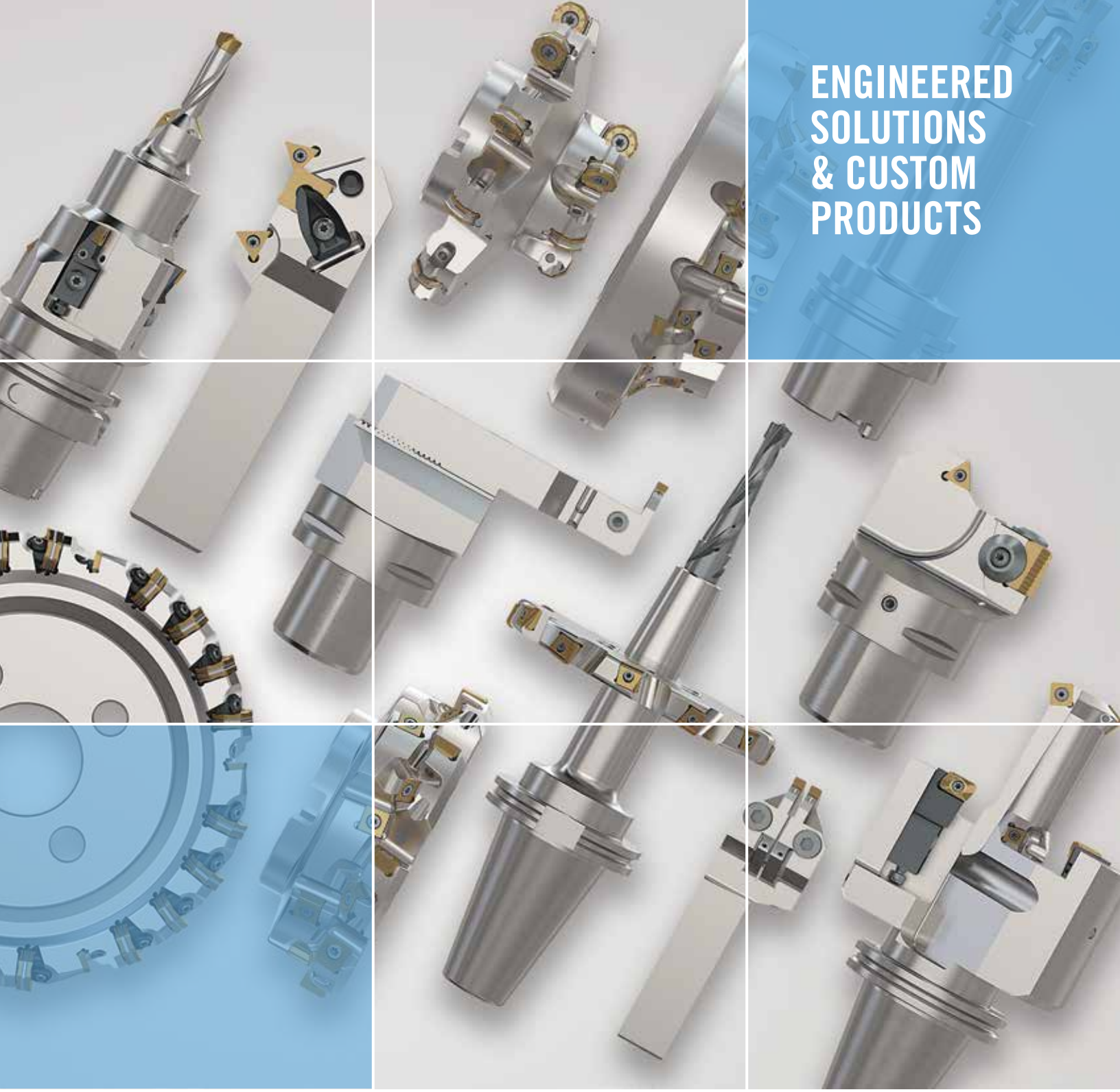


ENGINEERED SOLUTIONS & CUSTOM PRODUCTS

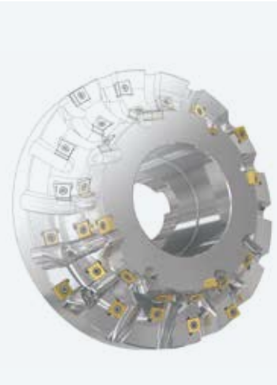
ANYTHING IS POSSIBLE.

SECO












OUR TEAM IS YOUR TEAM

SUPPORTING YOUR OPERATIONS WITH ENGINEERING EXPERTISE

While the market knows Seco for our diverse portfolio of productivity enhancing cutting tools, our customers know us for something more. When you face a challenge, small or large, you can rely on us to provide not a tool, but a solution. Sometimes that's as simple as supplying a single standard product. In other instances, it can involve designing and creating a complete production line for a new plant. Much of the time it falls somewhere in between. With comprehensive expertise in engineering and project management, our Engineered Solutions team enables us to meet your needs, regardless of size or scope.

A PHILOSOPHY OF PARTNERSHIP

Seco understands that collaboration is a prerequisite for success in today's manufacturing landscape. Optimizing an application requires knowledge of the machine, cutting tools, material, part requirements, software and more. Our Engineered Solutions team fosters close partnerships both with our customers, as well as providers of ancillary equipment. This results in the level of information sharing needed to achieve the best possible outcome.

GLOBAL RESOURCES

When you work with Seco, you are drawing upon a literal world of resources. Our Engineered Solutions team works from a network of 13 strategically placed locations, supporting the more than 50 countries where we do business. This allows us to quickly identify and adopt new best practices and offer consistently high levels of support regardless of where you are.

INVESTED IN YOUR SUCCESS

From maintaining a staff of more than 20 dedicated engineers in North America to our 35,000 sq. ft. Custom Products facility in Troy, Michigan, Seco's Engineered Solutions team is fully committed to making the investments necessary to exceed your expectations and provide exceptional service.

CONSTANT INNOVATION

Our global team is continually working towards better solutions. Our biannual expansive product launches are the most visible end result, but we also constantly conduct research into cutting processes, materials properties and more, allowing us to always be at the forefront of innovation within the industry.

SECO ENGINEERED SOLUTIONS MAKE YOUR JOB EASIER

THE WHOLE PACKAGE FROM START TO FINISH

Seco Engineered Solutions provides a comprehensive package for establishing a new process or updating an existing one. We put together all the pieces of the puzzle—not just cutting tools, but also machining strategy, component material, machine tool capability, fixturing and inventory management—to make sure that you manufacture your part with maximum effectiveness.

1 To start, we give you an in-depth **CONSULTATION** to determine whether you need a single custom tool or a comprehensive engineered solution.

2 With our full **PROJECT MANAGEMENT**, we take the lead on everything from defining scope to execution and installation.

3 Our expert team conducts a thorough **PROJECT REVIEW** tthat includes evaluation of machines, fixturing, tooling, cycle time and processes.

4 A **COMPREHENSIVE PROPOSAL** summarizes the best way to machine your part, including the required equipment, processes and cutting data.

5 We'll **DESIGN** custom products perfectly suited to your unique needs that improves your efficiency and cost-effectiveness.

6 You and your team **APPROVE** our analysis and proposed solution.

7 The talented team at our production facility will **BUILD** the product to the determined specifications.

8 We **ASSEMBLE** and **BALANCE** complex products products before they leave our facility to ensure they're ready to provide you with impeccable performance out of the box.

9 We ensure timely **DELIVERY** of your solution — immediately ready to integrate into your operations.

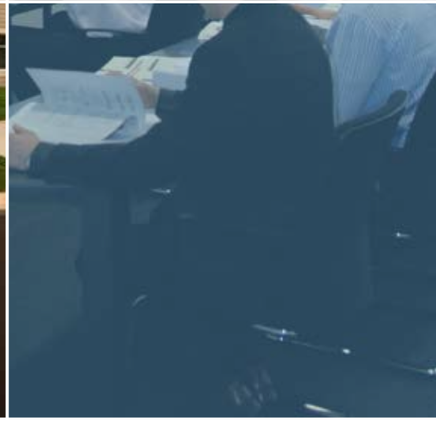
10 Our global team of experts **SUPPORT** you throughout the implementation process.









CUSTOM PRODUCTS

PERFECT SOLUTIONS FOR YOUR UNIQUE CHALLENGES

Whether working as part of a larger Engineered Solutions project or responding to your need for a specific non-standard cutting tool, our Custom Products team provides solutions perfectly tailored to your requirements. Our engineers thoroughly evaluate your application and then create a product specifically designed to optimize it.



STATE-OF-THE-ART MANUFACTURING AND SUPPORT

Since 2014, Seco has manufactured world-class cutting tools at our Custom Products facility located at our North American headquarters in Troy, Michigan. The establishment of this state-of-the-art, temperature controlled production plant has allowed us greater responsiveness in meeting manufacturers' needs for custom products. Additionally, co-locating the facility with our North American headquarters ensure a high level of collaboration with our Engineered Solutions staff of over 20 experts.

Featuring 35,000 sq. ft. of production space, the facility produces over 9,000 custom products per year, using advanced 5-axis and 3-axis machining centers, EDMs, CNC lathes and CMM equipment. The plant is ISO 14001 certified and maintains a green footprint.

The Custom Products facility is adjacent to the 5,000-sq.-ft. Seco Technology Center, which houses machines used for run-offs, training and demonstrations, as well as a stadium-style auditorium to host customer, distributor and industry events.

CUSTOM PRODUCT CASE STUDIES

CUSTOM DOUBLE DISC MILLING CUTTER

THE APPLICATION:
Machining lower arm ball joint on a steering knuckle.

THE CHALLENGE:
Optimize productivity and cost performance, while reducing the effect of cutting forces on the clamping fixture and meeting surface finish requirements.

SECO'S CUSTOM SOLUTION:
Combining a Double Octomill® and R335.18 cutter, this double disc milling cutter machines the top face with the Double Octomill, which incorporates 16-edged inserts with a positive chip groove that reduces cutting forces. The 335.18 cutter performs back face milling and achieves the required radius value on the bottom face of the feature.

Material:	Nodular cast iron (GGG) (SMG K4)/Forged steel (SMG P5)	
Coolant:	Water-soluble oil	
Operation:	Back square shoulder milling of lower ball joint location with radius of 2.4 mm	Face milling the lower ball join location
Criterion:	Tool life	Tool life
Fixturing:	Hydraulic clamping fixture	Hydraulic clamping fixture
Tool:	Custom double disc milling cutter	Custom double disc milling cutter diameter Ø= 145.4
Insert 1:	LNKT080524PPTN-M06, F40M	ONMU090520ANTN-M12, MP2500
Insert 2:	–	–
Cutting data:	**Insert 1**	**Insert 1**
N	458 rpm	458 rpm
v_c	230 m/min (754 sfm)	209 m/min (685 sfm)
f_n	2.4 mm/rev (.094 ipr)	2 mm/rev (.078 ipr)
f_z	0.2 mm/rev (.0078 ipr)	0.25 mm/rev (.0098 ipr)
a^p	4 mm (.157")	4 mm (.157")
a^p	45 mm (1.77")	42 mm (1.65")
v_f	1125 mm/min (44.29 ipm)	900 mm/min (35.43 ipm)
z	12	—
	Results: Flexibility increased through grade F40M's suitability to machining both materials	Results: Flexibility increased through grade MS2500's suitability to machining both materials

CUSTOM PCD REAMER

THE APPLICATION:
Machining valve seats in an automotive engine.

THE CHALLENGE:
Reliably perform high-quality finishing of bores.

SECO'S CUSTOM SOLUTION:
Balanced and featuring through coolant holes, this custom reamer is PCD tipped and can be reground or reconditioned to its original condition to achieve maximum tool life. Quick-fit clamping minimizes tool change time and provides accurate repositioning for high process reliability.

Material	Sintered metal 50 HRB	Sintered metal 90 HRB
Tool life (seat)	5,000 plunging	5,000 plunging per edge
Cutting data:	**Guide**	**Seat**
Vc	90 (m/min)	80 (m/min)
n	5,209 (rev/min)	957 (rev/min)
f	0.07 (mm/rev)	0.1 (mm/rev)
Vf	365 (mm/min)	95 (mm/min)

CUSTOM MULTI-STEP BORING BAR

THE APPLICATION:
Producing ball bearing location on a steering knuckle.

THE CHALLENGE:
Reduce the per-unit cycle time and tooling cost.

SECO'S CUSTOM SOLUTION:
This custom multi-step boring bar performs roughing and semi-finishing for the bearing seat and chamfers its lead edge, all in one motion. The groove cutter mounted at the end of the boring head interpolates a retaining ring groove into the bore once the finish bore tool clears the part upon retraction.

Material: Nodular cast iron (GGG) (SMG K4)		
Coolant: Water-soluble oil		
Operation: Roughing & semi-finishing of bearing bore		
Criterion: Reduce machining time		
Fixturing: Hydraulic clamping fixture		
Tool: Custom multi-step boring bar		
Insert 1: SNMG120412-M5, TK2001 (roughing)		
Insert 2: SNMG120408-M3, TP1500 (semi finishing)		
Cutting data:	**Insert 1**	**Insert 2**
N	799 rpm	865 rpm
v_c	226 m/min (739 sfm)	250 m/min (817.5 sfm)
f	1.2 mm/rev (.047 ipr)	0.5 mm/rev (.019 ipr)
f_z	0.3 mm/rev (.011 ipr)	0.25 mm/rev (.0098 ipr)
a^p	3 mm (.118")	1 mm (.039")
v_f	959 mm/min (37.75 ipm)	432 mm/min (17 ipm)
Results: Tool change time reduced due to combined tool for step boring & milling		

SECO-CAPTO™ CUSTOM TURNING TOOLS

THE APPLICATION:
Machining rear differential gear.

THE CHALLENGE:
Achieving effective chipbreaking when roughing and maximizing productivity across multiple features.

SECO'S CUSTOM SOLUTION:
These Seco-Capto turning tools were error-proof modified for mass production applications and incorporate electronic data chips in the toolholders for full automation. The use of ISO/ANSI WNMG 06 inserts in a Duratomic grade provided an economical solution for turning the internal diameter, undercut groove and back facing. Additionally, the incorporation of high pressure coolant through Jetstream Tooling resulted in optimal chipbreaking.

Material: Carbon steel (SMG 4)		
Coolant: Water-soluble oil		
Operation: I.D. turning and O.D. grooving		
Criterion: Tool life		
Tool: Custom Seco Capto C5 twin seat pocket		
Insert 1: WNMG060408-M3, TP2500, turning tool		
Insert 2: LCMF160304-0300 FT, TGP25, grooving tool		
Cutting data:	**Insert 1**	**Insert 2**
v_c	325 m/min (1065 sfm)	250 m/min (820 sfm)
f	.03 mm/rev (.012 ipr)	0.15 mm/rev (.006 ipr)
a^p	2.5 mm (.098")	3 mm (.118")
Results:	Tool 1 tool life = 30 minutes Tool 2 tool life = 35 minutes Reduction of tool change time by combining ID and OD operations on Seco-Capto turning head.	

CUSTOM JETSTREAM® TOOLING

THE APPLICATION:
Machining aircraft engine component fan discs.

THE CHALLENGE:
Maintaining tight geometric tolerances and high quality while controlling chip flow and maximizing productivity.

SECO'S CUSTOM SOLUTION:
These custom turning products enabled the application of Jetstream Tooling to increase cutting data, extend tool life, optimize chip flow and improve surface finish. Its application to the turning of complex disc profiles allowed higher productivity while maintaining stringent tolerances.

CUSTOM PLUNGE MILLING CUTTER

THE APPLICATION:
Fluid ends machining.

THE CHALLENGE:
Maximize metal removal rates.

SECO'S CUSTOM SOLUTION:
Designed for high-horsepower, high-torque machines, this large-diameter plunge milling cutter incorporates a staggered insert design which minimizes step over and reduces cutting forces to enable higher feed rates.

FREQUENTLY ASKED QUESTIONS

Where do I start?
Your local Seco salesperson is the best starting point to initiate an Engineered Solutions project, but you can also call our team directly at 800.896.2593 or via email at epd@secotools.com.

How do I identify which of my processes need to be evaluated?
Many processes can seem to be running smoothly, yet represent hidden opportunities for increasing productivity and reducing costs. If you're working with a relatively new or challenging material, applications should be routinely evaluated. And even if you're working with a common material, your processes should be checked every several years. Cutting tool technologies and processes are improving faster than ever before and constant evaluation and improvement has become vitally important.

Do I need a custom product or will an off-the-shelf work?
Some processes are truly optimized through custom products, but some can reach their full potential with standard, off-the-shelf products. After an initial consultation, we'll be able to tell you which is the best fit for your application.

What information will I need to provide?
To effectively evaluate your processes, we'll need some basic details on the application. These include data related to your machine tools, component materials, part features, fixturing, quantities and current cycle times. A Seco representative will work with you to gather the information we need to analyze your current processes.

How much does an Engineered Solutions project cost?
There is no charge to have Seco evaluate a process and create an Engineered Solutions proposal.

What commitment do I need to make to have an Engineered Solutions project undertaken on my behalf?
Our expectation is that if Seco Engineered Solutions provides and documents a proposal that you decide to implement, you will purchase the related tooling from us.

How do I sell my boss and peers on participating in an Engineered Solutions project?
On average, process improvements recommended by Seco Engineered Solutions result in $11,000 in cost savings upon implementation, and there is no cost to have us evaluate a process and create a proposal. Combined, these two facts create a compelling argument for most manufacturers.

How long does the Engineered Solutions process take?
Length varies substantially depending on the scope of project. If we're evaluating a single part feature that can be optimized with a standard product, you may receive a recommendation within days. At the other end of the spectrum, some customers have engaged us in months-long projects to create and define processes from scratch for a new production line or facility. We will provide a proposed timeline after our initial consultation.

Why choose Seco for this type of process improvement?
For starters, we have extensive experience in this area at all scope levels, from recommending a single standard or custom product to coordinating development of processes for a full production facility with the involvement of machine tool builders and providers of other ancillary products. It's a core aspect of our approach to the market and we invest heavily in maintaining engineering teams around the world that are solely dedicated to Engineered Solutions projects. Furthermore, we have not just the resources, but also the dedication. We partner with you for the entire process, from our initial consultation all the way through to successful production of finished parts.

"Seco custom designed insert holders that allow us to quickly and easily switch from generating one type of pipe connection to the next in only seconds. This played a key role in shortening our cycle times."
– Oil & gas pipe manufacturer

"Seco collaborated with us on a higher technical level than any other tooling company."
– Job shop specializing in advanced materials

"With all the tooling technology available, Seco eliminates the guess work for us. It's like having an on-staff tooling engineer."
– Custom valve manufacturer

"With just a few key Seco tooling changes, we reduced tool usage by 40%, gained longer tool life and boosted the output of our machining cells by at least 50% each."
– Manufacturer of lifting solutions

"Over the past 18 months, we have turned over all our incoming projects to Seco and basically had them determine the best tooling package for each. We are now in markets that, quite frankly, we had no business competing in over the past few years."
– High volume job shop

"With Seco, we're getting an engineer for free. Any time we can take advantage of such technical expertise to help us optimize our processes, we're definitely going to do so."
– Gear manufacturer

Follow Seco Tools on Twitter, Facebook, Blogger and YouTube. Stay up to date on new products and technology, special events, promotions and more.

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