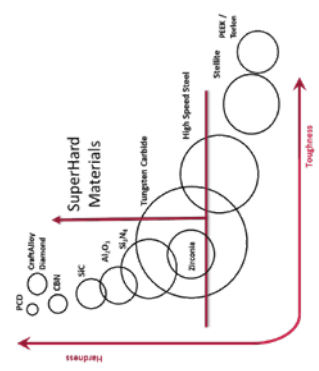




SuperHard Material Properties Guide



Material Family	Material Grade	High-Speed Steel	Tungsten Carbide					Zirconia Ceramic	Silicon Nitride	Alumina Ceramic	Silicon Carbide	Diamond
Wear Life Toughness Corrosion Resistance Heat Transfer Electrical Conductivity Thermal Stability Raw Material Cost Manufacturing Cost Mass (Density)	M-Series	-	+	-	=	+	-	+	+	-	-	-
	C6-F	=	+	=	=	+	-	+	+	-	-	-
	C6-SM	=	+	=	=	+	-	+	+	-	-	-
	C10-SM	=	+	=	=	+	-	+	+	-	-	-
	C15-SM	=	+	=	=	+	-	+	+	-	-	-
	N10C-SM	=	+	+	=	+	-	+	+	-	-	-
	MG-PSZ	=	+	+	-	-	=	+	=	=	=	=
	3Y-TZP	=	+	+	-	-	=	+	=	=	=	=
	8Y-FSZ	=	+	+	-	-	=	+	=	=	=	=
	SSN	+	=	+	=	-	+	-	+	+	+	+
	ZTA	+	=	+	-	-	+	-	+	+	+	+
	99.99% Al2O3	+	=	+	-	-	+	-	+	+	+	+
SSC	+	-	-	-	-	+	-	+	+	+	+	
PCD	+	-	-	-	-	+	-	+	+	+	+	



Our engineering team is ready to discuss your application and offer solutions. 800-323-6802 engineering@craftstech.net

The Crafts Way 100% Employee Owned & Operated

Crafts Technology is an engineering and manufacturing house that takes pride in understanding your application and designing components & systems that optimize your performance while maximizing the total cost of ownership for your industrial equipment.

We **leverage our expertise with SuperHard Materials** to design and produce innovative solutions that solve some of the strictest requirements in terms of performance, quality, and downtime.

Materials Science:

Crafts Technology is known for application engineering that assists customers in identifying the optimum material for the development of products that will provide the best performance and the least cost method of manufacturing.

Culture of Ownership:

Each member of our team is an owner, which fosters a true Culture of Ownership that allows us to design and produce the highest performance components and assemblies made of superhard materials.



State of the Art Manufacturing:

Our manufacturing facility, located near Chicago's O'Hare International Airport, serves clients with national and global markets. We are continually upgrading our technology and training our people to produce outstanding results and to provide responsive customer service.

Engineer - Innovation:

Transformational engineering balances materials science, engineering design, and manufacturability to develop novel approaches that optimize every aspect of our partner's value stream.



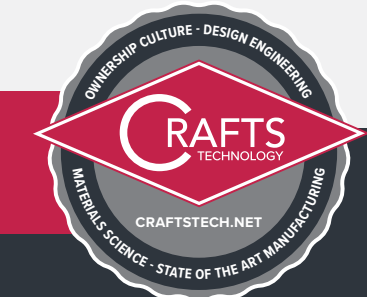
Aerospace Manufacturing

Modular Composite Countersink Drilling Solutions & AFP & ATL Cutters for Composite Aerospace Manufacturing



Our engineering team is ready to discuss your application and offer solutions.

800-323-6802
engineering@craftstech.net

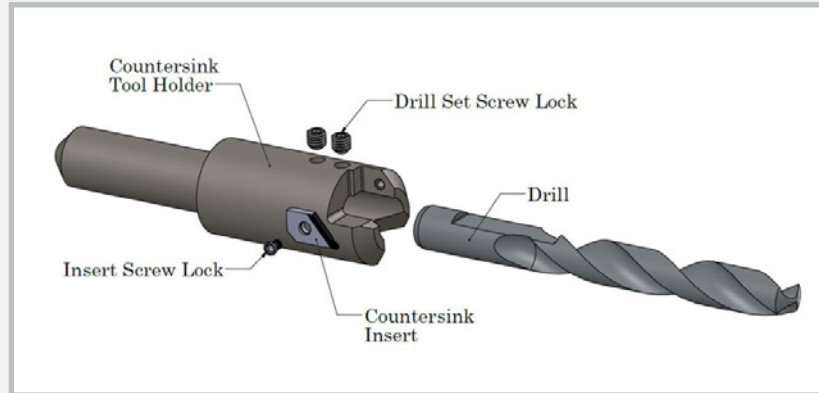


Modular Composite Countersink Drilling Solutions



Automated Fiber Placement (AFP) Blades & Automated Tape Laying (ATL) Blades

Crafts Technology designs and produces custom drilling & countersinking solutions for machining of carbon fiber reinforced composite materials.



A modularly designed system allows for the replacement of individual drills and countersink inserts at a **dramatically reduced life-cycle cost** when compared to integral designs.

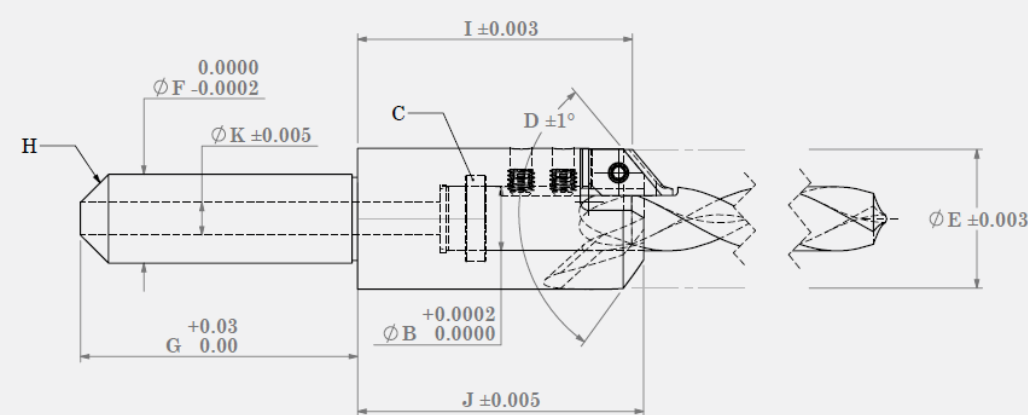
All designs feature specific features and tolerances that obtain near zero runout criteria the major drill diameter.

Crafts works closely with leading drill manufacturers to provide an assembly where each component **works seamlessly as a complete solution**.

This brochure details the parameters used to develop your tailored design. An individual print will be developed for approval from these specifications.

Modular Countersink Holder Design Guide

A	B	C	D	E	F	G	H	I	J	K
MAKE	ID SIZE LOWER LIMIT	COOLANT SEALED DESIGN	C'SINK ANGLE	MAX C'SINK DIAMETER	SHANK DIAMETER	SHANK LENGTH	SHANK STYLE	SHOULDER OF BODY TO MAX C'SINK DIAMETER	BODY LENGTH	ID SIZE OF CLEARNCE HOLE
CRAFTS	Lower Limit of Inside Diameter of Holder (To be .0002" Larger then the Upper Limit of the Major Drill Diameter)	0 = Non-Coolant Sealed Design 1 = Coolant Sealed Design	C'Sink Angle in Degrees	Largest Countersink Diameter Assembly will Produce in inches (+.050" Safety Factor)	Size of Shank Diameter	Shank Length	0 = Straight 1 = Threaded 2 = Lead In	Length from Back of Body to Max C'Sink Diameter	Length of Body of Holder	Inside Diameter of Rear Hole for Coolant Flow / Clearance
All values to be in inches										
CRAFTS	.4387	0	100	.990	.6299	1.97	0	2.195	2.097	.232

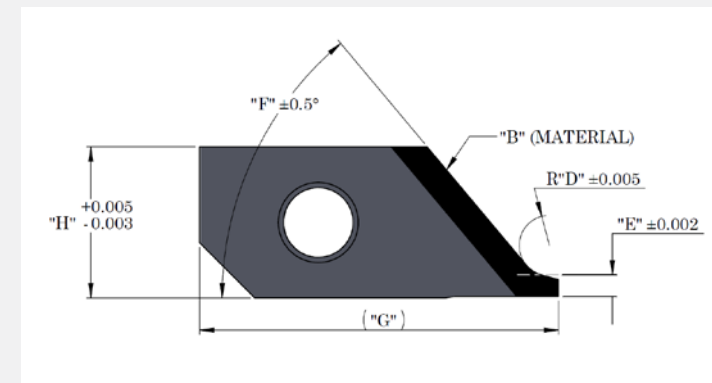


Modular Countersink Insert Design Guide

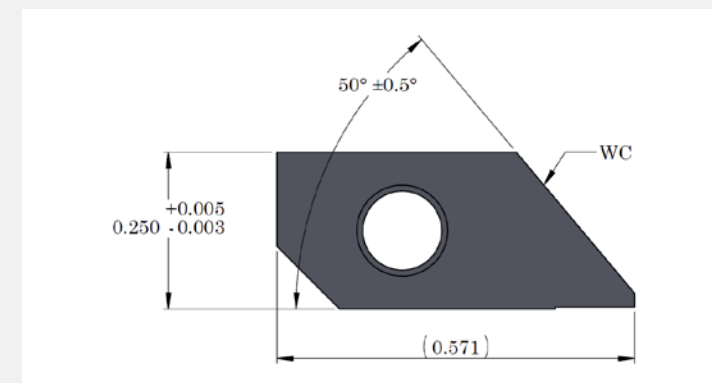
A	B	C	D	E	F	G	H
MAKE	MATERIAL CONSTRUCTION	INSERT STYLE	#1 RADII SIZE	RADII TANGENT	C'SINK ANGLE	OVERALL LENGTH	OVERALL HEIGHT
CRAFTS	WC (Tungsten Carbide) PCD (Polycrystalline Diamond Brazed to Tungsten Carbide Base)	R (Radius) S (Straight) C (C'Sink / C'Bore)	Size of Radius (Located at Junction of Major Drill Diameter and C'Sink Insert)	Length from Bottom of Insert to Tangent of Radii (Mimics Step in Drill)	C'Sink Angle in Degrees	Overall Length of Insert	Overall Length of Insert

All values to be in inches
If a feature does not apply a zero will be shown to omitt that particular feature

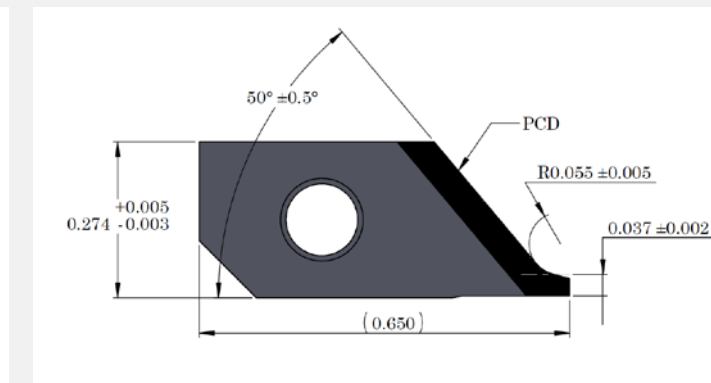
Template:



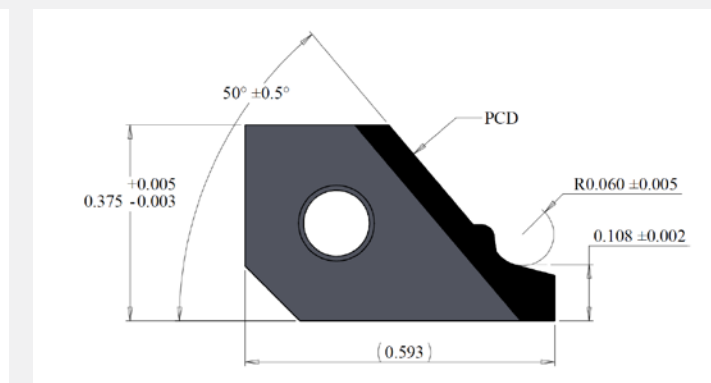
Example 1: CRAFTS - WC - S - 50 - .571 - .250



Example 2: CRAFTS - PCD - R - .055 - .037 - 50 - .650 - .274



Example 3: CRAFTS - PCD - C - .060 - .108 - 50 - .593 - .375



Crafts Technology designs and produces AFP & ATL cutters that harness the significant advantages of Tungsten Carbide or PCD to optimize tool life and reduce change out to achieve the lowest cost per cut & minimize downtime.

Each aspect of the cutter is specifically designed for your application. The main goal is to achieve significantly reduced manufacturing costs by **delivering the optimum amount of cuts per total life of the tool**.

Crafts accomplishes this goal through the following:

Innovative Design Approach:

Develop patent pending innovative designs that blend ergonomics, and functionality with Design for Manufacturability.

Cutting Edge Quality:

Cutting Angle, Relief Angle, and Surface Finish of cutting planes all contribute to the precise quality of the cutting edge.

Critical Assembly:

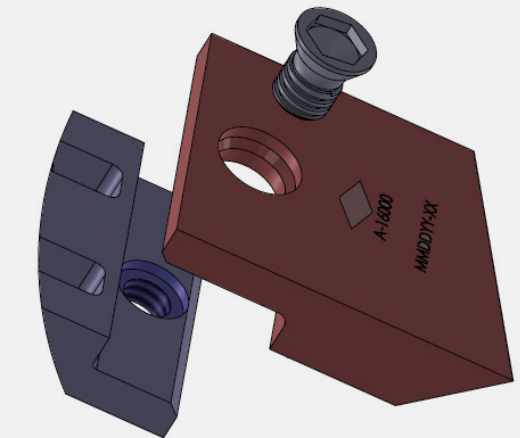
Each area of assembly must be considered to produce the highest performance part, while also leveraging individual material strengths to achieve the optimum results.

Enhanced Regrind Program:

Develop and streamline a regrind program to further optimize cost per cut.

Coatings:

Proprietary coatings available to reduce friction, negate fiber buildup, and improve cutter life



Our engineering team is ready to discuss your application and offer solutions.

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