

Special Holder Design Proves Key to Locking Tools in Place

Tough to machine materials, aggressive metal removal rates and long awkward tool overhangs are machining conditions that require toolholders perform flawlessly and provide strong gripping force, high precision and vibration control. In most instances, toolholder systems that function using heat or hydraulics are used, but even these systems run the risk of cutting tools pulling out of the holders. To prevent such a catastrophe, a new toolholder system has been developed that locks cutting tools in place - eliminating cutter pullout. And, it does so using an innovative mechanical design.

While mechanical toolholding systems provide incredible holding power, tooling manufacturers continue to actively develop systems that offer even more security against cutter pullout. Many of the existing systems involve special grooved patterns such as reverse helixes, or other modifications, that must be ground into a cutter's shank. These systems can limit what brands of tools can be used. Additionally, because there is an added manufacturing process of modifying cutter shanks, these systems prove to be a bit more expensive.

Unlike systems that require modified tool shanks, the new system, called secuRgrip and pioneered by REGO-FIX Tool Corporation, uses a special threaded insert or key that eliminates the need to alter cutters. The simple and effective design is part of the company's well-established powRgrip mechanical toolholding system and one that allows the use of any off-the-shelf tool as long as it has a common standard Weldon flat on its shank. The secuRgrip further enhances the already extreme holding capability of REGO-FIX's well-established powRgrip mechanical holder system.

To lock a cutter in place, the small insert of the secuRgrip system is placed in the Weldon flat of a cutter. The bottom profile of the insert matches that of the Weldon flat, and its exposed side has a thread pattern that matches with those of internally threaded powRgrip system collets. Users hold the insert in place while sliding the tool into the collet. The collet is turned so that its threads engage with those of the insert, and the tool is then screwed all the way into the collet. This cutter-collet assembly is pressed into a powRgrip system holder, and a

special external cap nut is tightened onto the holder for added pullout security.

Users with existing powRgrip holders can easily transform their systems into a secuRgrip holder by simply threading the outside of any powRgrip PG 25 or PG 32 holder for accepting the cap nut. REGO-FIX can either supply the necessary thread specifications or factory-threaded holders.

The secuRgrip holders accommodate cutter diameters from 0.472" up to 1.000". And with holder body tensile strengths higher than those of the cutting tools being held, the secuRgrip holders will withstand cutting forces that could break the cutters before ever damaging the toolholder itself.

As machine tool spindle speeds and feed rates continue to increase, the more critical a toolholder's vibration dampening capabilities become. The better a toolholder controls or even eliminates vibration, the tighter its T.I.R. The tighter a holder's T.I.R., the more it helps increase tool life as well as improves part accuracies and surface finishes.

The powRgrip and secuRgrip systems ensure concentricity (T.I.R.) with deviations of less than 3 microns (0.0001") for tool lengths up to 3 x diameter and length pre-adjustment with a repeat accuracy of less than 10 microns (0.0004"). The secret to these results lies in the interior of powRgrip. The system achieves high vibration dampening due to the functional contact surfaces between its toolholders and collets, and the collets and tool shanks. The concept absorbs vibrations better than do non-mechanical systems such as heat shrink holders.

The powRgrip system absorbs vibrations by creating "material breaks." The process starts with a cutting tool, typically made from anything from high-speed steel to carbide to cobalt, with each material having its own specific vibration frequency or harmonics. The cutting tool is held in a collet that is also made from a particular type of steel then inserted into a powRgrip toolholder made from a different type of steel.

REGO-FIX's use of different materials, all with their own unique harmonics/frequencies, creates breaks or gaps. These gaps – between

the cutter and collet, collet and toolholder body – provide a natural vibration-dampening capability. In leading European university testing, the vibration dampening capabilities of the standard powRgrip holder were proven to far exceed those of heat shrink-type systems.

As mechanical designs, powRgrip and secuRgrip are also faster than other systems when it comes to exchanging tools. Removing a tool from a holder and installing another takes about 10 seconds. Heat shrink holders, on the other hand, must be heated, the cutter installed, then put in a chiller for 2 or 3 minutes before the tool can be used.

Mechanical-base tooling innovations such as REGO-FIX's powRgrip and secuRgrip provide shops with solutions for their machining challenges, especially those involving tough materials such as titanium and Inconel. With such toolholding systems, shops can increase cutting tool life, experience significant cost advantages and confidently run their cutting tools at the highest speeds and feeds to increase productivity while also improving part surface finish quality.