

Maximize your through-put and tool life with

Complex Custom Tooling Made Simple

ARCH[®] Cutting Tools

SOLID CARBIDEHSS/COBALTINDEXABLESINTEGRAL SHANKMICRO TOOLSCUMPLEX FORM TOOLSMULTI-FEATURE UNDERPCD

Contact ARCH Specials: (844) 321-ARCH ARCHCTSpecials@archgp.com Engineered For Your Applications







ARCH[®] Specials

We can create your custom tooling solution with expert engineers across the company, within ARCH's 400,000+ square feet of manufacturing space.





Award Winning Custom Tooling

ARCH Cutting Tools is the 2020 winner of the ANCA Tool of the Year. Our team created this tool to demonstrate our design capabilites. This tool is a multifunctional tool designed to take the place of six separate cutting tools.

The customer's increased profitability by reducing tool changes and the compliment of enhanced geometries in a combined process for better performance and tool life.



Why ARCH Cutting Tools?

One size fits all. Off-the-shelf. Those are **NOT the answers** to the special cutting tool challenges your manufacturing operation faces including:



Special challenges demand special solutions.

you need **ARCH** Specials

You need an innovative, responsive, service-oriented partner -





ARCH Specials delivers *American-made* custom tooling solutions to make your manufacturing operation more competitive and more productive.

Agile and flexible



A midsize cutting tool company with the strength of the big guys, and with the agility and flexibility they can't match; ARCH Specials delivers quickly, affordably and with reliable all-American quality.

Get a special tool quote in only 48 hours or less.



ARCH Cutting Tools offers fully integrated resources - get everything you need on one P.O.

Delivering American manufacturing excellence to you from its more than 400,000+ square feet of production space throughout the U.S.









Our engineers talk to your engineers – fewer steps for your critical application

Productivity at the Spindle

We provide:

- Cost-reducing efficiencies
- · Process improvements
- Advanced coatings
- Your One Stop Shop for Custom Tooling Packages
- Laser etching
- Comprehensive supply chain management
- Unmatched customer service

ARCH Cutting Tools' Tooling Packages combine the widest range of our lightning-fast special cutting tool capabilities with our robust Standards product portfolio to provide a single-touch point, turn-key solution. Backed by American craftsmanship and ingenuity, you won't be disappointed.







Operational Consultation

At high speeds, even the smallest variance is amplified. When a customer consults with us, they get design-for-manufacturability guidance. We can help reduce the number of steps required to produce a component and the number of cutting tools needed to do it. Each time you take out a step in the manufacturing process, you remove the introduction of an inconsistency, divergence, or variation, no matter how small.

Milling, drilling, boring, turning, and holding tools can all be optimized with our proven full product life cycle process. From the initial on-site consultation to engineering and design assistance, from full supply chain management to complete customer service, ARCH Specials enables our customers to develop specialized cutting tool solutions that not only improve their final product, but also how they operate as an organization.

Check out The Collection Catalog for our robust Standard Portfolio







Specials Aren't Scary

ARCH Cutting Tools Embraces Specialty Tooling

With our wide range of application expertise and depth of cutting tool knowledge, we bring our customers an overarching perspective, full life cycle collaboration, and supply chain management that provide performance improvements to your organization. ARCH Cutting Tools offers best practices, engineering intelligence, and infrastructure to allow us to focus on creating custom-engineered solutions centered on our customer's needs.

Starting from Ø.004" (.10mm)













Case Studies

Providing the special tools that our customers need to do their unparalleled work is just the beginning of the ARCH Specials story. Our engineers help identify your opportunities to increase value, improve quality and performance, and enhance manufacturing operations.



Annual cost savings





Improved surface finish

30% Reduction in scrap Customized micro step drill

\$22,000 Annual cost savings Advanced tool coating process \$68,000 Annual cost savings

www.archcuttingtools.com/special-tools







Coast to Coast Support

Custom PCD Tooling

ARCH CT is proud to offer Polycrystalline Diamond (PCD) with our proprietary internally developed design and manufacturing process. We create tool tolerances as tight as .003mm, provide CNC inspection reports with every tool, and offer unmatched lead times for new tools.

Key Features for PCD Tooling:

- Combining roughing and finishing tools
- · Improved surface finishes
- Consistent results
- Tighter tolerances achievable

- Can be used in many materials including:
 - Aluminum Composite Material (ACM)
 - Composite panels
 - High pressure laminates (HPL)
 - Fiberglass

Our Capabilities

- · Custom solutions, specific for your application and part configuration
- Combining PCD and carbide tooling in the same tool to lead to balanced, optimized solutions
- 1-2 week turnaround on re-tipped tools
- Reconditioning, sharpening, re-tipping ANY manufacturers PCD tools and in any style connection, including steerable connections



www.archcuttingtools.com/special-tools







'Customers are Really Buying a Hole' – Innovative Process and Application Engineering Make Accurate, Effective PCD Cutting Tools Production

Diamond is the hardest material known to man. It's also the most resistant to abrasion and that's what makes diamond, including synthetic diamonds like Polycrystalline Diamond (PCD), ideal for use in cutting tools. PCD tools are noted for their longer cutting life, their ability to operate at higher cutting speeds, and their exceptional performance processing non-ferrous materials like aluminum as well as composites.

Forming PCD

Diamond is made of Carbon. It can be synthesized by subjecting the hexagonal phase to extreme pressures and temperatures by using large hydraulic presses. The conversion of graphite to a harder cubic phase is made easier using a catalyst.

For PCD products, diamond powders are mixed and placed on a cemented carbide substrate disc and encased in a protective metal canister. The capsule is loaded into the High Pressure, High Temperature (HPHT) system and pressure and temperature applied for 30 – 120 minutes.

Manufacturing application demands determine the choice of grade of PCD tooling cutting tool material. The important requirements of the material to be considered are abrasion resistance, toughness and strength, and work piece finish. The ability to grind and EDM materials, and quality of cutting edge also influence choice of grade. The ideal choice is the best combination of abrasion resistance and toughness.

Putting PCD to Work in Manufacturing

Creating PCD and selecting the right grade is only the beginning, however. Making an accurate, effective PCD cutting tool for use in manufacturing requires expertise, high-level engineering, and an innovative approach.

"Design and application engineering are critical to creating PCD cutting tools," says Charlie Novak Jr., ARCH® Cutting Tools Business Development Manager/Coordinator - ARCH® Specials. "Focusing on providing an overall solution and working on the process instead of focusing on simply creating a single tool is important.

It's even better if that can be accomplished with no outsourcing. That is, if a single tooling solution provider can deliver a total solution to a manufacturer, from materials to finished tooling; and then support that solution with professional services."

Novak notes that ARCH Specials is unique in providing end to end PCD solutions.

"We offer industry-leading, innovative design and application engineering with a dedicated team of design engineers operating within our proprietary process that is capable of responding to today's accelerated demands of the manufacturing industry for quick turn-around and value."

Novak also notes that the ARCH Cutting Tools process delivers total tool tolerances as tight as .003mm, and that inspection reports are available for every tool produced. The same professional expertise that produces these tools backs them as well.

ARCH Specials will re-tip its tools with turnaround in fewer than two weeks, to maintain productivity for its customers. Additionally, Novak adds, ARCH Specials will also re-tip tools from other manufacturers, in support of its customers.

The secret to the best tooling solutions lies in the process behind the design and application engineering.

"In reality, our customers are buying a hole," says Charlie Novak, Sr., General Manager – ARCH Cutting Tools – Mentor. "What they need is a precise hole in their product and they're relying on our tool to create that hole; and it has to be right the first time and every time."

Future Markets, Wider Application

As the utilization of aluminum-based parts continues to grow – particularly in automotive

manufacturing, to reduce weight – the performance of PCD tooling is becoming a more significant issue.

"Regulatory requirements in the automotive industry to reduce weight and improve fuel economy; as well as various uses in alternative fuel vehicles, including battery EVs, to reduce overall weight have made the application of aluminum more widespread and increased the demand for PCD tooling," says Bill Orris, ARCH Cutting Tools Director of Product Development and Custom Solutions.

And the demand will continue to grow, due to demands in other industries.

"Aerospace applications and innovative uses of aluminum in consumer products will drive demand as well," he added. "Quality products depend on quality tooling; and it's important to be in partnership with our customers to meet their goals."

Although cutting tools represent a relatively small percentage of the total cost to manufacture a specific product, the cost of lost production because of the failure of a tool to perform properly can be substantial. PCD cutting tools can last up to 25 times that of an equivalent carbide tool.

Correct cutting parameters is the key to seeing the true value of PCD over other cutting tools, adds Novak, Jr. "An operation can generally machine much faster – at higher speeds with increased chip load; the greatest increase is with speed. PCD maintains a sharper edge and has a lower coefficient of friction. Those characteristics, coupled with the proper speeds and feeds, will result in better surface finish and increased throughput."

PCD cutting tools, created through a rigorous design and application engineering process, deliver longer tool life – with less adjustments over the life of the tooling, more throughput, and help manufacturing operations capture all available cost savings without compromising quality or productivity.



Specials Spotlight: PCD Tipped Indexable Rough Boring Bar with Exchangeable Head





Industry: Oil/Gas

This tool started as a four flute PCD tipped ream and chamfer. To save time and eliminate another tool, we added the PCD tipped back mill and indexable rough inserts to the front of the tool.

Our expertise helped reduce the number of steps required to produce a component and improve cycle time by combining three tools into one. The original tool was designed in 2016, and we are still making or retipping this tool today!

Customer Requirements:

- •Combine 3 Tools in 1
- •4 flute PCD tipped reamer and chamfer
- •Reduce Cycle Time
- •Continued Retipping Opportunity to Reduce Cost



Specials Spotlight: Carbide Trepan Cutter



Industry: Medical

This tool was a tricky request for a finisher - only removing around .02 stock per side. It is designed to plunge down on the bottom of the cell hole then go into a .03 interpolation to finish the dome and 5/8 radius in one shot.

To add to the complexity, one of the customer's main requests was to expedite the tool. Our expertise and coordination with a preform vendor helped get the appropriate material within a couple of days. We then had less than a week to finish and ship the tools and got them out the door with a quick turnaround.

Customer Requirements:

- •Complex form
- •Tight tolerances
- •Surface finish and radius blend very important
- •Large Solid Carbide Body
- Quick Turnaround





Specials Spotlight: Straight Shank Plunge Form Tool





Industry: Power Management Technologies Customer Requirements:

- •3 Processes in 1
- •Difficult-to-combine
- Long Tool Life
- Repeatability
- •Detailed feature to achieve

This customer threw us a curveball application. They were spot-drilling, drilling, and reaming a specific feature on a part that they machine often. We believed we could combine all three operations into one tool even after the engineers stated several other tool manufactures were unsuccessful.

The initial run proved to be a success. The feature was produced well within specifications and machining was perfect. The next step was to test tool life and repeatability, which also proved successful. After this, we were asked to quote and produce almost every form tool they purchased and were brought in to design new tooling for future projects.





Use Our Quick Quote Solution Today:

Go to www.archcuttingtools.com/special-tools/

Complete the form to receive a special tool quote in 24-48 hours. Our tool experts are here to assist:

- Turnkey projects
- Prototype-to-production projects
- Ongoing process
 improvement issues

- Excess scrap rates
- CPU challenges
- Production bottlenecks
- Supply chain inefficiencies







Easy Quote

Short on time? Use our Easy Quote Form and receive our expert assistance

16 manufacturing sites, 20+ application engineers, all working for you. Contact us today!

(844) 321-ARCH ARCHCTspecials@archgp.com









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THE COMPLETE TOOL MAKING AUTHORITY®