



MOHAWK

SPECIAL CUTTING TOOLS

www.mohawkeu.com

ALL GRADES OF HIGH SPEED STEELS

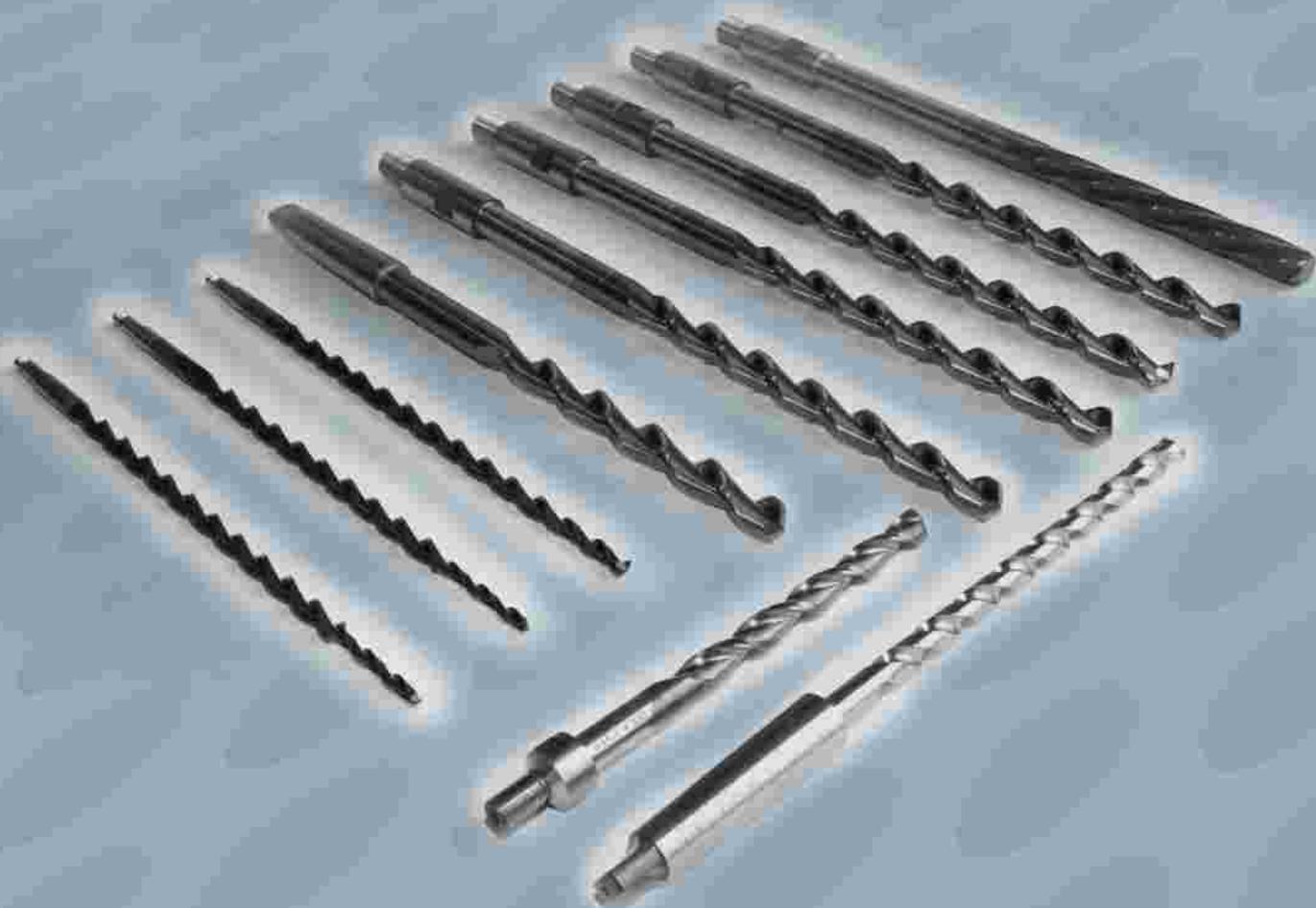


ALL GRADES OF SOLID CARBIDE

• **TOOLING & TECHNICAL INFORMATION**

World Wide Market Leaders in precision made Special Cutting Tools

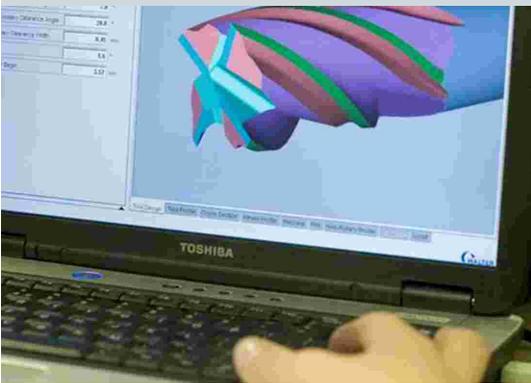
World Wide Market Leaders in precision made Special Cutting Tools



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COMPANY PROFILE

With over 40 years of experience MOHAWK is now recognised as one of the world's leading manufacturers of Customised Special Tools, providing innovative and high performance tooling solutions to all our customers . Based in Shannon, Ireland, our manufacturing facility is purposely designed to manufacture custom cutting tools to the worlds aerospace, automotive, electronic, woodworking and die mold industries. Our experienced staff, state of the art facility and precision inspection equipment, allow us to continuously grow and provide our customers with a cost effective tooling solution.

DESIGN SERVICE

Mohawk offers all of its customers a complete design service. Upon receipt of your part drawing, or cavity detail, our experienced design team using Computer Aided Design facilities, will furnish you with the optimal tool for your application. We will design and quote the necessary tooling to achieve the bore tolerance and surface finish requirement using the minimum number of tools. We supply a complete tool drawing showing all relevant manufacturing and resharpening details.

PRODUCTION EQUIPMENT

All our cutting tools are manufactured on CNC controlled 4 & 5 axis grinding machines. Our custom designed facility allows us to manufacture cutting tools for the toughest applications, and allows us meet critical delivery schedules.



QUALITY POLICY

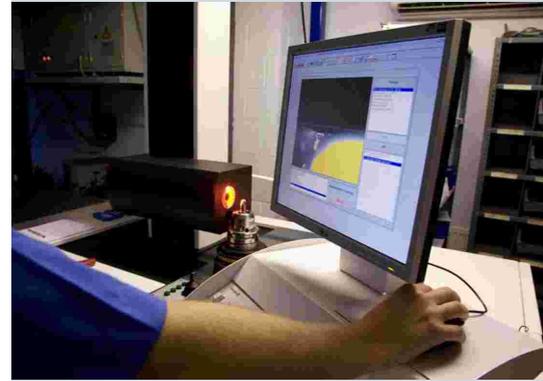
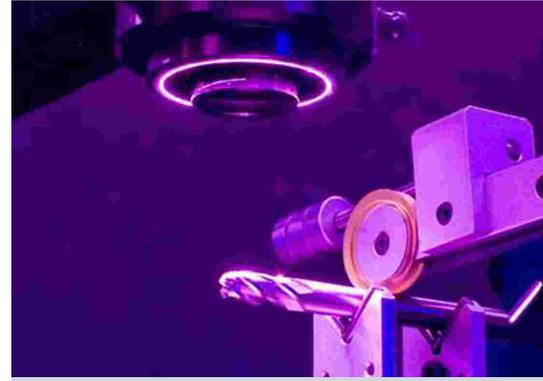
MOHAWK understands that excellence in the quality of its products and services is an essential prerequisite to the continuing success of its business.

MOHAWK

MOHAWK operates a Quality Management system in accordance with the ISO 9001-2008 standard and inspects all product in accordance with this standard. Mohawks mission is to be the world's best in the manufacturer of rotary shank "SPECIAL" cutting tools. Being the best means providing outstanding quality, service and value, ensuring complete customer satisfaction, through continuous improvement and customer interaction. Our goal is to provide the highest level of service, along with a broad selection of products at competitive prices.

INSPECTION FACILITY

All of our products are rigorously inspected before we ship to our customers, to ensure all aspects of the manufactured tool are to the customers print. Our equipment is regularly calibrated, with all our associates fully trained to operate the most up to date inspection equipment.





TWO FLUTE DRILLS

DESCRIPTION

On a wide range of 2 or 3 flute drills, MOHAWK offer you special point styles, flute formations and coatings specifically designed for the material you are machining. Where hole alignment, hole size and surface finish are critical, a tool specifically designed for the application, offers cost savings across the board. Mohawk also offer a wide choice of shank styles to suit your machine or hand held power tool (see page 35 & 36 for shank styles).

APPLICATIONS

The Mohawk drill is a highly versatile tool, which can be adopted to cover a broad range of applications. Whether it is CFRP/Ti/Al/GFRP or any such combination or material variation,

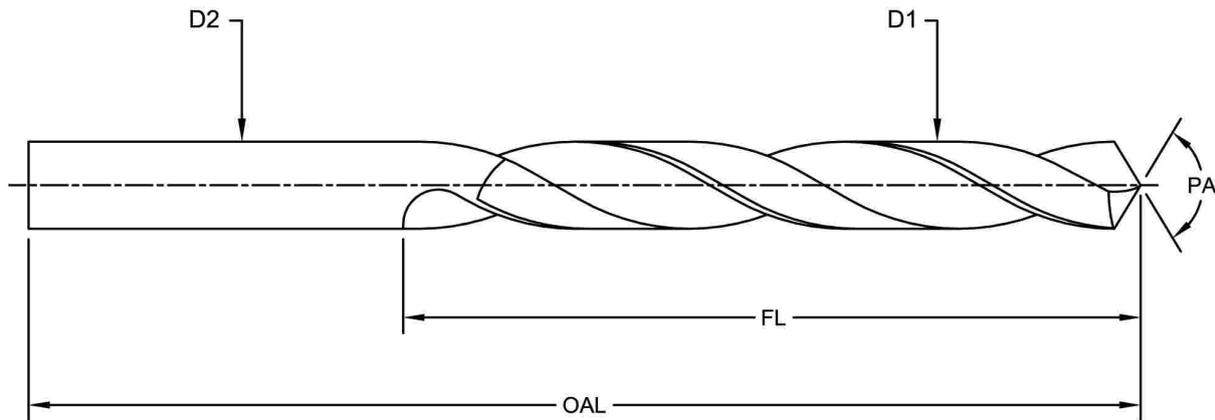
Mohawk has the experience to design the tool for all materials. Two or three flute drills, manufactured as SPECIAL are required where conditions exist such as over standard length, non-standard size diameter, special geometry or construction. Generally the Two Flute Drill is the starting tool and is used to remove large amounts of material economically.

AVAILABILITY

In all grades of High Speed Steels and Powered Metals, and also in all grades of Tungsten Carbide. We offer all tooling with a through coolant facility if required.



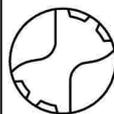
Order/ Enquiry Data
TWO FLUTE DRILL



TOOL DATA	MARGIN STYLE	TOOL MATERIAL	
OAL _____ OVERALL LENGTH	J1 <input type="checkbox"/>	High Speed Steel <input type="checkbox"/>	Shank Style _____
FL _____ FLUTE LENGTH	J2 <input type="checkbox"/>	Solid Carbide <input type="checkbox"/>	Thread _____
D1 _____ OUTSIDE DIAMETER	J3 <input type="checkbox"/>	Coolant Holes <input type="checkbox"/>	
D2 _____ SHANK DIAMETER		Tool Coating <input type="checkbox"/>	
PA _____ POINT ANGLE			
SEE PAGE 33 & 34 FOR OUR RANGE OF POINT STYLES		TANG	
		DIN <input type="checkbox"/>	
		A.S.A. <input type="checkbox"/>	

As Appropriate

MARGIN STYLE

J1	Single Margin	J2	Double Margin	J3	Triple Margin
					

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TOOL No. _____	
CUSTOMER _____	TITLE TWO FLUTE DRILL
DRAWN BY _____	COATING _____
DATE _____	ALL UNSPECIFIED DIMENSIONS AND TOLERANCES ARE TO MOHAWK STANDARDS





STEP DRILLS

DESCRIPTION:

Mohawk offer a wide range of Special size custom designed Step Drills. Mohawk Step Drills are built with flute formation, helix angle and point style specifically designed to machine both metals and composites, or a combination of both materials. Correct rake and chip clearance eliminates countersink chatter, while a highly polished flute allows for excellent chip evacuation. A choice of coatings helps pro long tool life and prevents premature wear. Mohawk also offer a wide choice of Shank Styles, to suit your machine or power tool (see pages 35 & 36 for shank styles).

APPLICATIONS:

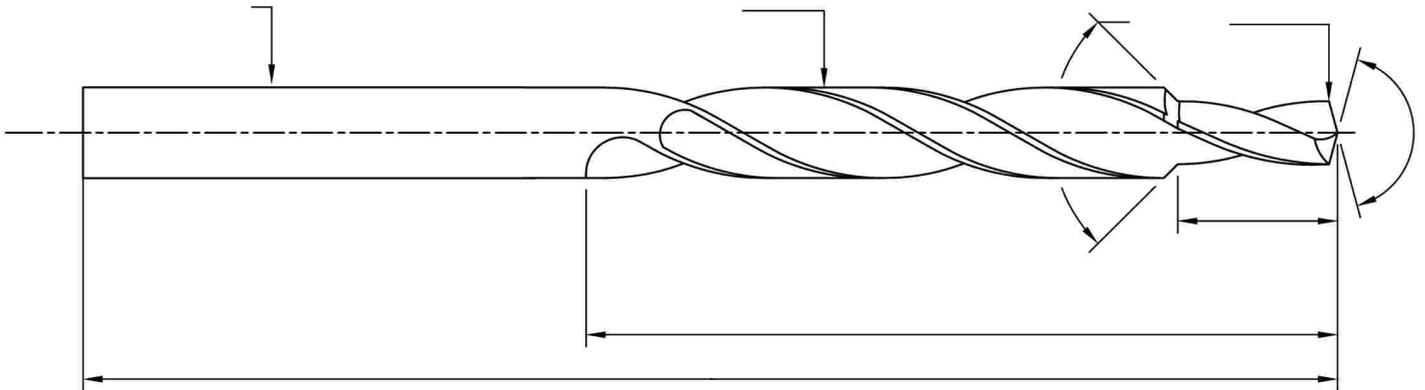
The two flute step drill eliminates operations by drilling multi diameter holes such as drill-chamfer, drill countersink, drill counterbore in one pass. Widely used in the aerospace and automotive industry these tools can be ordered to exacting tolerances, ensuring highly accurate holes. Diameters can be ground to 0.003mm (0.0001"), with run out from shank to point tip not exceeding 0.005mm (0.00015"). Mohawk's Step Drill are so accurate, they can in some cases eliminate completely the need for reaming.

AVAILABILITY:

In all grades of High Speed Steels and Powdered Metals, and also in all grades of Tungsten Carbide. We offer all tooling with through coolant facility if required.



STEP DRILL



As Appropriate

HOLE STYLE

- N1
- N2
- N3
- N4

CONSTRUCTION STYLE

- J1
- J2
- J3

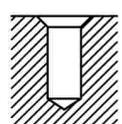
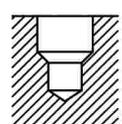
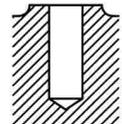
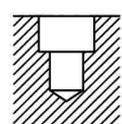
TOOL MATERIAL

- High Speed Steel
- Solid Carbide
- Coolant Holes
- Large Diameter
- Small Diameter

CONSTRUCTION STYLE

J1	Single Margin	J2	Double Margin	J3	Triple Margin Over 1" Dia.
					

HOLE STYLE

N1	Drill Chamfer	N2	Drill Drill	N3	Drill Spotface	N4	Drill Counterbore
							

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TITLE	STEP DRILL
TOOL No.	
CUSTOMER	
ALL UNSPECIFIED DIMENSIONS AND TOLERANCES ARE TO MOHAWK STANDARDS	



REAMERS

DESCRIPTION:

Mohawk Reamers are precision cutting tools used to “size” existing holes accurately. Depending on application stability, these tools will hold H5-H6 hole size tolerance. Mohawk helps our customers design the correct tool specifically suited for your application. Whether the material to be worked on is CFRP/GFRP/Al/Ti or any other metal type, or any combination of these materials, we will help you select the correct tool for your application. Why use a standard, when Mohawk can deliver tools in 2 weeks on almost any special.

APPLICATIONS:

Reamers are used to prepare, or finish ream, pre-drilled cavities for size, roundness, straightness

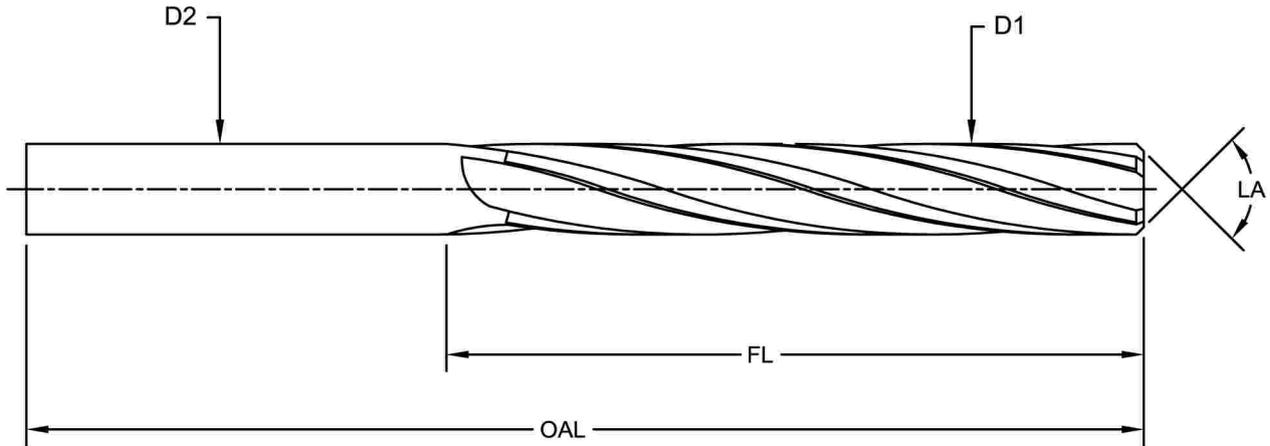
and surface finish. Flute geometry varies depending on the application, with left hand spiral, straight or right hand spiral flutes all available. The various lead angles sharpening styles illustrated on our sketch page allows you to choose the angle which suits your application. Reamer design also depends on surface finish required, the amount of stock to be removed, the types of material to be cut, and most importantly the combination of these materials if they are stacked together.

AVAILABILITY:

In all grades of high speed steels and Powered Metals, and also in all grades of Tungsten Carbide. We offer all our reamers with through coolant facility if required.

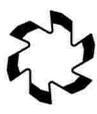
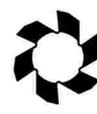
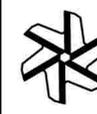
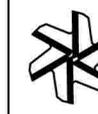


Order/ Enquiry Data
REAMER



TOOL DATA	END SHARPENING	TOOL MATERIAL	
OAL _____ OVERALL LENGTH	K1 <input type="checkbox"/>	High Speed Steel <input type="checkbox"/>	Shank Style _____
FL _____ FLUTE LENGTH	K2 <input type="checkbox"/>	Solid Carbide <input type="checkbox"/>	Thread _____
D1 _____ OUTSIDE DIAMETER	K3 <input type="checkbox"/>	Coolant Holes <input type="checkbox"/>	No. of Flutes _____
D2 _____ SHANK DIAMETER	K4 <input type="checkbox"/>	Tool Coating <input type="checkbox"/>	
LA _____ LEAD ANGLE			
	TANG	FLUTE STYLE	
	DIN <input type="checkbox"/>	Right Hand Spiral <input type="checkbox"/>	
	A.S.A. <input type="checkbox"/>	Left Hand Spiral <input type="checkbox"/>	
		Straight Flutes <input type="checkbox"/>	

As Appropriate

END SHARPENING							
K1	Standard Lead	K2	Flute Depth	K3	To Centre	K4	Across Centre
							

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TOOL No. _____	
CUSTOMER _____	TITLE REAMER
DRAWN BY _____	COATING _____
DATE _____	ALL UNSPECIFIED DIMENSIONS AND TOLERANCES ARE TO MOHAWK STANDARDS



FASTNER	HOLE DIAMETER LIMITS									
	DIAMETER		NORMAL SIZE		1/64" OVERSIZE		1/32" OVERSIZE		3/64" OVERSIZE	
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
5/32"	0.161	0.164								
3/16"	0.187	0.190	0.200	0.203	0.216	0.219	0.231	0.234		
1/4"	0.247	0.250	0.263	0.266	0.278	0.281	0.294	0.297		
5/16"	0.309	0.313	0.325	0.328	0.341	0.344	0.356	0.359		
3/8"	0.371	0.375	0.388	0.391	0.403	0.406	0.418	0.422		
7/16"	0.434	0.438	0.450	0.453	0.466	0.469	0.481	0.484		
1/2"	0.496	0.500	0.513	0.516	0.528	0.531	0.543	0.546		

STEP REAMERS

DESCRIPTION:

Mohawk offer a wide selection of both Piloted and Step Reamers. Our Step Reamers are manufactured with flute geometry specifically designed to allow both the step and the large diameter work together. We offer precision ground pilots (un-fluted if required), to allow our customers enlarge an existing cavity to a precise size, while also ensuring precise hole alignment. Mohawk stock most sizes of both piloted and step reamers, which allows us to offer our customers a quick turnaround for AOG situations, while also suiting the MRO industry with ready to go sizes. Flute geometry varies depending on the application, with left hand spiral, straight or right hand spiral flutes all available. Choose your own shank style to suit your application.

APPLICATION:

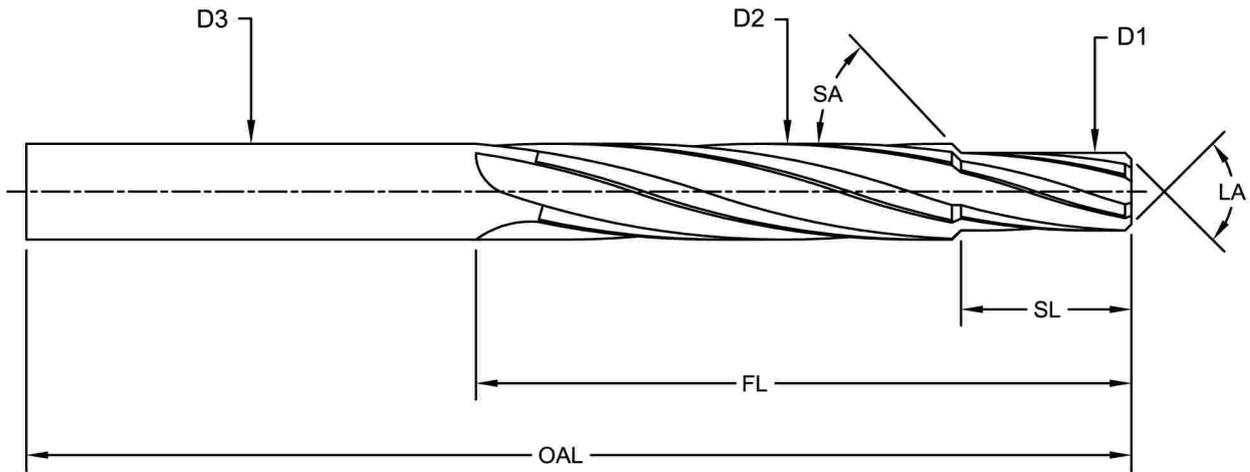
MRO facilities, engine and transmission manufacturers and aircraft assembly, all require highly accurate reamers to finish drilled or cast holes. Step or Piloted reamers are used where there is already an existing cavity, which needs to be enlarged to a precise size, while also holding the required surface finish. Reamer design also depends on surface finish required, the amount of stock to be removed, and the types of material to be cut, or the combination of these materials in a stack up.

AVAILABILITY:

We offer OVERNIGHT DELIVERY on sizes on illustrated chart, with tools available in all grades of high speed steels, Cobalt, and also in all grades of Tungsten Carbide. We offer all our reamers with through coolant facility if required.



Order/ Enquiry Data *STEP REAMER*



TOOL DATA	END SHARPENING	TOOL MATERIAL	
OAL <input type="text"/>		High Speed Steel <input type="checkbox"/>	Shank Style <input type="text"/>
FL <input type="text"/>	K1 <input type="checkbox"/>	Solid Carbide <input type="checkbox"/>	Thread <input type="text"/>
SL <input type="text"/>	K2 <input type="checkbox"/>	Coolant Holes <input type="checkbox"/>	No. of Flutes <input type="text"/>
SA <input type="text"/>	K3 <input type="checkbox"/>	Tool Coating <input type="checkbox"/>	
D1 <input type="text"/>	K4 <input type="checkbox"/>		
D2 <input type="text"/>		FLUTE STYLE	
D3 <input type="text"/>	TANG	Right Hand Spiral <input type="checkbox"/>	
LA <input type="text"/>	DIN <input type="checkbox"/>	Left Hand Spiral <input type="checkbox"/>	
	A.S.A. <input type="checkbox"/>	Straight Flutes <input type="checkbox"/>	

As Appropriate

END SHARPENING							
K1	Standard Lead	K2	Flute Depth	K3	To Centre	K4	Across Centre
							

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TOOL No. _____	
CUSTOMER _____	TITLE STEP REAMER
DRAWN BY _____	COATING _____
DATE _____	ALL UNSPECIFIED DIMENSIONS AND TOLERANCES ARE TO MOHAWK STANDARDS





SPACEMATIC TOOLING

DESCRIPTION:

Our Drill Countersink "Spacematic" and Drivematic tooling is world renowned for machining precise holes, in aircraft parts. Made with a variety of thread sizes, we hold 0.005mm (0.00015") run out from spindle to point, with all Point features made to tighter than industry standard tolerance, to ensure hole size. We guarantee to hold 0.050mm (0.0002") hole tolerance, with perfect alignment.

APPLICATIONS:

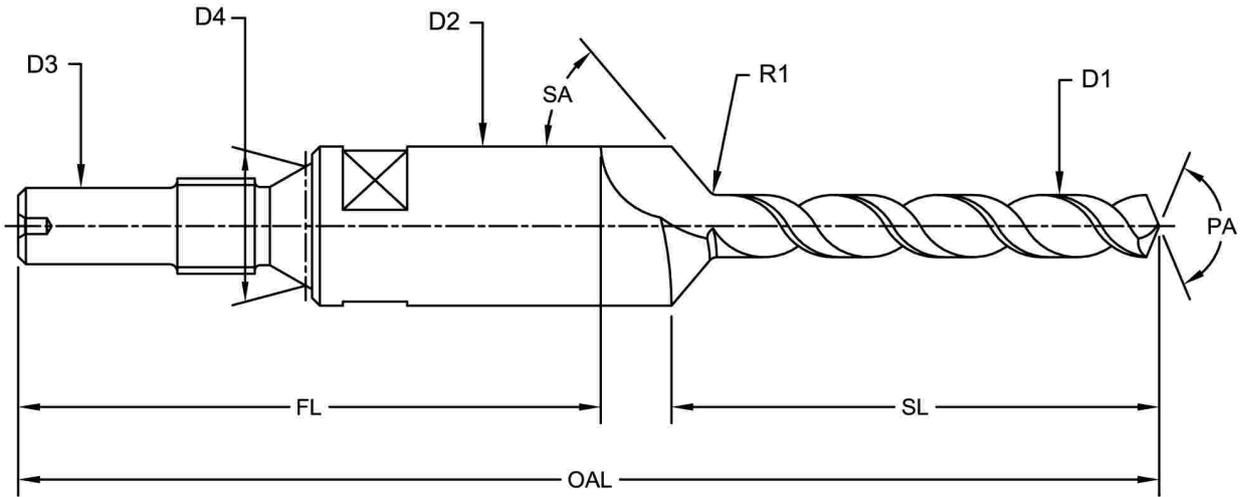
Advanced Drilling Equipment Power Tools, have been developed to address the need to achieve optimum hole quality. Where Aircraft components are too large, too irregular or too complex to be taken to a machining centre, Portable drill motors

with a broad range of cutter speed/feed rate combinations, are necessary for the critically close tolerance holes required in the diverse materials on aircraft parts. Our tools in most cases eliminate the need for any secondary operation, such as countersinking or reaming.

AVAILABILITY:

In all grades of high speed steels and cobalt, and also available in solid carbide, with a brazed on HSS Shank Adapter. Can also be purchased with an internal threaded interface.





TOOL DATA

OAL	_____
	OVERALL LENGTH
FL	_____
	FLUTE LENGTH
SL	_____
	STEP LENGTH
SA	_____
	STEP ANGLE
D1	_____
	STEP DIAMETER
D2	_____
	OUTSIDE DIAMETER
D3	_____
	SHANK DIAMETER
D4	_____
	GAUGE DIAMETER
R1	_____
	RADIUS
PA	_____
	POINT ANGLE

SEE PAGE 33 & 34 FOR OUR RANGE OF POINT STYLES

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TOOL No.	
CUSTOMER	TITLE SPACEMATIC
DRAWN BY	COATING
DATE	ALL UNSPECIFIED DIMENSIONS AND TOLERANCES ARE TO MOHAWK STANDARDS





STEP DRILL REAMERS

DESCRIPTION:

The MOHAWK Step Drill Reamer is a two fluted drill and a spiral fluted reamer combined into one tool. Suitable for all materials, this is an excellent tool when trying to eliminate a follow on reaming operation. Unique drill geometry, with a choice of point style to suit all materials, this tool type is used extensively in the aerospace and in some applications in the automotive markets. Mohawk also offer a wide choice of shank styles to suit your machine or hand held power tool (see page 35 & 36 for shank styles).

APPLICATIONS:

The Step Drill Reamer accomplishes both drilling and reaming of closer tolerance hole in one operation. The cavity should be a through hole, and the drill should break through the material, before, the reamer begins to cut to required size. Capable of holding a grade 7 (ISO) HOLE TOLERANCE. This tool type has achieved excellent results, stacked materials, such as CFRP/Ti/Al.

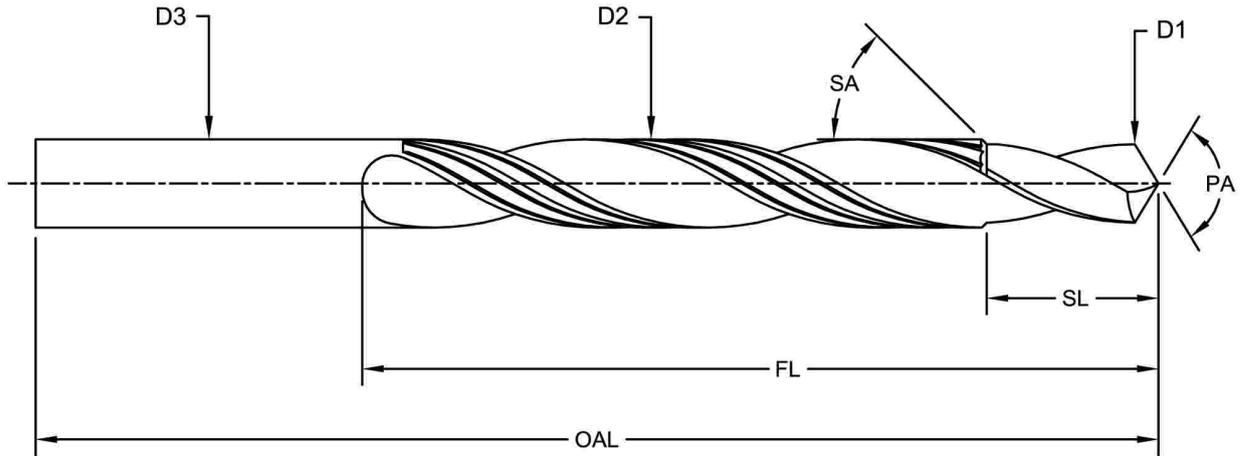
AVAILABILITY:

In all grades of high speed steels and cobalt, and also available in all grades of tungsten carbide. These tools are also offered with through coolant channels if required.



Order/ Enquiry Data

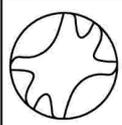
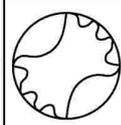
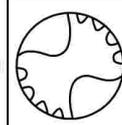
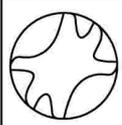
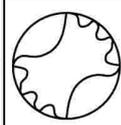
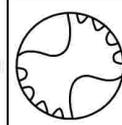
STEP DRILL REAMER



TOOL DATA	FLUTE STYLE	TOOL MATERIAL	
OAL _____ OVERALL LENGTH	J1 <input type="checkbox"/>	High Speed Steel <input type="checkbox"/>	Shank Style _____
FL _____ FLUTE LENGTH	J2 <input type="checkbox"/>	Solid Carbide <input type="checkbox"/>	Thread _____
SL _____ STEP LENGTH	J3 <input type="checkbox"/>	Coolant Holes <input type="checkbox"/>	
SA _____ STEP ANGLE	J4 <input type="checkbox"/>	Tool Coating <input type="checkbox"/>	
D1 _____ STEP DIAMETER			
D2 _____ REAMER DIAMETER		TANG	
D3 _____ SHANK DIAMETER		DIN <input type="checkbox"/>	
PA _____ POINT ANGLE		A.S.A. <input type="checkbox"/>	

SEE PAGE 33 & 34 FOR OUR RANGE OF POINT STYLES

As Appropriate

FLUTE STYLE							
J1	(2-4) 2.5 - 6.0mm	J2	(2-6) 6.0 - 32.0mm	J3	(2-8) 32.0 - 64.0mm	J4	(2-10) 64.0 - 76.0mm
							

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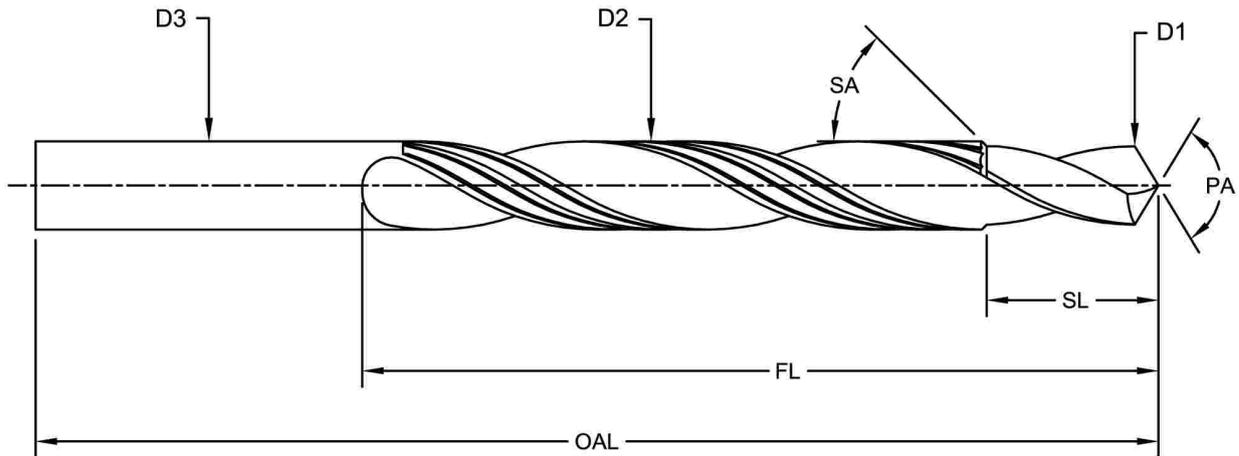
Signed _____ Date _____

TOOL No. _____	
CUSTOMER _____	TITLE STEP DRILL REAMER
DRAWN BY _____	COATING _____
DATE _____	ALL UNSPECIFIED DIMENSIONS AND TOLERANCES ARE TO MOHAWK STANDARDS



Order/ Enquiry Data

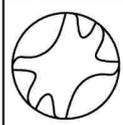
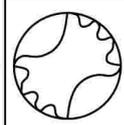
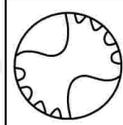
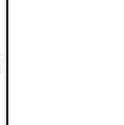
STEP DRILL REAMER



TOOL DATA	FLUTE STYLE	TOOL MATERIAL	
OAL _____ OVERALL LENGTH	J1 <input type="checkbox"/>	High Speed Steel <input type="checkbox"/>	Shank Style _____
FL _____ FLUTE LENGTH	J2 <input type="checkbox"/>	Solid Carbide <input type="checkbox"/>	Thread _____
SL _____ STEP LENGTH	J3 <input type="checkbox"/>	Coolant Holes <input type="checkbox"/>	
SA _____ STEP ANGLE	J4 <input type="checkbox"/>	Tool Coating <input type="checkbox"/>	
D1 _____ STEP DIAMETER			
D2 _____ REAMER DIAMETER		TANG	
D3 _____ SHANK DIAMETER		DIN <input type="checkbox"/>	
PA _____ POINT ANGLE		A.S.A. <input type="checkbox"/>	

SEE PAGE 33 & 34 FOR OUR RANGE OF POINT STYLES

As Appropriate

FLUTE STYLE						
J1	(2-4) 2.5 - 6.0mm	J2	(2-6) 6.0 - 32.0mm	(2-8) 32.0 - 64.0mm	J4	(2-10) 64.0 - 76.0mm
						

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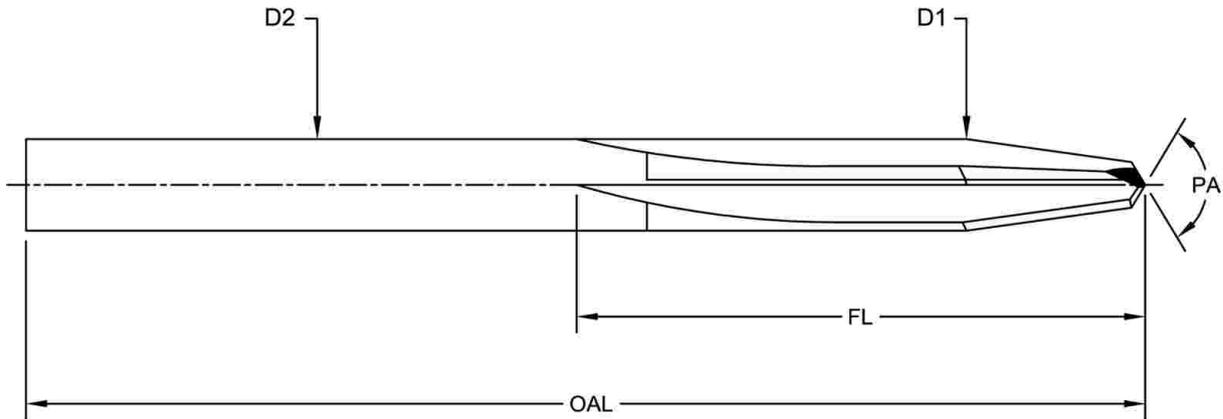
Please expedite the return of this print.
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Signed _____ Date _____

TOOL No. _____	
CUSTOMER _____	TITLE STEP DRILL REAMER
DRAWN BY _____	COATING _____
DATE _____	ALL UNSPECIFIED DIMENSIONS AND TOLERANCES ARE TO MOHAWK STANDARDS



Order/ Enquiry Data
ONE SHOT DRILL



TOOL DATA

OAL _____
OVERALL LENGTH
FL _____
FLUTE LENGTH
D1 _____
OUTSIDE DIAMETER
D2 _____
SHANK DIAMETER
PA _____
POINT ANGLE

TANG

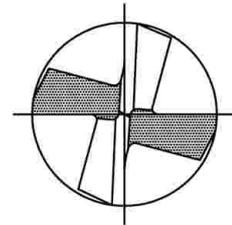
DIN
A.S.A.

TOOL MATERIAL

High Speed Steel
Solid Carbide
Tool Coating

Shank Style _____
Thread _____

POINT STYLE



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TOOL No.	
CUSTOMER	TITLE ONE SHOT DRILL
DRAWN BY	COATING
DATE	ALL UNSPECIFIED DIMENSIONS AND TOLERANCES ARE TO MOHAWK STANDARDS





CORE DRILLS

DESCRIPTION:

A Core Drill is the work horse of the cutting tools, used for enlarging pre-drilled, punched, cast or cored existing holes, while also straightening the hole and preparing it for the reaming operation. It is basically a twist drill with 3 or 4 flutes.

APPLICATIONS:

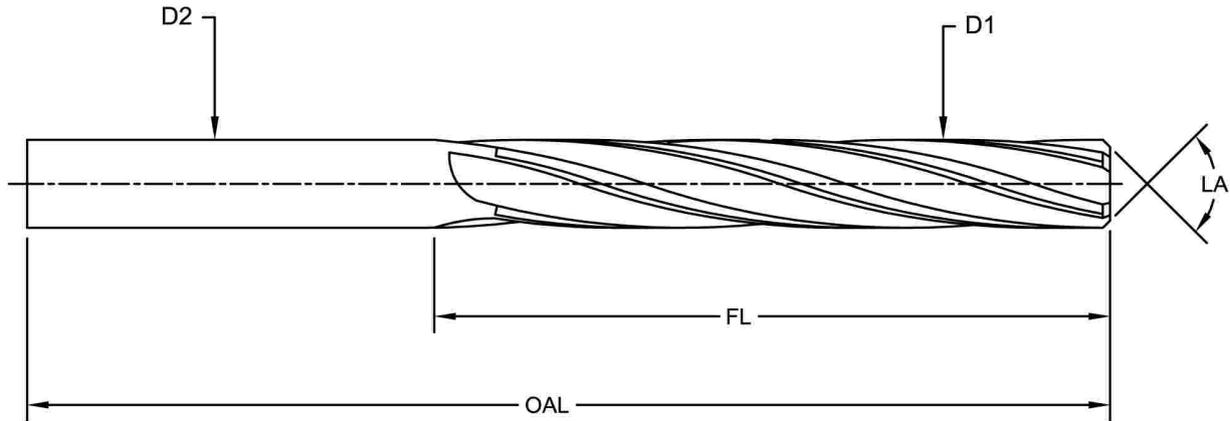
Where an existing hole is present, it is always recommended to use a tool with 3 or 4 flutes, as opposed to opening it with a 2 fluted tool. The 3 or 4 lands provide better guiding support, have a thicker web, and may be used with heavier feed rates. All MOHAWK Core Drills are manufactured to meet specific requirements, with the appropriate lead angle, end sharpening, number of flutes, etc.

Whether you are machining CFRP/GFRP/Al/Ti or any such combination, we will recommend flute formation and other features to suit your requirement

AVAILABILITY:

In all grades of high speed steel and cobalt material. These tools are also available in all grades of tungsten carbide, with through coolant channels if required. Can also be purchased with a step or pilot, see page 20 for sketch.





TOOL DATA

OAL _____
OVERALL LENGTH

FL _____
FLUTE LENGTH

D1 _____
OUTSIDE DIAMETER

D2 _____
SHANK DIAMETER

LA _____
LEAD ANGLE

END SHARPENING

K1

K2

K3

K4

TOOL MATERIAL

High Speed Steel

Solid Carbide

Tool Coating

Shank Style _____

Thread _____

No. of Flutes _____

HOLE STYLE

N1

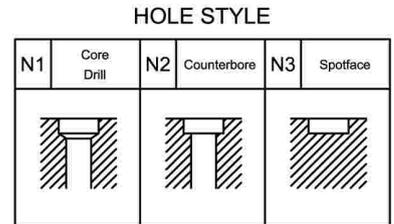
N2

N3

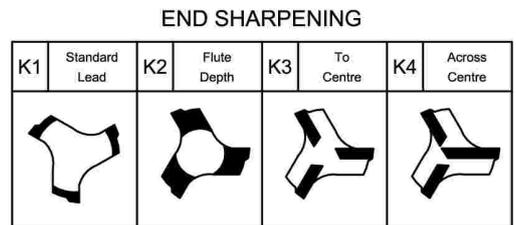
TANG

DIN

A.S.A.



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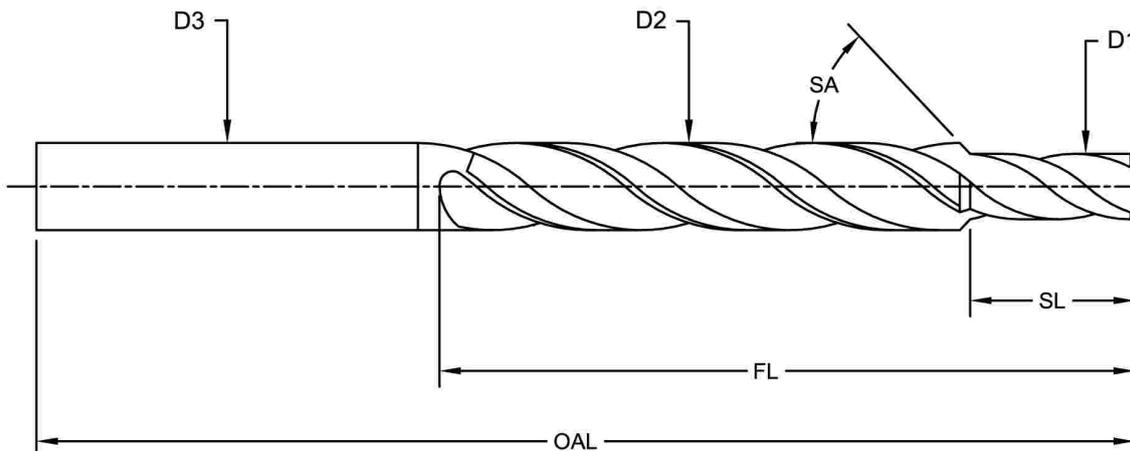
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TOOL No.	
CUSTOMER	TITLE CORE DRILL
DRAWN BY	COATING
DATE	ALL UNSPECIFIED DIMENSIONS AND TOLERANCES ARE TO MOHAWK STANDARDS



Order/ Enquiry Data
PILOTED CORE DRILL



TOOL DATA	TANG	TOOL MATERIAL	
OAL _____ OVERALL LENGTH	DIN <input type="checkbox"/>	High Speed Steel <input type="checkbox"/>	Shank Style _____
FL _____ FLUTE LENGTH	A.S.A. <input type="checkbox"/>	Solid Carbide <input type="checkbox"/>	Thread _____
SL _____ STEP LENGTH		Coolant Holes <input type="checkbox"/>	No. of Flutes _____
SA _____ STEP ANGLE		Tool Coating <input type="checkbox"/>	
D1 _____ PILOT DIAMETER			
D2 _____ CORE DIAMETER			
D3 _____ SHANK DIAMETER			

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TOOL No. _____	
CUSTOMER _____	TITLE PILOTED CORE DRILL
DRAWN BY _____	COATING _____
DATE _____	ALL UNSPECIFIED DIMENSIONS AND TOLERANCES ARE TO MOHAWK STANDARDS





BRAZED JOINTED TOOLING

DESCRIPTION:

Mohawk is the world's leading manufacturer of Solid Carbide to HSS Brazed Jointed Tools. We apply the latest technologies along with a vast experience of the brazing process to ensure true integrity of our tools. We also offer a choice of shanks to suit your specific application, and manufacture tools with or without internal coolant holes. Any of the previously featured tool types are available in brazed construction. All our tools are torque tested before shipping, and also have to meet stringent run-out tolerances to ensure highly accurate hole size and alignment.

APPLICATIONS:

In the aircraft industry where ADE Units are necessary, and it is also a requirement to use a Solid Carbide Tool (coated or uncoated), our tools work in various materials ranging from CFRP, GFRP, Al, Steel & Ti, and many other material types. Today's aircraft materials vary and are almost always stack ups of these materials. The benefit to using a Mohawk tool is that we design the tools for the specific application and quote using the least amount of tools, to reduce our customer's costs.

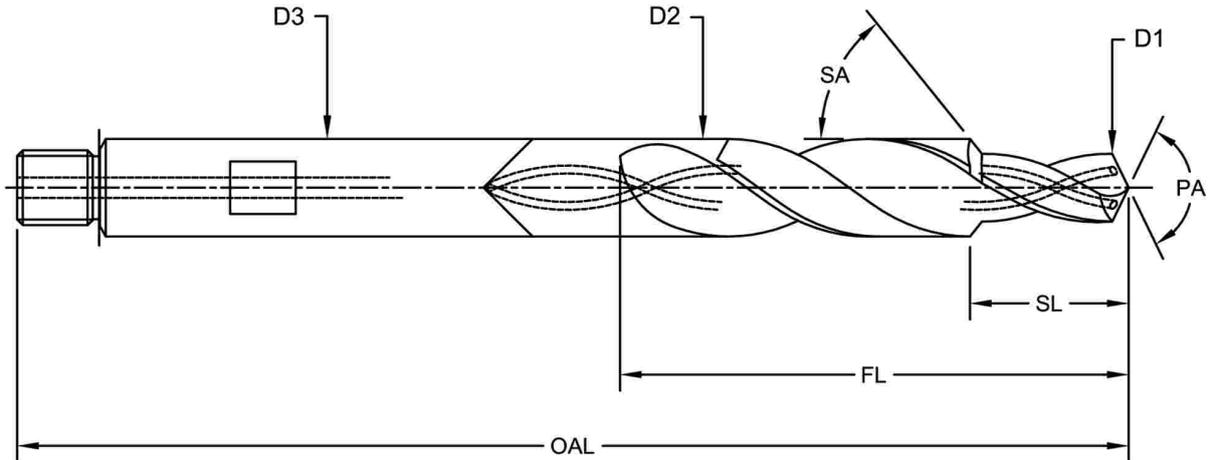
AVAILABILITY:

In all grades of High Speed Steels and Powdered Metals, and also in all grades of Tungsten Carbide. We offer all tooling with a through coolant facility if required.



Order/ Enquiry Data

BRAZED JOINTED STEP DRILL



TOOL DATA

OAL _____
OVERALL LENGTH

FL _____
FLUTE LENGTH

SL _____
STEP LENGTH

SA _____
STEP ANGLE

D1 _____
STEP DIAMETER

D2 _____
OUTSIDE DIAMETER

D3 _____
SHANK DIAMETER

PA _____
POINT ANGLE

HOLE STYLE

N1

N2

N3

N4

TOOL MATERIAL

High Speed Steel

Solid Carbide

Coolant Holes

Tool Coating

Shank Style _____

Thread _____

MARGIN STYLE

J1

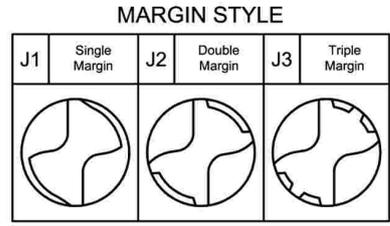
J2

J3

TANG

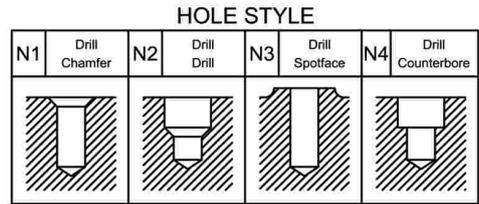
DIN

A.S.A.



SEE PAGE 33 & 34 FOR OUR RANGE OF POINT STYLES

As Appropriate



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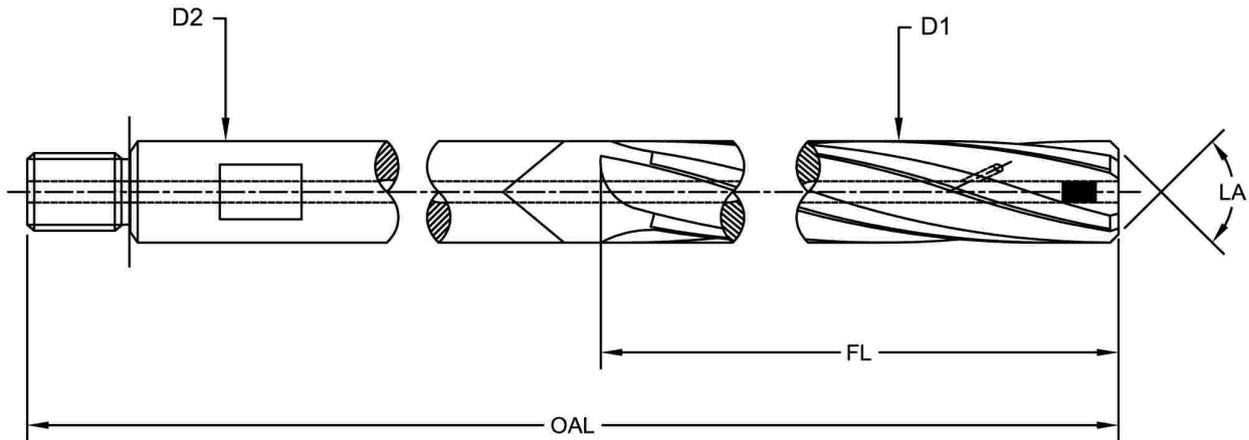
Signed _____ Date _____

TOOL No. _____	
CUSTOMER _____	TITLE BRAZED JOINTED STEP DRILL
DRAWN BY _____	COATING _____
DATE _____	ALL UNSPECIFIED DIMENSIONS AND TOLERANCES ARE TO MOHAWK STANDARDS



Order/ Enquiry Data

BRAZED JOINTED REAMER



<p>TOOL DATA</p> <p>OAL _____ OVERALL LENGTH</p> <p>FL _____ FLUTE LENGTH</p> <p>D1 _____ OUTSIDE DIAMETER</p> <p>D2 _____ SHANK DIAMETER</p> <p>LA _____ LEAD ANGLE</p>	<p>END SHARPENING</p> <p>K1 <input type="checkbox"/></p> <p>K2 <input type="checkbox"/></p> <p>K3 <input type="checkbox"/></p> <p>K4 <input type="checkbox"/></p> <p>TANG</p> <p>DIN <input type="checkbox"/></p> <p>A.S.A. <input type="checkbox"/></p>	<p>TOOL MATERIAL</p> <p>High Speed Steel <input type="checkbox"/></p> <p>Solid Carbide <input type="checkbox"/></p> <p>Coolant Holes <input type="checkbox"/></p> <p>Tool Coating <input type="checkbox"/></p> <p>FLUTE STYLE</p> <p>Right Hand Spiral <input type="checkbox"/></p> <p>Left Hand Spiral <input type="checkbox"/></p> <p>Straight Flutes <input type="checkbox"/></p>	<p>Shank Style _____</p> <p>Thread _____</p> <p>No. of Flutes _____</p>
---	---	---	---

As Appropriate

END SHARPENING							
K1	Standard Lead	K2	Flute Depth	K3	To Centre	K4	Across Centre
							

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TOOL No. _____	
CUSTOMER _____	TITLE BRAZED JOINTED REAMER
DRAWN BY _____	COATING _____
DATE _____	ALL UNSPECIFIED DIMENSIONS AND TOLERANCES ARE TO MOHAWK STANDARDS





TAPERLOK TOOLS

DESCRIPTION:

Taperlok Tooling is widely used in the aircraft industry to machine precision tapered holes in various aircraft parts. The tooling lends itself to a Fastening System, whereby a Tapered Fastener is used to bolt together the machined parts in a self-sealing system. Taper-Lok systems derive its self-sealing ability through its tapered interference fit, which also assures accurate alignment of the structure being joined. The controlled interference provides contact and sealing between the bolt shank and the total bearing area within the hole.

APPLICATIONS:

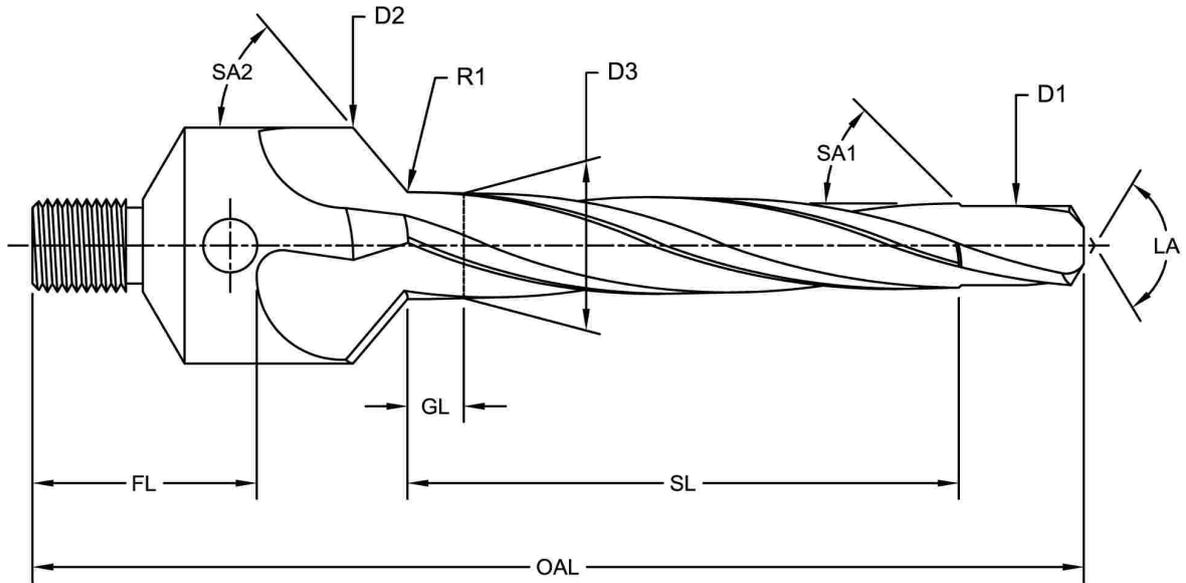
Used in Hand Held Positive Feed Power Tools, our closer than standard tolerance pilot seats snugly in a pre-drilled hole allowing you produce a precise and accurate hole faster, and also creates the countersink to match your fastener head. All our cutters are designed, manufactured and inspected to exacting specifications, ensuring a quality hole finish. Mohawk has a high degree of technical competence and experience in the airframe manufacturing sector.

AVAILABILITY:

In all grades of High Speed Steels and Powered Metals, and also in all grades of Tungsten Carbide. We offer all tooling with a through coolant facility if required.



Order/ Enquiry Data
TAPERLOC DRILL REAMER



TOOL DATA

OAL	_____
	OVERALL LENGTH
FL	_____
	FLUTE LENGTH
SL	_____
	STEP LENGTH
GL	_____
	GAUGE LENGTH
SA1	_____
	STEP ANGLE
SA2	_____
	C'SINK ANGLE
D1	_____
	STEP DIAMETER
D2	_____
	OUTSIDE DIAMETER
D3	_____
	GAUGE DIAMETER
R1	_____
	RADIUS
LA	_____
	LEAD ANGLE

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Signed _____ Date _____

TOOL No. _____	
CUSTOMER _____	TITLE TAPERLOC DRILL REAMER
DRAWN BY _____	COATING _____
DATE _____	ALL UNSPECIFIED DIMENSIONS AND TOLERANCES ARE TO MOHAWK STANDARDS





SQUARE DRILL

HIGH PRODUCTIVITY LOW COST DRILLING WITH MOHAWK'S SQUARE DRILL

The "Square" Drill/Burnishing Tool was designed to withstand the many tough hole making applications encountered when using Solid Carbide Tooling.

This Tool is particularly suitable when hole alignment and size is a problem. The "Square" Drill is recommended for the drilling of aluminium and cast iron materials.

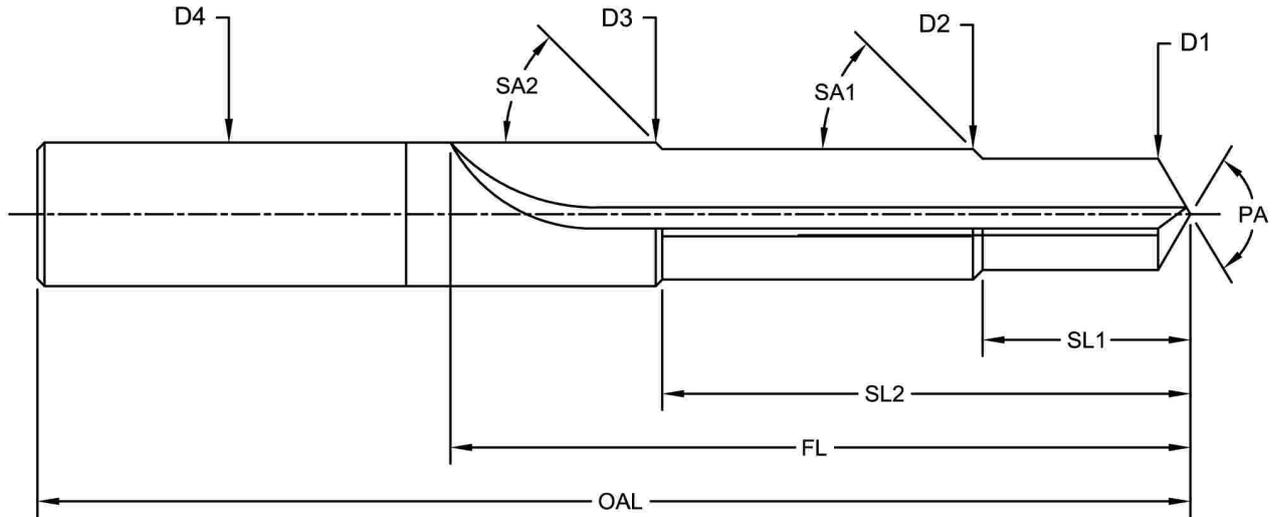
SPECIAL FEATURES

- High Cutting Speeds and Feed Rates
- Extended Tool Life
- Straight Flute Construction ensures maximum rigidity and improved hole alignment
- Improved hole size and roundness
- The Mohawk "Square" Drill has a unique four margin flute geometry which drills and burnishes and in many cases eliminates the need to ream.
- Optional coolant feed design and choice of coatings



Order/ Enquiry Data

STEP SQUARE DRILL



TOOL DATA

- OAL _____
OVERALL LENGTH
- FL _____
FLUTE LENGTH
- SL1 _____
STEP LENGTH
- SL2 _____
STEP LENGTH
- SA1 _____
STEP ANGLE
- SA2 _____
STEP ANGLE
- D1 _____
STEP DIAMETER
- D2 _____
STEP DIAMETER
- D3 _____
OUTSIDE DIAMETER
- D4 _____
SHANK DIAMETER
- PA _____
POINT ANGLE

SEE PAGE 33 #7
FOR POINT STYLE

TANG

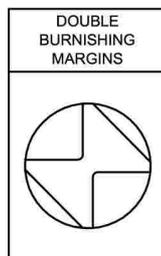
- DIN
- A.S.A.

TOOL MATERIAL

- High Speed Steel
- Solid Carbide
- Coolant Holes
- Tool Coating

Shank Style _____
Thread _____

MARGIN STYLE



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APPROVAL PRINT

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NOT Approved Other: _____

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Signed _____ Date _____

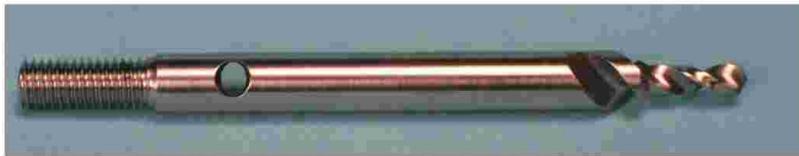
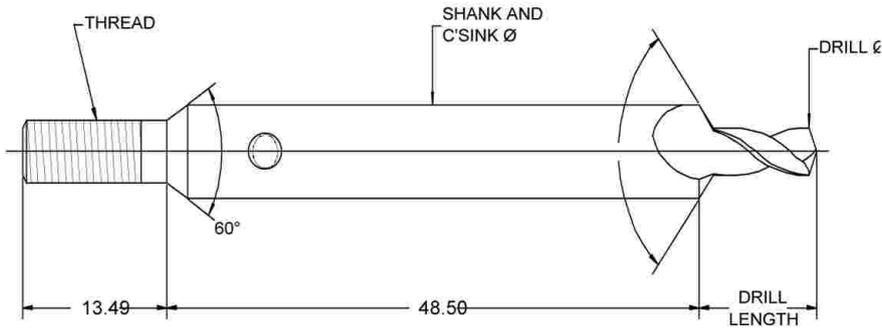
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TOOL No. _____	
CUSTOMER _____	TITLE STEP SQUARE DRILL
DRAWN BY _____	COATING _____
DATE _____	ALL UNSPECIFIED DIMENSIONS AND TOLERANCES ARE TO MOHAWK STANDARDS



NUTPLATE DRILLS

Application: Used in Nutplate Drill Motors, these drills machine precise holes in Aluminum, Titanium and Carbon Fibre. Mohawk Cutting Tools, manufactures a number of different sizes, to meet the needs of the Aircraft manufacturers different Nutplate Rivets.



Cutter Series No.	Shank & C'Sink Dia.	Drill Dia.	External Thread
WD51	.1250	.0670	# 3-56
WDS51	.1875	.0670	# 8-32
WD40	.1875	.0980	# 8-32
WDS40	.2500	.0980	# 8-32
WD30	.2500	.1285	# 8-32
WDS30	.3125	.1285	# 8-32
WD21	.3125	.1590	# 8-32
WDS21	.3750	.1590	# 8-32

Drill Length	"L" Dim.
-25	.295
-35	.420
-50	.560
-90	.970

PART NO. EXPLANATION: WDXX

-XXX° -XX

CUTTER SERIES NO.

DRILL LENGTH DASH NO. (SEE TABLE FOR MFG DIM'S.)

MATERIAL TO BE DRILLED
OMIT IF FOR ALUMINUM
"M3" FOR STEEL OR TITANIUM

C'SINK ANGLE

Available in H.S.S.,

H.S.S. Cobalt & Solid Carbide

*Please specify required dimensions.
Approval print available on request.*



CUTTING CONDITIONS

Improper speeds and feeds can drastically affect the performance of any cutting tool, causing premature tool wear, and oversize holes.

Cutting speed is the speed at the outside edge of the tool as it is cutting. This is also known as surface speed. Surface speed, surface footage, and surface area are all directly related. If two tools of different sizes are turning at the same revolutions per minute (RPM), the larger tool has a greater surface speed. Surface speed is measured in surface feet per minute (SFPM). All cutting tools work on the surface footage principle. Your cutting speed will depend primarily on the type of material you are cutting and the kind of cutting tool you are using. The hardness of the work material has a great deal to do with the recommended cutting speed. The harder the work material, the slower the cutting speed. The softer the work material, the faster the recommended cutting speed.

The three factors, cutting speed, feedrate and depth of cut, are known as cutting conditions. Cutting conditions are determined by the machinability rating of the material. Machinability is the comparing of materials on their ability to be machined. From machinability ratings we can derive recommended cutting speeds. Recommended cutting speeds are given in charts. These charts can be found in the following pages. The spindle speed must be set so that the tool will be operating at the correct cutting speed. To set the proper spindle speed, we need to calculate the proper revolution per minute or RPM setting. Cutting speed or surface speed will change with the size of the tool. So to keep the surface speed

the same for each size tool, we must use a formula, which includes the size of the tool, to calculate the proper RPM to maintain the proper surface footage.

Once you have calculated the RPM, remember that this is only a recommendation. Some judgment must be made in selecting the actual RPM setting to use. There are always outside factors that must go into deciding on the proper speed and feed to use. Ask yourself these questions before deciding on an RPM setting. How sturdy is my setup? Go slower for setups, which lack a great deal of rigidity. Am I using coolant? You may be able to use a faster speed if you are using flood coolant. How deep am I drilling? If you're drilling a deep hole, there is no place for the heat to go. You may have to slow the RPM down for deep whole drilling.

The greatest indicator of proper and improper cutting speed is the color of the chip. When using a high-speed steel drill bit, the chips should never be turning brown or blue. Straw-colored chips indicate that you are on the maximum edge of the cutting speed for your cutting conditions. When using carbide, chip colors can range from amber to blue, but never black. A dark purple color will indicate that you are on the maximum edge of your cutting conditions.

For technical assistance with any of your cutting tool requirements, why not contact us for advice on best practice, we have a catalogued encyclopaedia of cutting tool usage in all materials from CFRP to Aluminium.



Drill Speeds (m/min)

Material	H.S.S.	Coolant FED H.S.S.	Carbide	Coolant FED Carbide
Aluminium & Aluminium Alloys.	46 - 80	80 - 100	70 - 137	150 - 200
Brass and Bronze (free cutting)	46 - 92	80 - 105	70 - 120	125 - 180
Brass and Bronze (high tensile)	21 - 37	32 - 45	42 - 61	58 - 90
Cast Iron (<260 B.H.)	24 - 49	29 - 58	55 - 80	60 - 90
Cast Iron (>260 B.H.)	9 - 15	10 - 18	20 - 46	40 - 53
Copper Alloys	21 - 31	52 - 76	40 - 95	90 - 150
Lead and Lead Alloys	60 - 90	90 - 120	90 - 150	180 - 245
Magnesium	50 - 100	90 - 135	105 - 185	190 - 245
Nickel Based Alloys	6 - 15	20 - 26	12 - 27	30 - 46
Plastic and Related Materials	31 - 61	70 - 90	46 - 91	150 - 180
Tin and Tin Alloys	60 - 90	90 - 120	90 - 150	180 - 245
Zinc and Zinc Alloys	60 - 80	70 - 95	70 - 120	150 - 185
Composites				
Carbonfibre	-	-	75 - 110	-
Fibreglass	-	-	80 - 90	-
Kevlar*	-	-	120 - 150	-
Steel				
Alloyed - under 200 B.H.	18 - 27	35 - 45	40 - 55	70 - 90
Alloyed - 200 - 300 B.H.	10 - 20	25 - 38	21 - 40	50 - 65
Alloyed - 300 - 350 B.H.	6 - 9	17 - 25	12 - 18	40 - 52
Cast and Forged	12 - 21	25 - 35	21 - 40	50 - 60
Heat Treated - 35 - 40 R.C.	9 - 12	12 - 15	16 - 26	24 - 32
Heat Treated - 40 45 R.C.	-	6 - 10	15 - 22	24 - 28
Heat Treated - 45 - 50 R.C.	-	5 - 9	6 - 12	15 - 21
Mild - 0.2 - 0.3% Carbon	21 - 31	18 - 34	25 - 47	53 - 58
Mild - 0.4 - 0.5% Carbon	15 - 24	12 - 29	20 - 45	24 - 69
Stainless - 300 Series	6 - 15	11 - 18	12 - 27	24 - 38
Stainless - 400 Series	9 - 12	17 - 24	15 - 35	38 - 46
Tool - Over 1.0% Carbon	10 - 15	12 - 18	16 - 26	24 - 34
Titanium Alloys	21 - 31	9 - 34	12 - 27	30 - 70

*Kevlar is a registered trademark of Du Pont

Drill Feeds

Diameter Range (mm)	Normal Feed (mm/rev)	Heavy Feed (mm/rev)
1.5 - 3	0.025 - 0.05	0.05 - 0.1
3 - 6	0.05 - 0.1	0.1 - 0.2
6 - 12	0.1 - 0.2	0.2 - 0.4
12 - 25	0.2 - 0.4	0.4 - 0.6
over 25	0.4 - 0.6	0.6 - 0.8

The above are suggested starting ranges, but due to the many variables in an operation, such as tool construction, fixturing, machine, coolants, etc., a more optimum speed and feed rate may be established through trial.



Cutting Speeds

Drill Ø	Cutting Speeds (m/min)																			
	5	10	12	16	20	22	25	30	40	50	60	80	90	100	150	200	300	400	500	600
	Spindle Speed (rev/min)																			
2.5	637	1273	1528	2037	2546	2801	3183	3820	5093	6366	7639	12186	11459	12732	19099	25465	38197	50930	63662	76394
3	531	1061	1273	1398	2122	2334	2653	3183	4244	5305	6366	8488	9549	10610	15915	21221	31831	42441	53052	63662
4	398	796	955	1273	1592	1751	1989	2387	3183	3979	4775	6366	7162	9958	11937	15915	23873	31831	39789	47746
5	318	637	764	1019	1273	1401	1592	1910	2546	3183	3826	5093	5730	6366	9549	12732	19099	25465	31831	38197
6	265	531	637	849	1061	1167	1326	1592	2122	2653	3183	4244	4775	5305	7958	10610	15915	21221	26526	31831
7	227	455	546	728	909	1000	1137	1364	1819	2274	2728	3638	4093	4547	6821	9095	13642	18189	22736	27284
8	199	398	477	637	796	875	995	1194	1592	1989	2387	3183	3581	3971	5968	7958	11937	15915	19894	23873
10	159	318	382	509	637	700	796	955	1273	1592	1910	2546	2865	3183	4775	6366	9549	12732	15915	19099
12	133	265	318	424	531	584	663	796	1061	1326	1592	2122	2387	2653	3979	5305	7958	10610	13263	15915
14	114	227	273	364	455	500	568	682	909	1137	1364	1819	2046	2274	3410	4547	6821	9095	11368	13642
15	99	199	238	318	398	438	497	957	796	995	1194	1592	1790	1989	3183	4244	6366	8488	10610	12732
18	88	177	212	283	354	389	442	531	707	884	1061	1415	1592	1768	2653	3537	5305	7074	8842	10610
20	80	159	191	255	318	350	398	477	637	796	955	1273	1432	1592	2387	3183	4775	6366	7958	9549
22	72	145	174	231	289	318	362	434	579	723	858	1157	1302	1447	2170	2894	4341	5787	7234	8681
24	66	133	159	212	265	292	332	398	531	663	796	1061	1194	1326	1989	2653	3979	5305	6631	7958
25	61	122	147	196	245	269	306	367	490	612	735	979	1101	1224	1910	2546	3820	5093	6366	7639
28	57	114	136	182	227	250	284	341	455	568	682	909	1023	1137	1705	2274	3410	4547	5684	6821
30	53	106	127	170	212	233	265	318	424	530	636	849	955	1061	1592	2122	3183	4244	5305	6366
32	50	99	119	159	199	219	249	298	398	497	597	796	895	995	1492	1989	2984	3979	4974	5968
34	47	94	112	150	187	206	234	281	374	468	562	749	843	936	1404	1872	2809	3745	4681	5617
36	44	88	106	141	177	195	221	265	354	442	531	707	796	884	1326	1768	2653	3537	4421	5305
38	42	84	101	134	168	184	209	251	335	419	503	670	754	834	1256	1675	2513	3351	4188	5026
40	40	80	95	127	159	175	199	239	318	398	477	637	716	796	1194	1592	2387	3183	3979	4775
45	35	71	85	113	141	156	177	212	283	354	424	566	637	707	1061	1415	2122	2829	3537	4244
50	32	64	76	102	127	140	159	191	255	318	382	509	573	637	955	1273	1910	2546	3183	3820
55	29	58	69	93	116	127	145	174	231	289	347	463	521	579	868	1157	1736	2315	2894	3472
60	27	53	64	85	106	117	133	159	212	265	318	424	477	531	796	1061	1592	2122	2653	3183

USEFUL FORMULAE

Where N = Spindle speed
 D = Diameter of tool
 S = Cutting speed

$$N = \frac{1000 \times S}{\pi D}$$

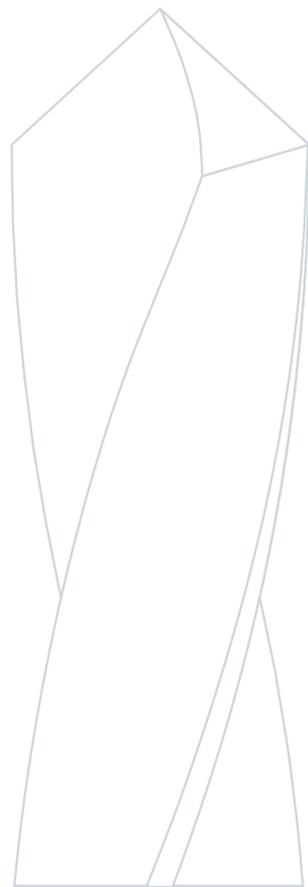
Where F = Feed rate
 f_m = Feed rate per minute
 D = Diameter of tool
 S = Cutting Speed

$$F = \frac{f_m \times D \times \pi}{S \times 1000}$$

Where t = machine time
 f_m = Feed rate per minute
 w = Depth of Cut

$$t = \frac{w}{f_m}$$

$$\text{Drilling time} = \frac{\text{Total Tool Travel Distance}}{\text{RPM} \times \text{Feed per Rev}}$$



Solid Carbide Square Drills

Material	Cutting Speed SFM (m/min)	Feed Rate inch/rev (mm/rev)				
		0.12-0.24in (3-6mm)	0.24-0.36in (6-9mm)	0.36-0.48in (9-12mm)	0.48-0.63in (12-16mm)	0.63-1.00in (16-25mm)
Aluminium die cast alloy	200 - 330 (60 - 100)	0.001/0.004 (0.03/0.10)	0.0015/0.006 (0.04/0.15)	0.002/0.008 (0.05/0.20)	0.002/0.012 (0.06/0.30)	0.008/0.016 (0.20/0.40)
zinc die cast alloy	130 - 200 (40 - 60)					
Alumimium alloy (castings)						
Cast iron (soft)	100 - 200 (30 - 60)	0.001/0.003 (0.03/0.08)	0.0015/0.005 (0.04/0.12)	0.002/0.008 (0.05/0.20)	0.002/0.012 (0.06/0.30)	0.008/0.016 (0.20/0.40)
Cast iron (hard)	50 - 130 (15 - 40)	0.008/0.002 (0.02/0.05)	0.001/0.003 (0.03/0.08)	0.0016/0.005 (0.04/0.12)	0.002/0.006 (0.05/0.15)	0.008/0.012 (0.20/0.30)

Solid Carbide Coolant Feed Square Drills

Material	Cutting Speed SFM (m/min)	Feed Rate inch/rev (mm/rev)				
		0.12-0.24in (3-6mm)	0.24-0.36in (6-9mm)	0.36-0.48in (9-12mm)	0.48-0.63in (12-16mm)	0.63-1.00in (16-25mm)
Aluminium die cast alloy	330 - 700 (100 - 210)	0.004/0.006 (0.10/0.18)	0.006/0.010 (0.18/0.25)	0.010/0.012 (0.25/0.30)	0.012/0.016 (0.30/0.40)	0.016/0.020 (0.40/0.50)
zinc die cast alloy	260 - 650 (80 - 200)					
Alumimium alloy (castings)						
Cast iron (soft)	230 - 400 (70 - 120)	0.004/0.006 (0.10/0.15)	0.006/0.008 (0.15/0.20)	0.008/0.010 (0.20/0.25)	0.010/0.014 (0.25/0.35)	0.014/0.016 (0.35/0.40)
Cast iron (hard)	230 - 400 (70 - 120)	0.003/0.005 (0.08/0.12)	0.005/0.007 (0.12/0.18)	0.007/0.009 (0.18/0.22)	0.009/0.012 (0.22/0.30)	0.012/0.014 (0.30/0.35)

Cutting fluid: Water soluble / lightduty oil.

Pressure: 20 Bar (290 P.S.I.) minimum

Flow rate: 4.5 litres / minutes minimum

Concentration: Normally 3% - 4% but may vary depending on the cutting fluid.
(We suggest that you follow the recommendation of the manufacturer of the cutting fluid.)

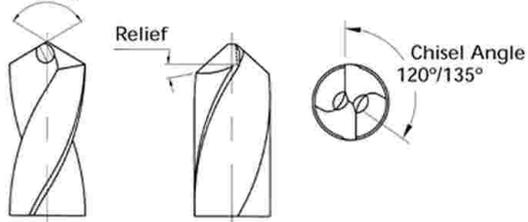


Point Styles

1 Radial Point

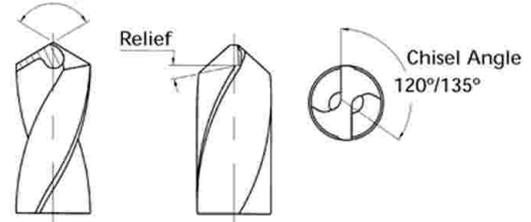
This point style is supplied on all of Mohawk Europa's standard and special drills unless specified.

Point Angles



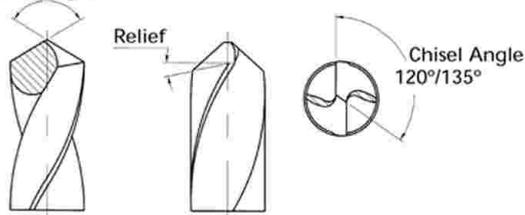
2 Din 1412 B Corrected Cutting Edge

Point Angles



3 Roll Point Corrected Cutting Edge

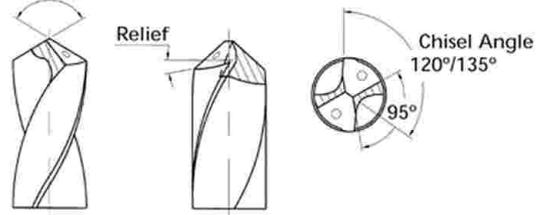
Point Angles



4 Oilhole Type

Primarily used on HSS heavy duty oil feed drills.

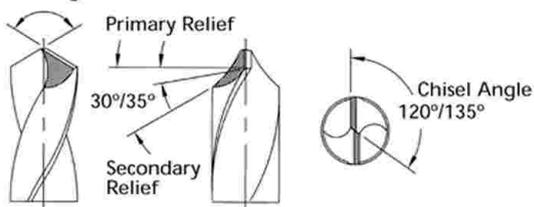
Point Angles



5 Four Facet Point

Good self-centring ability. Breaks up chips in deep hole drilling

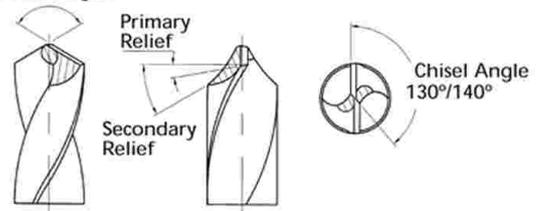
Point Angles



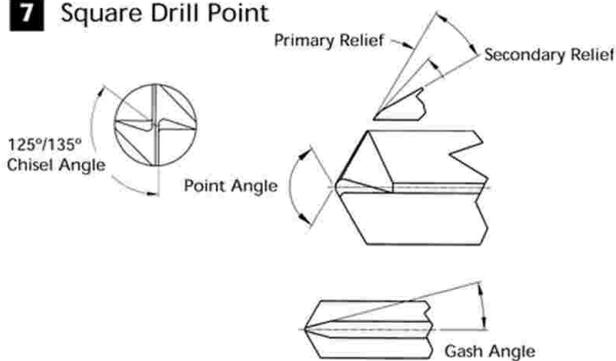
6 Avyac Point

Good self centering ability, good hole accuracy.

Point Angles



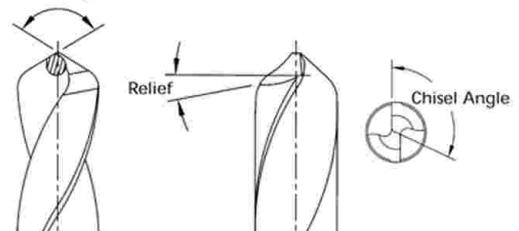
7 Square Drill Point



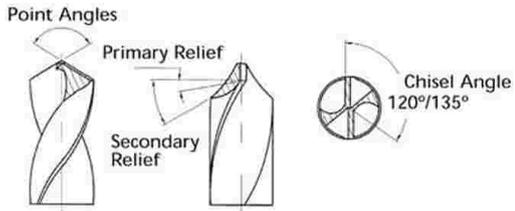
8 Bickford Point

Combination of helical and Racon point features. Self centring ability and reduces burrs. Excellent hole geometry and increased tool life.

Point Angle

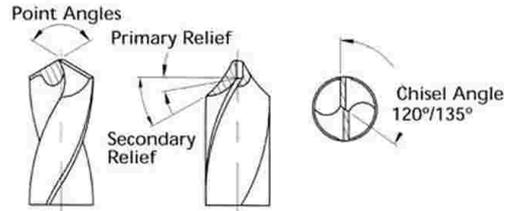


9 Four Facet Split Point



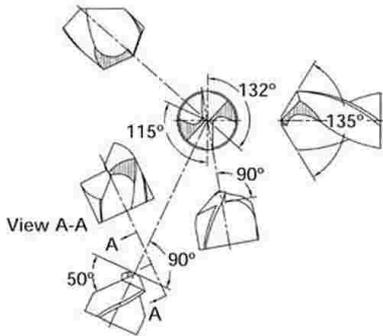
10 Four Facet Corrected Edge Point

Primarily used for hard material.



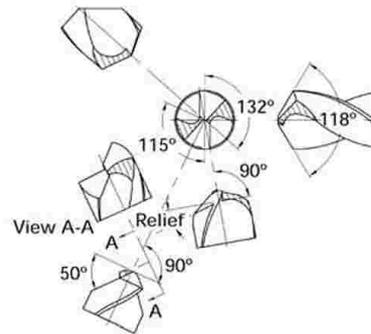
11 135° Split Point

Commonly known as a crankshaft point, it is primarily used for deep hole drilling.

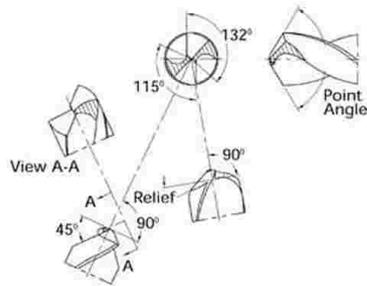


12 118° Split Point

Self centring ability, reduces thrust.

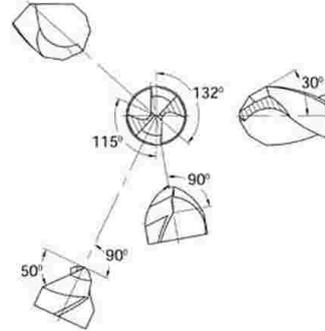


13 Standard Radial Split Point



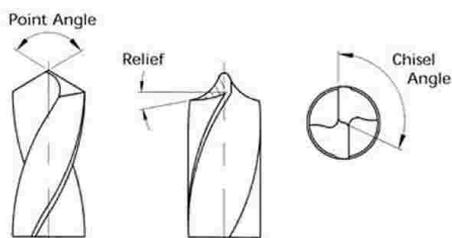
14 Double Angle Point (30°)

Primarily used to reduce chatter when drilling brass.

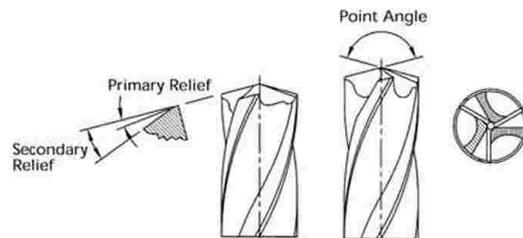


15 Standard Helical 'S' Point

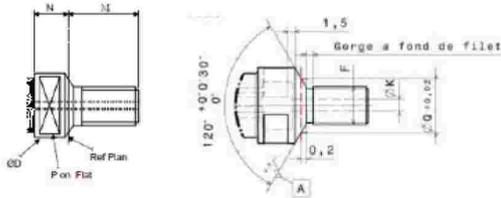
Can eliminate centre drilling, excellent hole geometry, close relationship between drill size and hole size. Increased tool life.



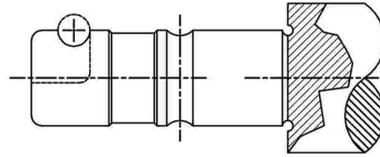
16 Three Flute Drill Point



Various Shank Styles



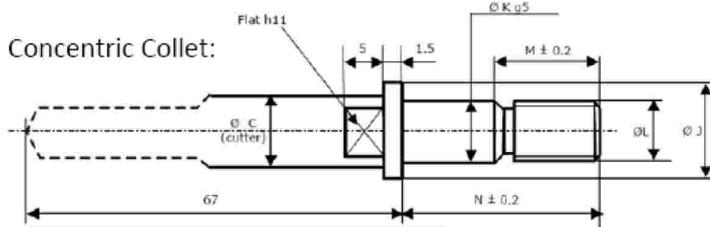
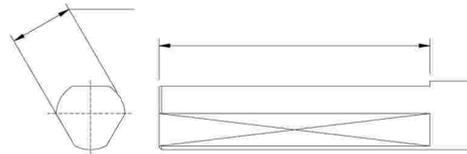
Pin Drive



¼ Turn Locking System Cutter Backends:

Cutters Ø range	Attachment Type F	ØD	ØQ	ØK	M	N mini	P
0 to 10	1/4 - 28 Thread	9.9	8.593	2	8	7	8
10 to 13	5/16 - 24 Thread	11.9	11.093	3	10	8	10
13 to 19	3/8 - 24 Thread	13.9	12.193	3	12	10	12
19 to 25.4	7/16 - 20 Thread	17.9	15.893	3	12	10	17

Tri Flats

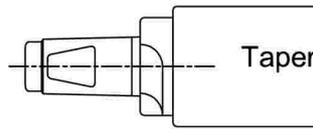


Simple Flat



Drilling diameter	ØJ	ØK g5	ØL	M ± 0.2	N ± 0.2
4.2	9	6.2	M6 x 100	10	20
4.8					
5.6					
6.4					
7.9					
9.5	12	8.2	M8 x 100	10	30
11.1	14	10.2	M10 x 100	10	30
12.7					

Taper Torque drive



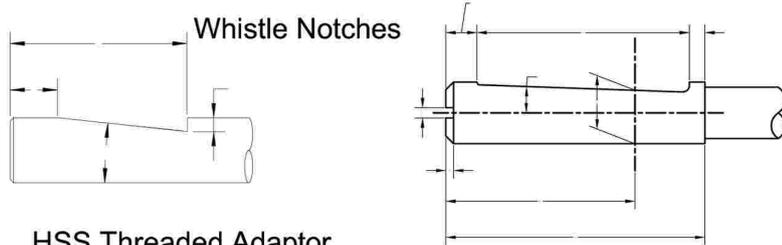
Ø cutter is more important than *Ø J*, we choose the Ø of the cutter in place of *Ø J*.

NO COUNTERSUNK		COUNTERSUNK	
Drilling diameter	Flat h11	Drilling diameter	Flat h11
4.2	6	4.2	100°
4.8		4.8	100°
5.6		5.6	130°
6.4		6.4	100°
7.9		7.9	130°
9.5	8	9.5	100°
11.1		11.1	130°
12.7	10	12.7	100°
		12.7	130°
		12.7	100°

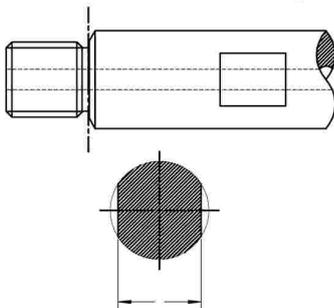
Quick Change Adaptor



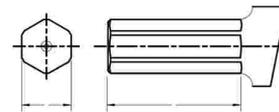
Whistle Notches



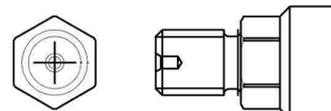
HSS Threaded Adaptor



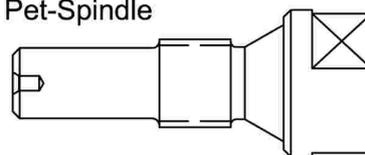
Hex Shank



Threaded Hex Shanks



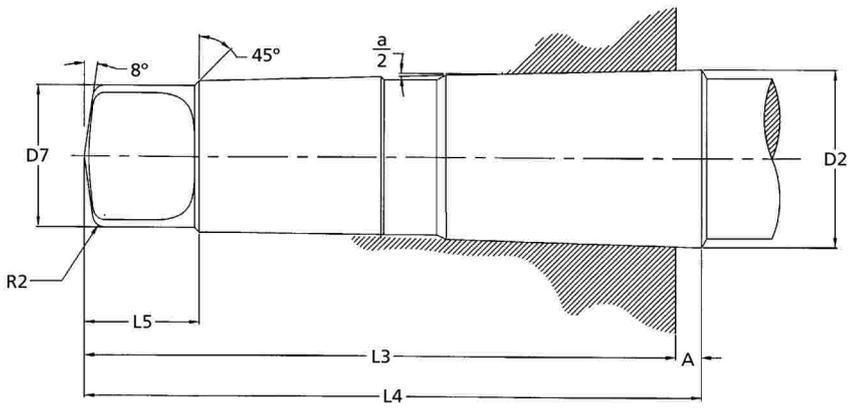
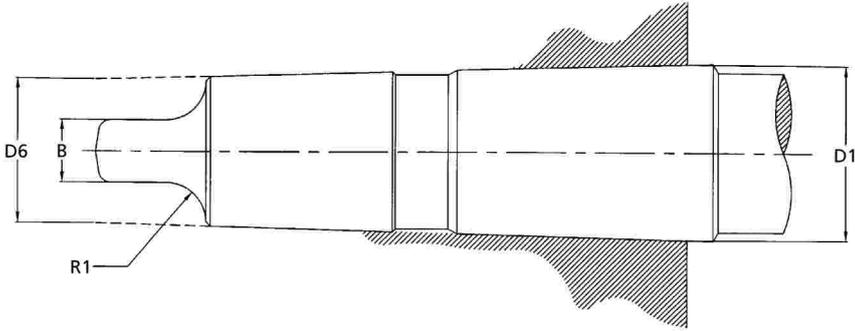
Pet-Spindle



Shank Types



Morse Taper Shank to Din 228 (Part B)



Morse taper number	a/2	A	B	D1	D2	D6	D7	L3	L4	L5	R1	R2
0	1° 29' 27"	3.0	3.9	9.045	9.2	6.1	6.0	56.5	59.5	10.5	4	1.0
1	1° 25' 43"	3.5	5.2	12.065	12.2	9.0	8.7	62.0	65.5	13.5	5	1.2
2	1° 25' 59"	5.0	6.3	17.780	18.0	14.0	13.5	75.0	80.0	16.0	6	1.6
3	1° 26' 16"	5.0	7.9	23.825	24.1	19.1	18.5	94.0	99	20.0	7	2.0
4	1° 29' 15"	6.5	11.9	31.267	31.6	25.2	24.5	117.5	124.0	24.0	8	2.5
5	1° 30' 26"	6.5	15.9	44.399	44.7	36.5	35.7	149.5	156.0	29.0	10	3.0
6	1° 29' 36"	8.0	19.0	63.348	63.8	52.4	51.0	210.0	218.0	40.0	13	4.0





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