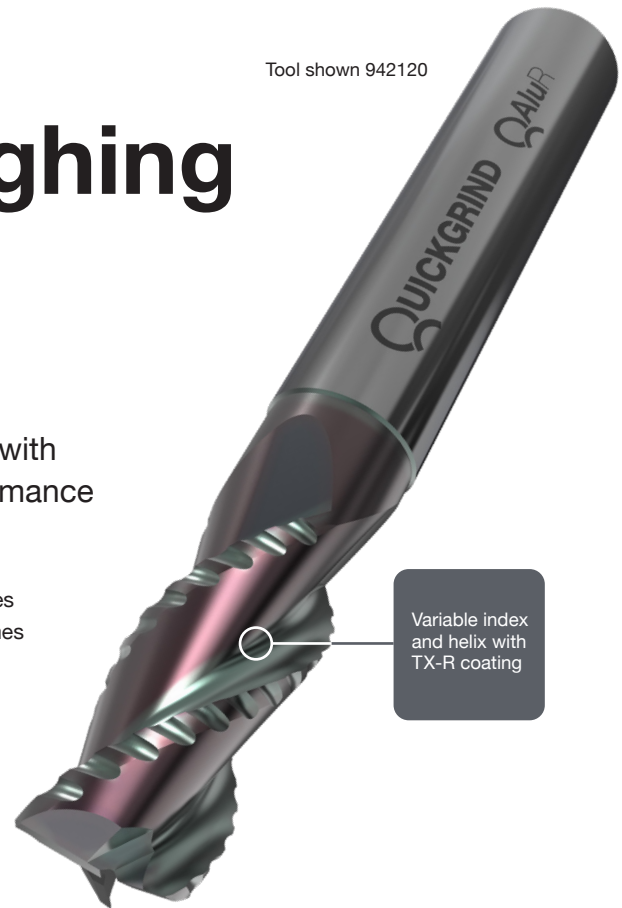
Trochoidal roughing of aluminium

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

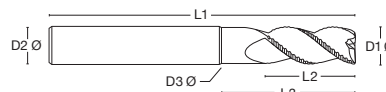
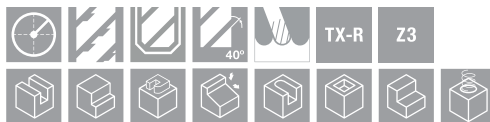
QAlu-R can be used in conventional and trochoidal machining strategies with lower power requirements. It has variable index and helix and comes with TX-R coating.



Tool shown 942060



Variable index and helix with TX-R coating



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

D1 Ø mm	D2 Ø mm	D3 Ø mm	L1 mm	L2 mm	L3 mm	Chamfer x 45°	Teeth Z	Stock code	List £
6.00	6.00	5.70	58.00	13.00	23.00	0.10	3	942060	54.61
8.00	8.00	7.70	64.00	18.00	28.00	0.20	3	942080	68.00
10.00	10.00	9.50	73.00	21.00	31.00	0.25	3	942100	84.79
12.00	12.00	11.50	84.00	25.00	35.00	0.30	3	942120	103.00
16.00	16.00	15.30	93.00	32.00	50.00	0.45	3	942160	153.28
20.00	20.00	19.30	105.00	40.00	60.00	0.50	3	942200	226.39

A coated 3 flute

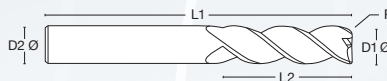
for excellent surface finishes

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	List £
3.00	3.00	50.00	12.00	0.25	3	124030	37.93
3.00	3.00	50.00	12.00	0.50	3	124031	37.93
3.00	3.00	50.00	12.00	0.75	3	124032	37.93
4.00	4.00	51.00	16.00	0.25	3	124040	38.59
4.00	4.00	51.00	16.00	0.50	3	124041	38.59
4.00	4.00	51.00	16.00	0.75	3	124042	38.59
5.00	5.00	51.00	20.00	0.25	3	124050	39.59
5.00	5.00	51.00	20.00	0.50	3	124051	39.59
5.00	5.00	51.00	20.00	0.75	3	124052	39.59
6.00	6.00	58.00	24.00	0.50	3	124060	41.67
6.00	6.00	58.00	24.00	1.00	3	124061	41.67
6.00	6.00	58.00	24.00	1.50	3	124062	41.67
6.00	6.00	58.00	24.00	2.00	3	124063	41.67
8.00	8.00	64.00	25.00	0.50	3	124080	53.71
8.00	8.00	64.00	25.00	1.00	3	124081	53.71
8.00	8.00	64.00	25.00	1.50	3	124082	53.71
8.00	8.00	64.00	25.00	2.00	3	124083	53.71
8.00	8.00	64.00	25.00	3.00	3	124084	53.71
10.00	10.00	73.00	27.00	0.50	3	124100	68.56
10.00	10.00	73.00	27.00	1.00	3	124101	68.56
10.00	10.00	73.00	27.00	1.50	3	124102	68.56
10.00	10.00	73.00	27.00	2.00	3	124103	68.56
10.00	10.00	73.00	27.00	3.00	3	124104	68.56
12.00	12.00	84.00	32.00	0.50	3	124120	88.37
12.00	12.00	84.00	32.00	1.00	3	124121	88.37
12.00	12.00	84.00	32.00	1.50	3	124122	88.37
12.00	12.00	84.00	32.00	2.00	3	124123	88.37
12.00	12.00	84.00	32.00	3.00	3	124124	88.37
16.00	16.00	93.00	39.00	0.50	3	124160	139.72
16.00	16.00	93.00	39.00	1.00	3	124161	139.72
16.00	16.00	93.00	39.00	1.50	3	124162	139.72
16.00	16.00	93.00	39.00	2.00	3	124163	139.72
16.00	16.00	93.00	39.00	3.00	3	124164	139.72
20.00	20.00	105.00	42.00	0.50	3	124200	208.05
20.00	20.00	105.00	42.00	1.00	3	124201	208.05
20.00	20.00	105.00	42.00	1.50	3	124202	208.05
20.00	20.00	105.00	42.00	2.00	3	124203	208.05
20.00	20.00	105.00	42.00	3.00	3	124204	208.05

A new standard for complex components

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

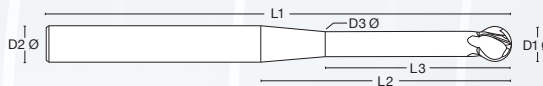
Lollipop tools are often only used for undercuts and de-burring. Orbis, with its new CXPlus coating, is setting new standards of unrivalled high performance and surface finish in applications and component features that have previously caused many issues.

Tool shown 866083

Force-resistive
submicrograin
carbide
for strength
and toughness

Tapered neck
and radial
runout options
for clearance
and strength

Up to 270° plus
spherical cutting



Tool shown 866033

Spherical
cutting in all
directions

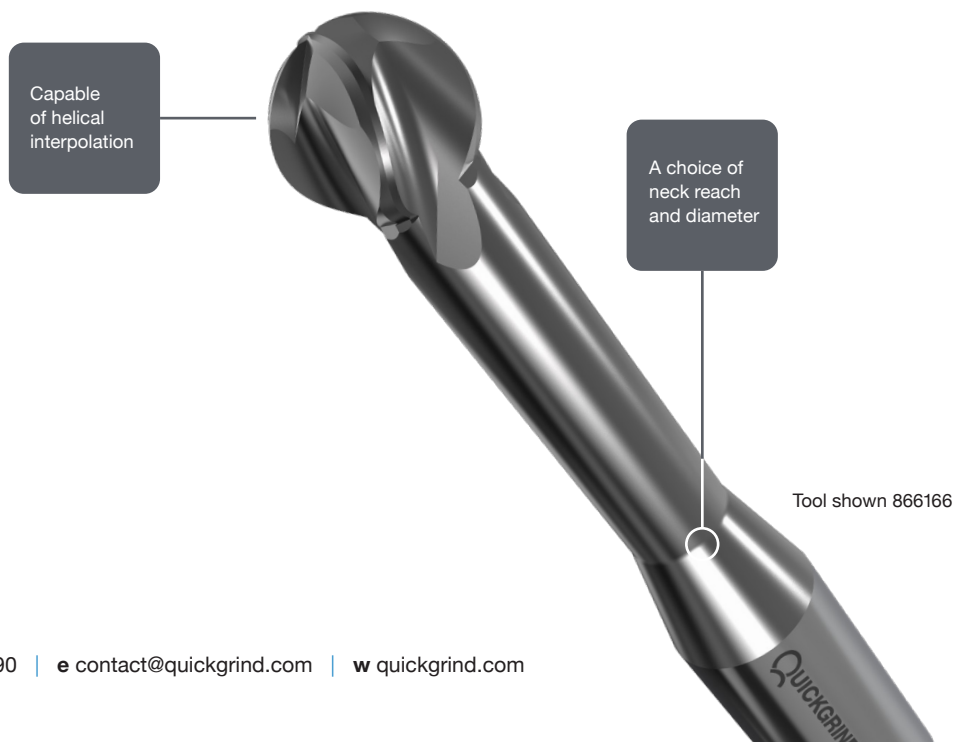
Applications and features

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



Orbis 4 flute lollipop cutters for mixed materials

D1 Ø mm	D2 Ø mm	D3 Ø mm	L1 mm	L2 mm	L3 mm	Spherical head °	Teeth Z	Stock code	List £
2.00	6.00	1.30	80.00	30.00	6.00	270°	4	866020	102.74
2.00	6.00	1.30	80.00	36.00	10.00	270°	4	866023	102.74
2.00	6.00	1.30	80.00	42.00	16.00	270°	4	866026	102.74
3.00	6.00	2.00	80.00	30.00	9.00	270°	4	866030	102.74
3.00	6.00	2.00	80.00	36.00	15.00	270°	4	866033	102.74
3.00	6.00	2.00	80.00	42.00	21.00	270°	4	866036	102.74
4.00	6.00	2.70	80.00	30.00	12.00	270°	4	866040	102.74
4.00	6.00	2.70	80.00	36.00	20.00	270°	4	866043	102.74
4.00	6.00	2.70	100.00	42.00	32.00	270°	4	866046	102.74
6.00	6.00	4.00	80.00	28.00	18.00	270°	4	866060	102.74
6.00	6.00	4.00	80.00	40.00	30.00	270°	4	866063	102.74
6.00	6.00	4.00	100.00	44.00	32.00	270°	4	866066	102.74
8.00	8.00	5.40	100.00	38.00	24.00	270°	4	866080	132.09
8.00	8.00	5.40	100.00	54.00	40.00	270°	4	866083	132.09
8.00	8.00	5.40	100.00	68.00	55.00	270°	4	866086	132.09
10.00	10.00	6.70	100.00	48.00	30.00	270°	4	866100	165.85
10.00	10.00	6.70	100.00	58.00	40.00	270°	4	866103	165.85
10.00	10.00	6.70	100.00	68.00	55.00	270°	4	866106	165.85
12.00	12.00	8.00	100.00	58.00	36.00	270°	4	866120	201.81
12.00	12.00	8.00	100.00	68.00	55.00	270°	4	866126	201.81
16.00	16.00	10.70	100.00	54.00	48.00	270°	4	866160	236.30
16.00	16.00	10.70	100.00	68.00	55.00	270°	4	866166	236.30



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.

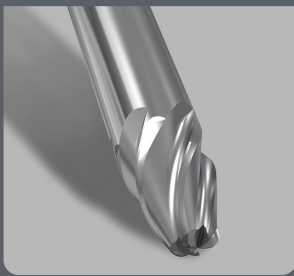
Reduces cycle times by up to
90%



Tool shown 307208

A choice of coatings for a wide range of materials

Type A | Uncoated

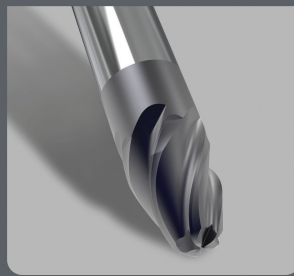


Non-ferrous N

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

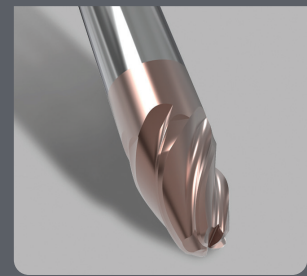
Grey
cast iron

SG iron

Hardened materials H

Hardened
steels
45-55 Hrc

Type S | XRed coated



Stainless M

Precipitation
13-8/15-5
17-4PH

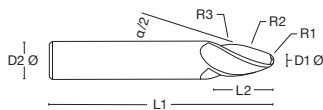
Austenitic
303/304/316L

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	List £
2.00	6.00	58.00	8.50	1.00	250	2.00	3	20.00	A	852503	113.65
2.00	6.00	58.00	8.50	1.00	250	2.00	3	20.00	D	862503	119.35
2.00	6.00	58.00	8.50	1.00	250	2.00	3	20.00	S	872503	119.35
3.00	8.00	64.00	10.50	1.50	250	4.00	3	20.00	A	197202	129.23
3.00	8.00	64.00	14.50	1.50	1000	4.00	3	12.50	A	797202	129.23
3.00	8.00	64.00	10.50	1.50	250	4.00	3	20.00	D	207202	135.68
3.00	8.00	64.00	14.50	1.50	1000	4.00	3	12.50	D	897202	135.68
3.00	8.00	64.00	10.50	1.50	250	4.00	3	20.00	S	307202	135.68
3.00	8.00	64.00	14.50	1.50	1000	4.00	3	12.50	S	997202	135.68
4.00	10.00	73.00	12.50	2.00	250	5.00	3	20.00	A	197203	143.59
4.00	10.00	73.00	16.50	2.00	1000	5.00	3	12.50	A	797203	143.59
4.00	10.00	73.00	12.50	2.00	250	5.00	3	20.00	D	207203	150.75
4.00	10.00	73.00	16.50	2.00	1000	5.00	3	12.50	D	897203	150.75
4.00	10.00	73.00	12.50	2.00	250	5.00	3	20.00	S	307203	150.75
4.00	10.00	73.00	16.50	2.00	1000	5.00	3	12.50	S	997203	150.75
6.00	12.00	84.00	13.50	3.00	250	6.00	3	20.00	A	197204	161.52
6.00	12.00	84.00	19.50	3.00	1000	6.00	3	12.50	A	797204	161.52
6.00	12.00	84.00	13.50	3.00	250	6.00	3	20.00	D	207204	169.60
6.00	12.00	84.00	19.50	3.00	1000	6.00	3	12.50	D	897204	169.60
6.00	12.00	84.00	13.50	3.00	250	6.00	3	20.00	S	307204	169.60
6.00	12.00	84.00	19.50	3.00	1000	6.00	3	12.50	S	997204	169.60
8.00	16.00	93.00	18.50	4.00	500	8.00	3	20.00	A	197205	197.41
8.00	16.00	93.00	18.50	4.00	500	8.00	3	20.00	D	207205	207.29
8.00	16.00	93.00	18.50	4.00	500	8.00	3	20.00	S	307205	207.29
8.00	16.00	93.00	18.50	4.00	1500	8.00	3	20.00	A	197208	197.41
8.00	16.00	93.00	18.50	4.00	1500	8.00	3	20.00	D	207208	207.29
8.00	16.00	93.00	18.50	4.00	1500	8.00	3	20.00	S	307208	207.29

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.

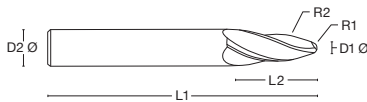
With the correct CAM cycles tangential barrel tools are capable of optimised tool paths and strategies, accessing areas the conical cannot. We use OPEN MIND *hyperMILL*® in-house as our CAM provider. See pages 41 and 44 for more information.

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.



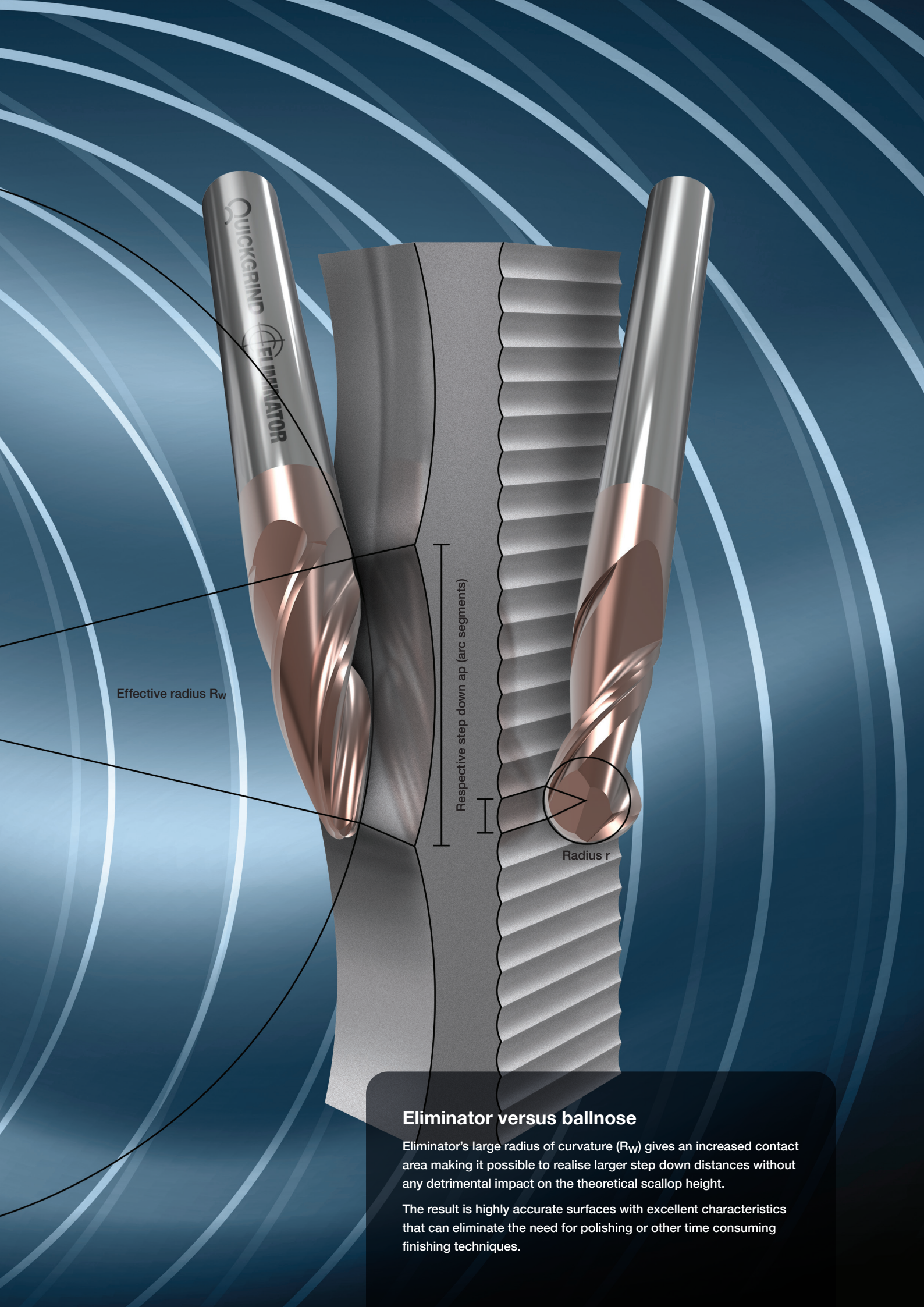
Tool shown 260012

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



Eliminator tangential barrel tool

D1 Ø mm	D2 Ø mm	L1 mm	L2 mm	R1 mm	R2 mm	Teeth Z	Geometry	Stock code	List £
1.00	6.00	58.00	22.00	0.50	95	3	S	230060	119.35
1.00	8.00	64.00	25.00	0.50	90	3	S	230080	135.68
2.00	10.00	73.00	26.00	1.00	85	3	S	230010	150.75
2.00	12.00	84.00	28.00	1.00	80	3	S	230012	169.60
3.00	16.00	93.00	31.00	1.50	75	3	S	230016	207.29
4.00	10.00	73.00	26.00	2.00	85	6	S	260010	150.75
4.00	12.00	84.00	28.00	2.00	80	6	S	260012	169.60
6.00	16.00	93.00	31.00	3.00	75	6	S	260016	207.29



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.

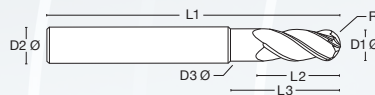
Four flutes provide for highly efficient swarf evacuation and enable high speed and feed machining with great stability. Whether contour milling or profiling this tool excels at roughing, semi-finishing, finishing and super-finishing in a wide range of materials.



Tool shown 495915



XRed coating aids chip flow and resists wear



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

D1 Ø mm	D2 Ø mm	D3 Ø mm	L1 mm	L2 mm	L3 mm	R mm	Teeth Z	Stock code	List £
3.00	6.00	2.80	58.00	10.00	15.00	1.50	4	495906	43.28
4.00	6.00	3.80	58.00	11.00	16.00	2.00	4	495908	46.69
5.00	6.00	4.70	58.00	13.00	18.00	2.50	4	495914	46.69
6.00	6.00	5.60	58.00	13.00	20.00	3.00	4	495915	41.49
8.00	8.00	7.50	64.00	18.00	27.00	4.00	4	495916	57.16
10.00	10.00	9.50	73.00	22.00	32.00	5.00	4	495917	75.66
12.00	12.00	11.50	84.00	26.00	38.00	6.00	4	495918	101.12
16.00	16.00	15.50	93.00	32.00	44.00	8.00	4	495944	145.54



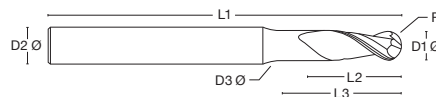
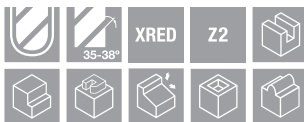
High Performance Ball Nose End Mills

Tool shown 195916

A real winner

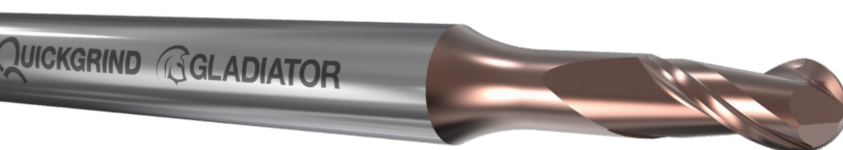
This world beating 2 flute ball nose cutter is used to great effect in mould and die, general engineering and on components such as turbine blades.

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



Gladiator 2 flute ball nose for steels

D1 Ø mm	D2 Ø mm	D3 Ø mm	L1 mm	L2 mm	L3 mm	R mm	Teeth Z	Stock code	List £
3.00	6.00	2.80	58.00	5.00	14.00	1.50	2	195912	43.77
4.00	6.00	3.80	58.00	8.00	14.00	2.00	2	195913	43.77
5.00	6.00	4.80	58.00	10.00	17.00	2.50	2	195914	43.77
6.00	6.00	-	58.00	12.00	-	3.00	2	195915	43.77
8.00	8.00	-	64.00	16.00	-	4.00	2	195916	52.43
10.00	10.00	-	73.00	20.00	-	5.00	2	195917	73.21
12.00	12.00	-	84.00	25.00	-	6.00	2	195918	97.20



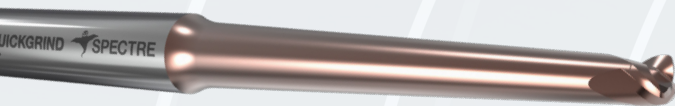
Tool shown 195913

High feed, high ROI

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

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

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



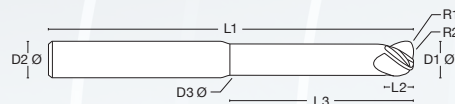
Tool shown 196201



Tool shown 196206

Neck relieved to overcome reach issues

XRed coating to aid chip flow and resist wear



Spectre 3 flute high feed end mill

D1 Ø mm	D2 Ø mm	D3 Ø mm	L1 mm	L2 mm	L3 mm	R1/R2 mm	Teeth Z	Stock code	List £
3.00	6.00	2.75	58.00	1.20	32.00	0.25/2.00	3	196201	55.54
6.00	6.00	5.20	58.00	4.00	26.00	0.50/4.00	3	196202	59.10
6.00	6.00	5.20	80.00	4.00	34.00	0.50/4.00	3	196203	65.83
8.00	8.00	7.00	80.00	6.00	40.00	0.67/5.33	3	196204	80.35
8.00	8.00	7.00	64.00	6.00	30.00	0.67/5.33	3	196234	94.44
10.00	10.00	9.00	80.00	6.00	40.00	1.25/6.75	3	196205	108.60
12.00	12.00	10.40	100.00	8.50	50.00	1.50/8.00	3	196206	133.10
12.00	12.00	10.40	84.00	8.50	30.00	1.50/8.00	3	196216	123.79



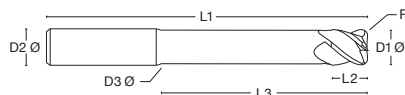
The very best of British

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

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



Tool shown 8HXLLL



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

D1 Ø mm	D2 Ø mm	D3 Ø mm	L1 mm	L2 mm	L3 mm	R mm	Teeth Z	Stock code	List £
6.00	6.00	5.50	58.00	8.00	20.00	0.50	4	6HX	71.35
6.00	6.00	5.50	66.00	8.00	30.00	0.50	4	6HXL	71.35
8.00	8.00	7.50	64.00	10.00	35.00	1.00	4	8HX	87.95
8.00	8.00	7.50	90.00	10.00	50.00	1.00	4	8HXL	87.95
8.00	8.00	7.50	110.00	10.00	70.00	1.00	4	8HXLLL	87.95
10.00	10.00	9.30	73.00	10.00	35.00	2.00	4	10HX	96.70
10.00	10.00	9.30	90.00	10.00	50.00	2.00	4	10HXL	96.70
10.00	10.00	9.30	100.00	10.00	60.00	2.00	4	10HXLL	96.70
12.00	12.00	11.00	84.00	15.00	50.00	3.00	4	12HX	110.42
12.00	12.00	11.00	100.00	15.00	60.00	3.00	4	12HXL	110.42
12.00	12.00	11.00	125.00	15.00	80.00	3.00	4	12HXLL	110.42
16.00	16.00	15.00	100.00	15.00	60.00	3.50	4	16HX	206.97
16.00	16.00	15.00	125.00	15.00	80.00	3.50	4	16HXL	206.97
16.00	16.00	15.00	145.00	15.00	100.00	3.50	4	16HXLL	206.97



High Performance High Feed End Mills

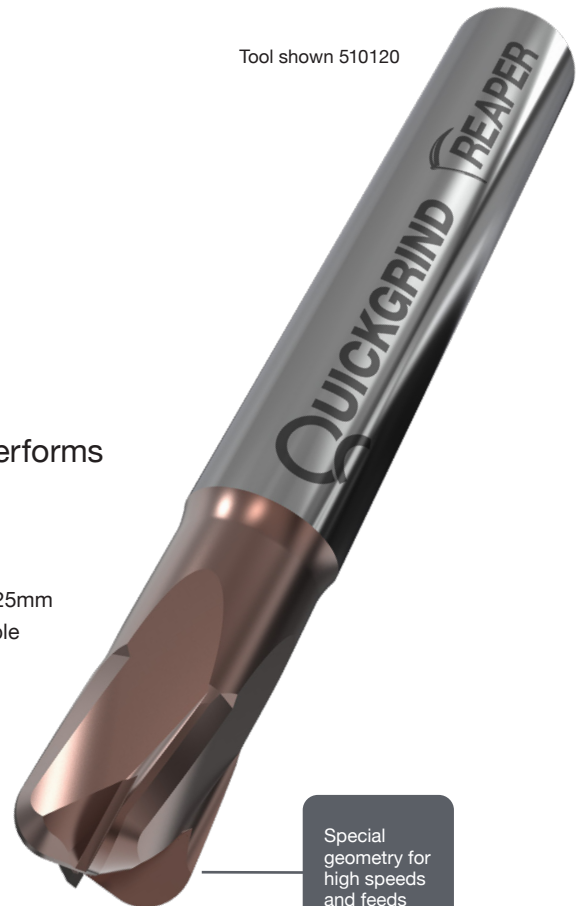
Tool shown 510120

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.



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

D1 Ø mm	D2 Ø mm	D3 Ø mm	L1 mm	L2 mm	L3 mm	R mm	Teeth Z	Stock code	List £
6.00	6.00	5.40	58.00	6.00	12.00	1.50	4	510060	81.09
8.00	8.00	7.50	64.00	8.00	16.00	2.00	4	510080	100.17
10.00	10.00	9.50	73.00	10.00	20.00	2.00	4	510100	133.56
12.00	12.00	11.05	84.00	12.00	24.00	3.00	4	510120	167.90



Tool shown 510060



High Performance High Feed End Mills

Tool shown 530120

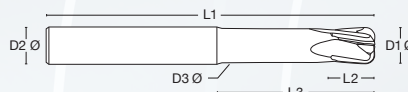
Longer reach for improved access

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	List £
6.00	6.00	5.40	66.00	6.00	24.00	1.50	4	530060	90.63
8.00	8.00	7.50	70.00	8.00	32.00	2.00	4	530080	111.62
10.00	10.00	9.50	85.00	10.00	40.00	2.00	4	530100	150.73
12.00	12.00	11.05	100.00	12.00	48.00	3.00	4	530120	187.94

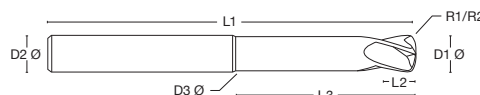
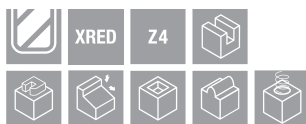
Four flutes, extended life

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.

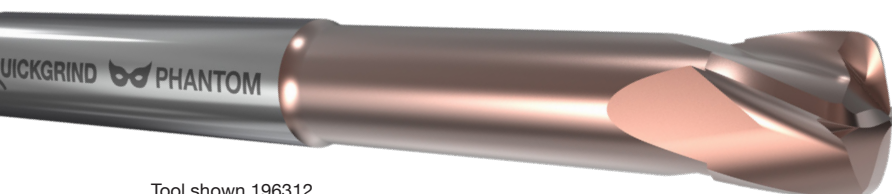
A relatively small depth of cut at high feed delivers great advantages to engineers and programmers.

Tool shown 196306



Phantom 4 flute high feed lens tool

D1 Ø mm	D2 Ø mm	D3 Ø mm	L1 mm	L2 mm	L3 mm	R1/R2 mm	Teeth Z	Stock code	List £
6.00	6.00	5.75	58.00	6.00	24.00	1.20/9.00	4	196360	75.83
8.00	8.00	7.50	64.00	8.00	26.00	1.60/12.00	4	196380	94.42
10.00	10.00	9.50	73.00	10.00	30.00	2.00/15.00	4	196301	125.73
12.00	12.00	11.00	84.00	6.00	50.00	2.00/20.00	4	196312	156.88
16.00	16.00	15.00	93.00	8.00	50.00	2.50/25.00	4	196306	207.27
20.00	20.00	19.00	105.00	20.00	50.00	3.00/32.00	4	196320	318.38



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-resistive submicrograin carbide for strength and toughness

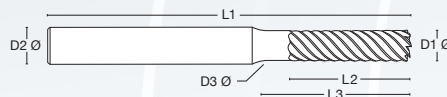
Multiflute count provides high core strength



Tool shown 9286D16



Tool shown 9286D5



Demon 8 flute end mill for finishing operations

D1 Ø mm	D2 Ø mm	D3 Ø mm	L1 mm	L2 mm	L3 mm	Square corner	Teeth Z	Stock code	List £
3.00	6.00	2.95	58.00	5.00	10.00	Yes	6	9286D3	72.90
4.00	6.00	3.95	58.00	8.00	13.50	Yes	6	9286D4	72.90
5.00	6.00	4.95	58.00	10.00	15.00	Yes	6	9286D5	72.90
6.00	6.00	-	58.00	12.00	-	Yes	6	9286D6	68.75
8.00	8.00	-	64.00	20.00	-	Yes	8	9286D8	89.29
10.00	10.00	-	73.00	25.00	-	Yes	8	9286D10	117.70
12.00	12.00	-	84.00	30.00	-	Yes	8	9286D12	149.57
16.00	16.00	-	93.00	40.00	-	Yes	8	9286D16	248.00

Three flutes

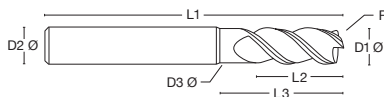
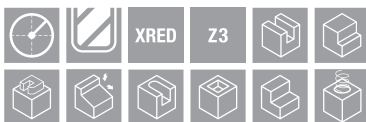
can be better than four

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	List £
3.00	6.00	2.80	58.00	10.00	20.00	0.25	3	395606	23.87
4.00	6.00	3.80	58.00	12.00	20.00	0.25	3	395609	24.46
5.00	6.00	4.75	58.00	14.00	22.00	0.25	3	395612	25.86
6.00	6.00	5.75	58.00	15.00	24.00	0.25	3	395614	30.99
8.00	8.00	7.50	64.00	18.00	26.00	0.50	3	395621	38.96
10.00	10.00	9.50	73.00	22.00	30.00	0.50	3	395629	47.08
12.00	12.00	11.50	84.00	32.00	40.00	0.50	3	395636	55.76
16.00	16.00	15.50	93.00	32.00	50.00	0.50	3	395645	106.52

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.

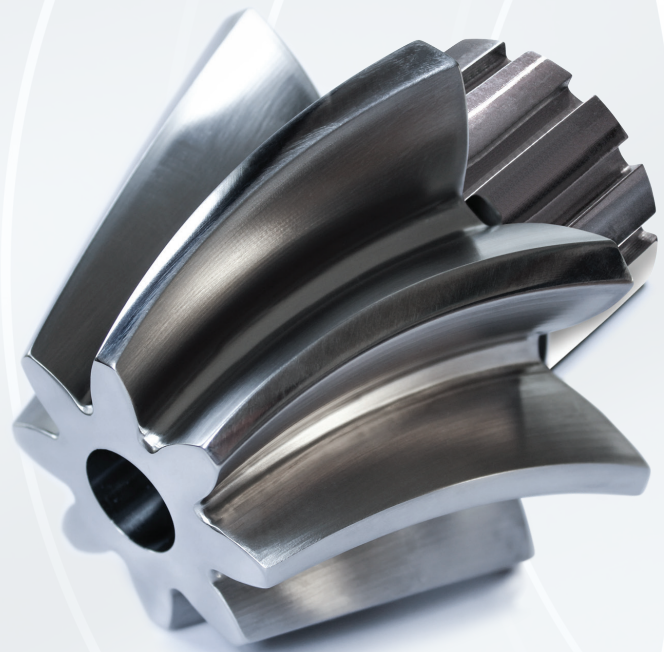
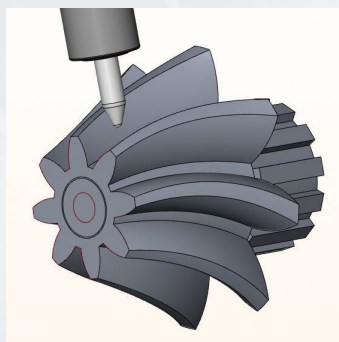
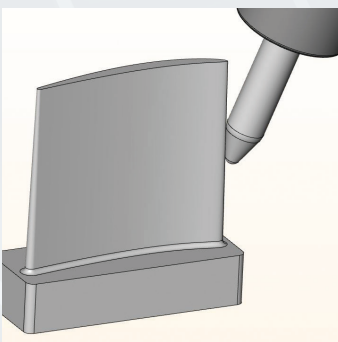
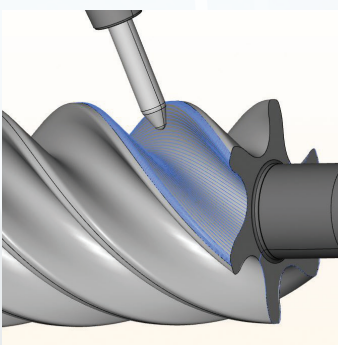
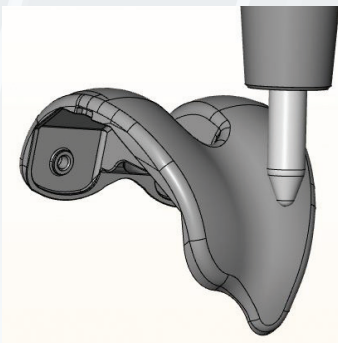
Implementing QuickCam in your business will give you reduced cycle times, leading to reduced tooling costs, increased output and improved capacity.

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.

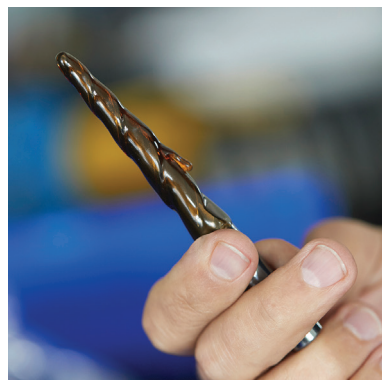


Ask
about our
introductory
offer today



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

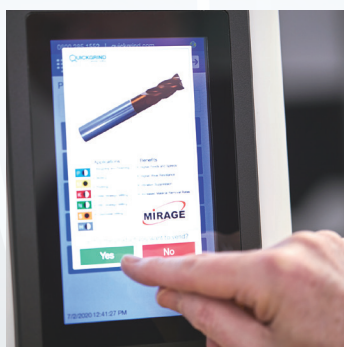
Call today
+44 (0) 1684 294090

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.

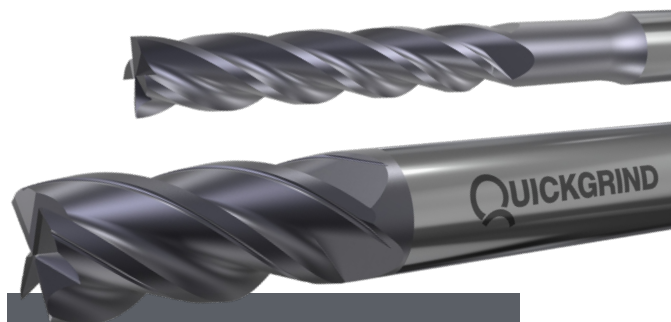
Crystallite size and internal stress levels are controlled by a selected PVD Arc deposition process.

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

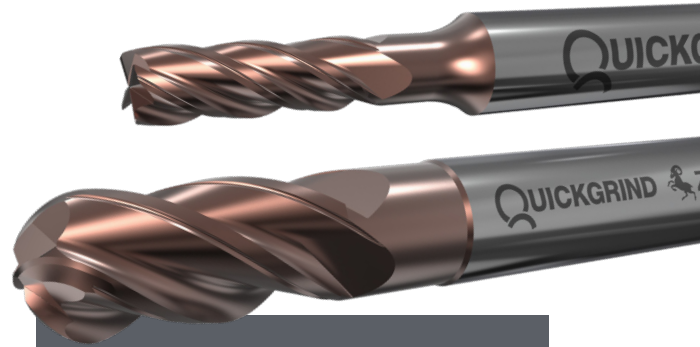
The coating for challenging conditions

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.

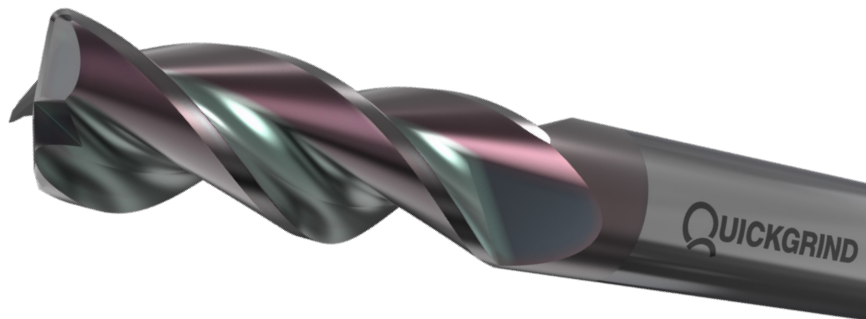
TX-R coated tools are also suitable for remanufacture and recoating thereby bringing even greater savings.



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

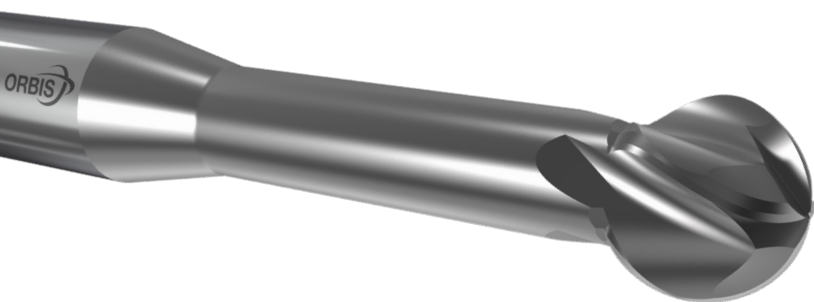
AlCrN Coating

Smoother, harder,
stronger

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

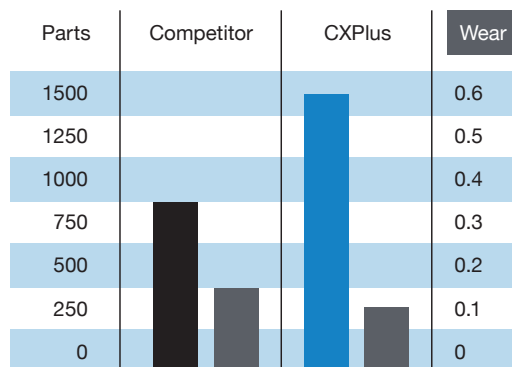
This results in increased density, a higher resistance to wear and a reduction in chipping on cutting edges. Its smooth surface and the controlled coating composition ensures improved tool performance.

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); $\pi = 3.142$
 a_p = depth of cut (mm); a_e = width of cut

Calculation of average chip thickness

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

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

$a_e \text{ max}$ = 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
		Fz	0.130	0.090	0.160	0.110	0.140
	P2	Vc	240-260	240-260	240-260	240-260	240-260
		Fz	0.110	0.080	0.140	0.100	0.130
	P3	Vc	200-220	200-220	200-220	200-220	200-220
		Fz	0.110	0.080	0.140	0.100	0.130
Stainless steels	M1	Vc	180-200	180-200	180-200	180-200	180-200
		Fz	0.080	0.060	0.100	0.070	0.090
	M2	Vc	140-160	140-160	140-160	140-160	140-160
		Fz	0.080	0.060	0.100	0.070	0.090
	M3	Vc	120-140	120-140	120-140	120-140	120-140
		Fz	0.040	0.030	0.050	0.040	0.090
Cast irons	K1	Vc	250-280	250-280	250-280	250-280	250-280
		Fz	0.080	0.060	0.090	0.070	0.100
	K2	Vc	160-220	160-220	160-220	160-220	160-220
		Fz	0.080	0.060	0.090	0.070	0.100
	K3	Vc	90-130	90-130	90-130	90-130	90-130
		Fz	0.080	0.060	0.090	0.070	0.100
Special alloys	S1	Vc	50-60	50-60	50-60	50-60	50-60
		Fz	0.040	0.030	0.050	0.040	0.050
	S2	Vc	80-110	80-110	80-110	80-110	80-110
		Fz	0.040	0.030	0.050	0.040	0.050
Hardened steels	H	Vc	60-90	60-90	60-90	60-90	60-90
		Fz	0.050	0.040	0.060	0.050	0.070

Tool diameter (mm)		12.00	12.00	16.00	16.00	20.00	20.00
		a _e	a _e	a _e	a _e	a _e	a _e
a _p		≤ 0.9 x L2	0.05 x D	0.1 x D	0.05 x D	0.1 x D	0.05 x D
Steels	P1	Vc	200-300	200-300	200-300	200-300	200-300
		Fz	0.250	0.180	0.290	0.210	0.240
	P2	Vc	240-260	240-260	240-260	240-260	240-260
		Fz	0.230	0.160	0.270	0.190	0.210
	P3	Vc	200-220	200-220	200-220	200-220	200-220
		Fz	0.230	0.160	0.270	0.190	0.210
Stainless steels	M1	Vc	180-200	180-200	180-200	180-200	180-200
		Fz	0.160	0.110	0.190	0.130	0.190
	M2	Vc	140-160	140-160	140-160	140-160	140-160
		Fz	0.160	0.110	0.190	0.130	0.190
	M3	Vc	120-140	120-140	120-140	120-140	120-140
		Fz	0.160	0.110	0.190	0.130	0.190
Cast irons	K1	Vc	250-280	250-280	250-280	250-280	250-280
		Fz	0.160	0.140	0.180	0.160	0.200
	K2	Vc	160-220	160-220	160-220	160-220	160-220
		Fz	0.160	0.140	0.180	0.160	0.200
	K3	Vc	90-130	90-130	90-130	90-130	90-130
		Fz	0.160	0.140	0.180	0.160	0.200
Special alloys	S1	Vc	50-60	50-60	50-60	50-60	50-60
		Fz	0.080	0.060	0.117	0.083	0.120
	S2	Vc	80-110	80-110	80-110	80-110	80-110
		Fz	0.080	0.060	0.117	0.083	0.120
Hardened steels	H	Vc	60-90	60-90	60-90	60-90	60-90
		Fz	0.100	0.080	0.120	0.100	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
	P2	140-190	0.080	0.090	0.120	0.180
	P3	120-160	0.060	0.080	0.100	0.100
Stainless steels	M1	90-130	0.080	0.090	0.100	0.150
	M2	60-100	0.060	0.070	0.090	0.100
	M3	60-70	0.040	0.055	0.060	0.070
Cast irons	K1	120-150	0.090	0.090	0.150	0.200
	K2	110-130	0.090	0.090	0.150	0.200
	K3	100-130	0.080	0.080	0.100	0.150
Special alloys	S1	25-40	0.060	0.070	0.090	0.100
	S2	50-90	0.040	0.055	0.060	0.070
Hardened steels	H	80-140	0.040	0.055	0.060	0.070

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
	P2	110-200	0.180	0.250	0.280	0.360
	P3	90-160	0.060	0.120	0.180	0.250
Cast irons	K1	120-250	0.200	0.300	0.360	0.550
	K2	110-200	0.200	0.250	0.280	0.360
	K3	90-160	0.150	0.120	0.180	0.250
Hardened steels	H	80-140	0.050	0.090	0.120	0.150

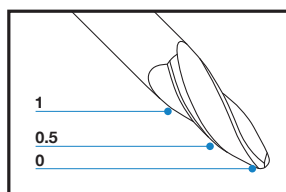
Radial cut a_e 60-75% x D						
Reaper a_p		0.200-0.350	0.300-0.400	0.350-0.500	0.400-0.650	-
Tool diameter (mm)		6.00	8.00	10.00	12.00	-
		Vc (M/min)		Feed per tooth ³ (mm)		
Steels	P1	160-300	0.125	0.170	0.220	-
	P2	140-200	0.130	0.170	0.220	-
	P3	120-160	0.110	0.140	0.160	-
Hardened steels	H	80-140	0.100	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. 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
	P2	140-170	0.030-0.050	0.050-0.070	0.070-0.095	0.100-0.115
	P3	90-120	0.010-0.030	0.030-0.050	0.050-0.070	0.070-0.090
Stainless steels	M1	110-140	0.030-0.050	0.050-0.070	0.070-0.095	0.100-0.115
	M2	60-90	0.030-0.050	0.050-0.070	0.070-0.095	0.100-0.115
	M3	40-70	0.025-0.045	0.035-0.060	0.055-0.080	0.090-0.100
Cast irons	K1	130-150	0.030-0.050	0.050-0.070	0.070-0.085	0.100-0.115
	K2	110-135	0.030-0.050	0.050-0.070	0.070-0.085	0.100-0.115
	K3	70-120	0.010-0.030	0.030-0.050	0.050-0.070	0.070-0.090
Non-ferrous	N1	250-500	0.045-0.060	0.060-0.075	0.065-0.090	0.085-0.110
	N2	150-350	0.045-0.060	0.060-0.075	0.065-0.090	0.085-0.110
	N3	130-275	0.035-0.050	0.050-0.065	0.055-0.080	0.080-0.100
Special alloys	S1	25-40	0.020-0.030	0.030-0.050	0.050-0.070	0.070-0.100
	S2	55-80	0.020-0.030	0.030-0.050	0.050-0.070	0.070-0.100
Hardened steels	H	60-90	0.025-0.035	0.035-0.055	0.055-0.075	0.080-0.110

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	Vc (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	Vc (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

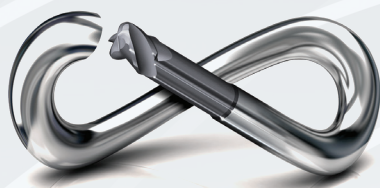
Feed recommendations						
Tool diameter (mm)		3.00	4.00	5.00	6.00	8.00
		Vc (M/min)	Feed per tooth (mm)			
Non-ferrous	N1	300-550	0.028-0.042	0.028-0.050	0.050-0.063	0.052-0.065
	N2	200-350	0.028-0.042	0.028-0.050	0.050-0.063	0.052-0.065
	N3	120-220	0.020-0.032	0.022-0.034	0.025-0.038	0.040-0.058
Tool 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	
		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	
		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	
		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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