



Norbert Kozar, CEO of Precision Swiss Products, selected Rego-Fix powRgrip (PG) toolholders and ER collets for consistent precision in machining tightly tolerated products. (All images provided by Precision Swiss Products and Rego-Fix Precision Tool)

PRECISION SWISS PRODUCTS

Advanced Toolholding Secures Part Quality for High End Job Shop

From the moment Norbert Kozar, CEO, took charge of Precision Swiss Products Inc. in 2007, he steered the Milpitas, Calif.-based job shop on a trajectory toward achieving both ISO 13485 certification and AS 9100 certification in a few short years. From that point on, Kozar focused on pursuing only those jobs that involved extremely difficult components and materials—a strategy that has continued to keep the shop successful.

The strategy comes with challenges.

What makes the jobs at Precision Swiss Products tough is a combination of tolerances as tight as $\pm 0.00015"$ (0.0038 mm) and intricate, complex geometries that can require as many as half a dozen operations with very small tools. The majority of the shop's milling cutters and drills are well under 0.5" (12.7 mm) in diameter and most are carbide and diamond tipped/coated. The performance of such tooling, according to Kozar, depends on highly precise toolholding systems.

"The tighter the tolerance, the more critical it is to control runout, so the ER collets and holders we use must provide consistent precision," he said. "Also, less tool runout means longer tool life. For us, every 0.0001" [0.003 mm] of runout causes a significant percentage of reduced tool life."

For one part the company machines, a 0.010" (0.25 mm) diameter end mill is used on a five-axis mill. "With very thin part-wall thicknesses, a cutter that is running out could actually introduce undue stresses into those walls because the tool is essentially banging against the wall as opposed to cutting it, which affects the integrity of the part," said Kozar.

Precision Swiss Products has 45 machines, 19 of which are Swiss-style screw machines. Other equipment includes wire EDMs, seven turning centers (two of which are automated with a robot and run parts 24/7), four five-axis milling machines, two HMCs and four VMCs. And across all of these machines, 90 percent of the shop's collet toolholders are Rego-Fix Super High-Precision ER16 collets.

In addition to its ER collets, the shop relies on Rego-Fix powRgrip (PG) toolholders for its milling machines and will soon incorporate the holders into its Swiss-style screw machine operations that currently run safe, non-slip Rego-Fix IntRlox MX Mini Nuts. For fast and precise tool mounting, Precision Swiss Products also acquired a Torco-Block benchtop tool assembly assistant unit from Rego-Fix that saves the shop's torque wrenches from damage.

"Besides costing less than heat shrink," said Kozar, "the PG system and ER collets contribute significantly to extending cutting tool life while also further improving part quality. What differentiates the Rego-Fix holders from every other type we have used is consistency in performance and holding power as well as producing the least amount of TIR as possible."

He went on to say that, for its diamond-tipped drills, for instance, the shop must run highly precise collets. "If we tried to use sloppy, subpar collets," said Kozar, "our tipped drills would literally destroy themselves. This is why we have to use Rego-Fix."

The Rego-Fix PG toolholding system relies on the interference between holder and collet to generate tool clamping force. Unlike other clamping systems where heat or hydraulics is used to expand the material, the PG system uses the mechanical properties of the holder material to generate tremendous gripping force with runout below 0.0001" (0.003 mm). PG units take less than 10 seconds to press in a tool or remove it from the holder. Because no heat is used, tools can be used immediately after a tool change.

The work areas for the shop's Swiss-style machines, especially smaller models, offer limited room for operators to change out worn or broken tools, so Precision Swiss Products secures them with intRlox MX Mini Nuts, which guarantee wrenches will



The Torco-Block benchtop tool assembly assistant unit features a built-in torque meter and interchangeable indicator rings for different ER series holders, saving the shop's torque wrenches from damage.

not slip off the nuts once properly engaged. These smaller ER collet nuts feature an anti-slip design that uses rounded locking grooves located around the nut profiles as opposed to end face surfaces. Wrenches grip from the sides of the nuts, and the action of tightening or loosening temporarily locks wrenches in place.

According to Kozar, as a heavy user of ER collet nuts, Precision Swiss Products was constantly replacing torque wrenches that operators damaged through inconsistent and over tightening. To remedy this problem, the shop uses its Torco-Block benchtop tool assembly assistant unit, which features a built-in torque meter and interchangeable indicator rings for different ER series holders. Together, these features eliminate the need for individual torque wrenches for every toolholder. The unit therefore eliminates the detrimental results of excessive runout that results from over torquing.

Precision Swiss Products first encountered Rego-Fix products thanks to Pat Murphy and the staff from Western Tool & Supply Co., along with Kenbil Engineering Inc. Prior to that, Kozar had considered heat-shrink toolholders but was concerned about harmful fumes from residual coolant on the heated holders, which led him to the Rego-Fix toolholding alternative.

Currently, in terms of the market segments it serves, Precision Swiss Products is about 60 percent medical, 30 percent



Job lot sizes for the shop's 19 Swiss screw machines that run 24/7 are typically between a couple hundred up to tens of thousands of pieces on an annual basis.

aerospace and 10 percent semi-conductor. It employs about 100 people and is approximately a \$14 million company, a value it has achieved in part thanks to the loyalty of its clients, 80 percent of whom are repeat customers.

Job lot sizes for the shop's screw machines are typically between a couple hundred up to tens of thousands of pieces on an annual basis. To achieve this level of output, the shop's 19 screw machines run 24/7. On the milling side, job lot sizes can be as few as 20 pieces and as many as 500. The shop also has some jobs that are ongoing and involve thousands of pieces needed on a monthly basis. Jobs involve materials that range from superalloys like Inconel, Nitinol, Haines 242 or Hastelloy to various other metals and plastics.

For its medical customers, the shop produces heart pumps, heart valve delivery systems, eye surgery tools, brain implants and stents along with collar bone, spine and ankle implants. On the aerospace side, Precision Swiss Products makes a lot of flight-critical hardware, including several for DX-rated jobs from the U.S. Department of Defense (DoD). It also manufactures parts for Holographic VR goggles used to instruct pilots as well as doctors. For the defense industry, jobs involve components that go into strategically vital vehicles and aircraft. For such



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jobs, the shop is ITAR compliant and AS 9100 REV D, ISO 13485, and ISO 9001-certified.

Besides its expertise in producing high-precision, complex parts, the shop excels on the metrology side of the business. The shop uses several in-house Zeiss coordinate measuring machines (CMMs) and other high-end metrology systems along with special inspection software that collects data for live SPC on the shop floor. "It gives the shop the ability to collect data literally as a part is being produced," Kozar said. "Quality doesn't stem from the QC department; it lives on the shop floor."

He added that the shop's success starts with its people. "You have to have the right individuals in the right positions. Then add the best machines, paired with the best toolholding, like what we get from Rego-Fix. If a shop sacrifices quality for cost, it will show up in the final product. The moment where we tried to take a short cut just to save a few dollars are the moments we failed," he said. "I'd rather walk away from a job than lower my quality standards to be competitive." ➡

For information on Precision Swiss Products Inc., visit www.precisionswiss.com or call 408-433-5880. For information on Rego-Fix Tool Corp., visit Rego-Fix.com or call 317-870-5959.



Medical and aerospace parts produced by Precision Swiss Products with tolerances as tight as ± 0.00015 " (0.0038 mm) have intricate, complex geometries that can require as many as half a dozen operations with very small tools.