

## CLAMPDISK™ PROVIDES MINIATURE ALTERNATIVE TO SCREWS, SOLDERS AND ADHESIVES by Jay McKenna

The need to use screws in a product can strike fear into the heart of the boldest fabricators. And for good reason. Top worries include cross-threading a screw, breaking the screw, ruining an assembly, and having a screw break during installation with the product subsequently breaking on the consumer. Original equipment manufacturers would love to eliminate screws on assemblies that may need to be disassembled for maintenance or repair.

Other fastening technologies serve up other worries. Soldering's weakest link as a method of fastening is the joint.

Vibration and impact both threaten the soldering joint. At the same time, adhesives aren't ideal, either. First off, they're permanent. Second, most adhesives poison a product's ability to be recycled, and adhesives that can be recycled are very expensive.

For clamping two or more items together that may later need to be taken apart, fabricators have seen no appealing alternatives and reluctantly turned to the screw as the solution.

It's how things have been done.

Several years ago, a phone manufacturer asked us to engineer an alternative to the screw for a concept product they were developing. They wanted something that could be removed by the consumer if needed, but that would

still hold pieces together under normal wear. Ultimately, the manufacturer scrapped the concept, but we saw an opportunity and continued development on the fastener.

PennEngineering developed a solution that could serve as a clamping alternative to screws, adhesives, rivets, soldering joints and other small fasteners for holding panels together.

We followed an iterative process to develop and test a clamping solution that delivered the optimum clamp with a strong but flexible material that would remain in place until pried off for removal.

In October, we commercially launched the CDS™ microPEM® ClampDisk™.

The stainless steel removable fastener presses straight onto a 1 mm pin. The disk's upward flanges grip onto the pin and prevent push-off while the downward flanges flex and generate clamp load. The patent-pending fastener is simple to install and intentionally removable with a sharp object and 4 pounds (18 Newtons) of force.

If the ClampDisk™ fastener is removed, it will reveal to repair or warranty technicians if the assembly has been tampered with. A new ClampDisk™ can be installed during reassembly.

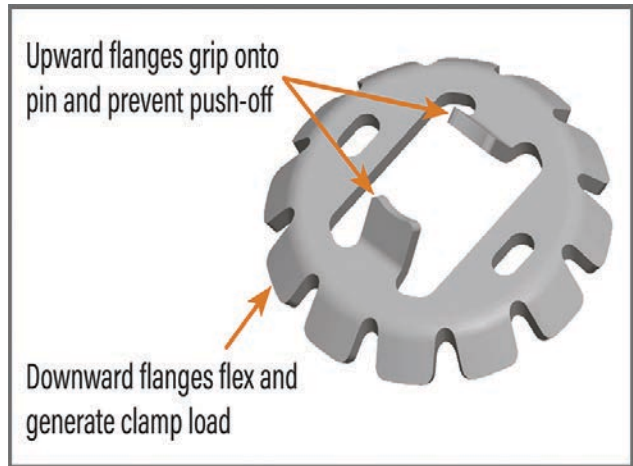


ClampDisk™ works with multiple panels and materials and requires limited installation stress to assemble. To install, the fabricator would place a ClampDisk™ fastener over a smooth or grooved pin, then, keeping the installation punch and anvil surfaces parallel, the fabricator would apply 75 pounds (330 Newtons) of squeezing force until the punch contacts the mounting sheet. Once the fastener is pressed down and installed, it won't flex but will maintain the shape until it's forcibly removed.

Depending on how many ClampDisk™ fasteners are being used in the assembly, the installation can be done manually or automatically fed. A specially designed installation punch can prevent over-installation and damage to the fastener. It can also be installed onto a grooved pin for increased strength and to allow installation onto any material.

For something so small – the standard ClampDisk™ fasteners are 3.2 mm in diameter and ideal for compact electronics applications – they are strong and deliver 1.5 pounds (7 Newtons) of clamping force. The fastener is made of stainless steel and can be used with any panel material.

So, even though our original customer for the



THE UPWARD FLANGES OF THE CLAMPDISK™ PREVENT PUSH-OFF WHILE THE DOWNWARD FLANGES GENERATE CLAMP LOAD. SOURCE: PENNENGINEERING

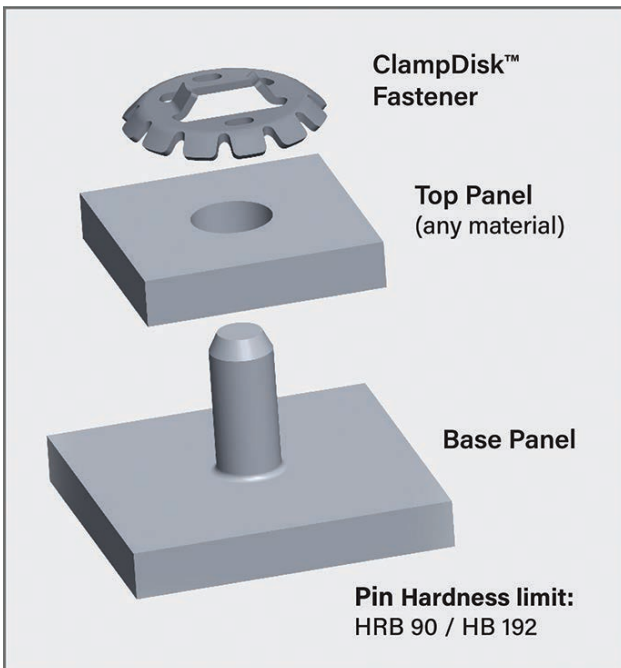
fastener had to back out, we finished developing that clamping technology and placed the fastener into the PennEngineering catalog to provide an innovative alternative to micro screws based on clamp technology.

As it turns out, several companies are already seeing the potential of the ClampDisk™. A consumer wearable company is evaluating the ClampDisk™ for potential use in a smart watch.

A Lidar company is evaluating ClampDisk™ samples to hold panels down in a Lidar system in an automobile so they can avoid solder joints and drive up reliability of the part and a consumer electronics company is considering it to hold down a flexible printed circuit in a wireless keyboard.

These manufacturers are seeking a new way to assemble their products. ClampDisk™ gives fabricators a new method to fasten panels together that eliminates all the headaches and worries associated with screws, soldering, and adhesives.

After all, why do things the way they've always been done when there's a better way?



THE CLAMPDISK™ FASTENER JOINS THE TOP AND BASE PANELS. SOURCE: PENNENGINEERING



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