



## Saluting Our Customer Partners

*It's astonishing to realize the dependence that manufacturers have placed on a small, relatively inexpensive metal device.*

*But for more than 60 years self-clinching fasteners have provided the means to assemble products efficiently and reliably.*

*We originated this type of hardware, which continues to impress customers with an ever-increasing number and variety of applications.*

*From electronic cabinetry to electric tea pots...from automotive air bags to garage door openers...self-clinching fasteners promote rapid assembly of products while allowing for ease of disassembly should repairs or upgrades be necessary.*

*Over the years, countless engineers have discovered firsthand the benefits of our products and technology.*

*Based on real-world experience, they have become loyal customers and partners, providing valuable input and insights.*

*As we enter our 61st continuous year, we salute these partners and all our customers who rely on PennEngineering for their fastening solutions.*

Kenneth A. Swanstrom,  
Chairman and CEO  
PennEngineering

## PEM® PRODUCT PROFILE: **BROACHING FASTENERS**

Ideal for electronics assembly applications, our broaching fasteners are designed for use in or with all types of printed circuit boards and polycarbonate materials.

They can enable quick and easy attachment of components-to-boards, boards-to-boards, and boards-to-chassis.

Available in a wide range of sizes and finishes, these fasteners install permanently and eliminate a need for additional attaching hardware, including washers, lockwashers, and nuts.

*The PEM family of broaching fasteners includes:*

**Broaching nuts** with permanent threads for board-mounting or component attachment;

**Threaded and unthreaded standoffs** for stacking or spacing and **flare-mounted standoffs** for greater pullout performance;

**Threaded studs** for use as solderable connectors or as permanently mounted mechanical fasteners with external threads;

**All-metal standoffs** featuring a spring action to hold a PC board securely without screws or threaded hardware;

**One-piece board-mount screw assemblies** with captive screws for easy mounting and removal of PC boards.

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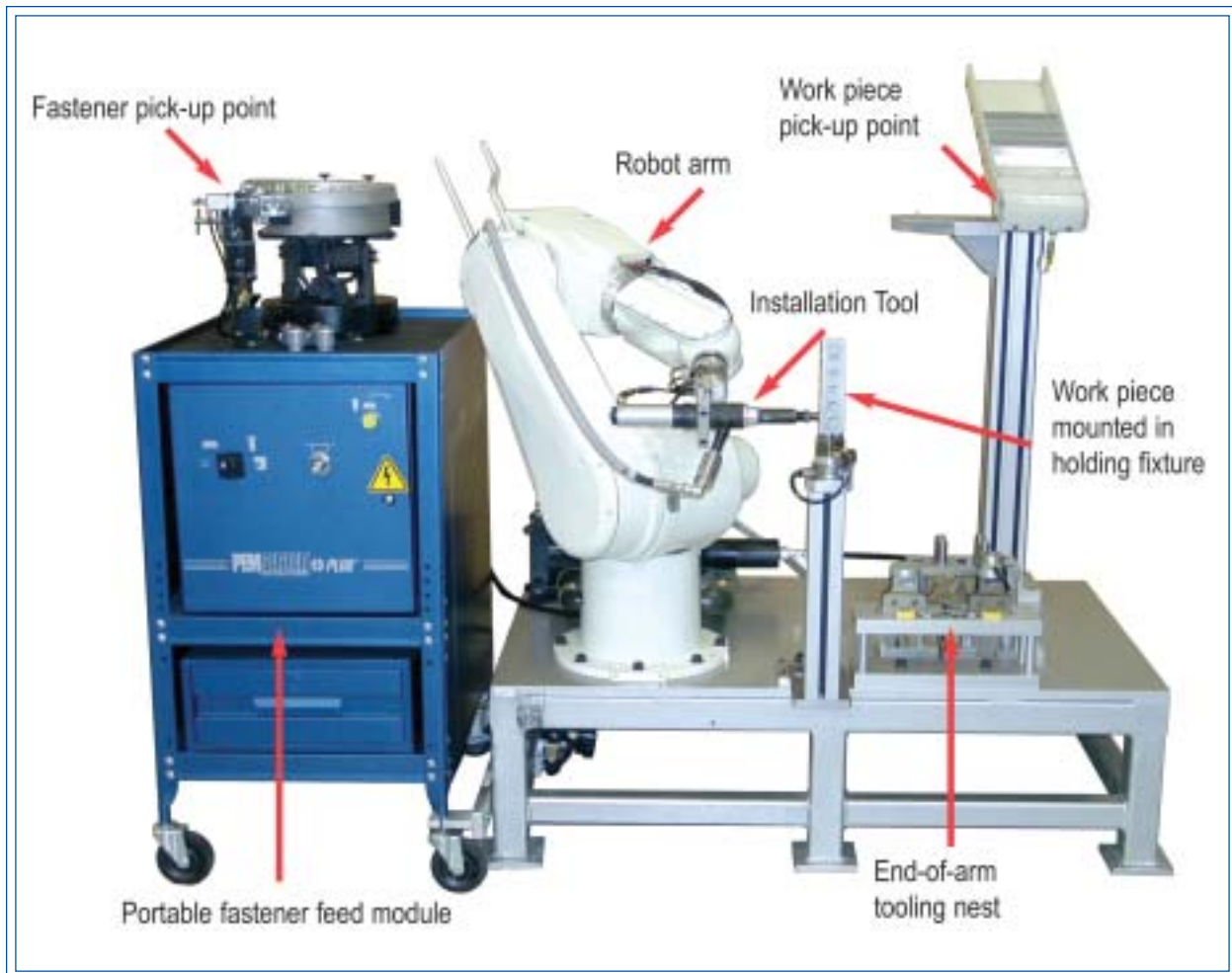
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# New Robotics to Install Atlas Fasteners



Our new Atlas Robotic Assembly System can install SpinTite®, MaxTite® and PlusTite® blind threaded rivets reliably and quickly.

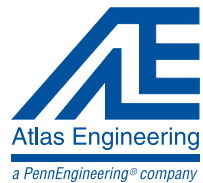
System benefits include lower installed fastener costs, increased quality installations, improved job productivity, and reduced floor-space requirements. Here's how it works:

The system positions a workpiece into a holding fixture utilizing an interchangeable end-of-arm (EOA) tooling hand; automatically switches to the installation tool; and then installs the fasteners in a pick-and-place format.

The workpiece can remain stationary while the six-axis articulated robot performs installations. This enables multiple fastener insertions at different surface angles without a need for workpiece repositioning. While the workpiece is in the holding fixture, other operations can be performed.

The system can be located anywhere on a shop floor, including between two work cells, where work can be shared utilizing the EOA tool-changing capability.

Atlas blind threaded rivets are designed for "blind" attachment applications (ideal for hydroformed tubing), where only one side of a workpiece is accessible for fastener installation and final component assembly. Installed permanently from the accessible side of a workpiece, these fasteners can be specified for panels as thin as .020"/0.51mm.



***Learn more about Atlas products and technology:  
[www.atlas-eng.com](http://www.atlas-eng.com)***

# PREVAILING TORQUE LOCKNUTS

## *Solutions to Prevent Mating Fasteners from Loosening*



PEM® self-clinching prevailing torque locknuts are designed to prevent potential loosening of mating fasteners due to vibration. All types of PEM locknuts serve as a "Design for Assembly" (DFA) improvement over the use of chemical locking methods or patches, which require additional production steps and materials. We offer several different styles (profiled below) to satisfy a wide variety of applications.

### **PEMHEX® LOCKNUTS**

A nylon hexagonal element provides a reusable, non-metallic prevailing torque thread lock for these steel or stainless steel fasteners (Types PL/PLC). Nylon element eliminates both the possibility of galling and the need for lubricant. These meet NASM25027 locking torque requirements for 15 cycles of repeatability. Thread sizes #4-40 through #10-32 and M3 through M5. They install permanently into aluminum or steel sheets as thin as .059"/1.5mm with maximum hardness of Rockwell B 70.

### **TRI-DENT® LOCKNUTS**

A patented indenting process reforms the top thread to provide prevailing locking torque for Type SL fasteners, an economical 3-cycle locknut. They are ideal for applications experiencing vibration and not requiring repeated removal of the mating bolt. Thread sizes #4-40 through 1/4-20 and M3 through M6. They install permanently into aluminum or steel sheets as thin as .040"/1mm with maximum hardness of Rockwell B 80.

### **PEMFLEX® LOCKNUTS**

Two rugged, semicircular flexing jaws prevent loosening of the mating fastener in severe service applications. These steel, stainless steel, or aluminum nuts (Types LK/LKS/LKA) meet NASM25027 locking torque requirements for 15 cycles of repeatability. Their robust design proves ideal for applications requiring frequent cycling of the mating bolt. Thread sizes #2-56 through #10-32 and M2.5 through M5. They install permanently into aluminum or steel sheets as thin as .040"/1mm with maximum hardness of Rockwell B 70 (B 50 for aluminum types).

### **ELLIPTICALLY SQUEEZED LOCKNUTS**

Tops of the fasteners are elliptically squeezed to provide prevailing locking torque. Product range includes miniature self-locking stainless steel Types FE, FEO and UL and floating self-locking Types LAS (steel) and LAC (stainless steel). They fit into minimal space and all (except Type UL) meet NASM25027 locking torque requirements for 15 cycles of repeatability. Thread sizes vary with type. They install permanently into aluminum or steel sheets as thin as .019"/0.76mm with maximum hardness of Rockwell B 70.





**Type PFC4 Panel Fasteners**

## New Fastener Gets UL Approval

Our new patented PEM® Type PFC4™ self-clinching panel fastener designed for installation into thin stainless-steel sheets has been recognized by UL in the United States and CSA in Canada.

This means that both countries have pre-approved this product line as meeting UL 1950 and CSA950 requirements for "tool only" access.

Ideal for applications where high corrosion-resistance is required, this panel fastener is made from 400 Series stainless steel and installs permanently in stainless sheets as thin as .060"/1.53mm (up to HRB 88 hardness on the Rockwell "B" scale).

The side opposite installation remains flush.

Type PFC4 panel fasteners are available in assorted screw lengths and in thread sizes #4-40 through #10-32 and M3 through M5. A Phillips recess is standard.

## Connecting with Brigham Young

A new class ("Fastening & Joining Processes") under way at Brigham Young University-Idaho is making use of product samples, bulletins, and other materials donated by PEM® Fastening Systems and Atlas Engineering to serve as instructional resources.

The class, required for a Mechanical Engineering Degree, is taught by Leo Castagno, a faculty member of the university's Engineering Department for eight years.

"This new class is designed to provide assembly instruction with hands-on practical experience," reports Castagno.

The program covers welding, traditional fasteners, adhesives, and "non-traditional" fasteners (such as PEM and Atlas products).

"We create a small assembly line and put the products to the test," Castagno adds.

**You can contact Leo Castagno for more information via e-mail (castagnol@byui.edu)**

## CUSTOMER ASSISTANCE PROGRAM

### Let us help you get started!

Our new Customer Assistance Program (CAP™) offers manufacturing, fastener insertion, design and assembly services to PEM® customers.

#### **CAP is the solution:**

- When a new project requires self-clinching fasteners.
- When in-house capabilities need to be supplemented.
- When an installation requires onetime, specialized tooling.
- When existing quality problems need fast resolution.
- When your equipment is down and a job must be completed.



#### **CAP Features:**

- Small or long runs.
- 100% guaranteed installations.
- Complete inspection and documentation.
- Performance testing.
- Component assembly.
- Technical and design assistance.
- Packaging.

**Learn more at [www.pemnet.com](http://www.pemnet.com)**

## PEM® FASTENING SYSTEMS

*a PennEngineering® company*

PEM® Fastening Systems develops and manufactures PEM self-clinching and broaching fasteners and SI® inserts for plastics. The PEMSERTER® Products Division manufactures and sells automatic and manual precision fastener-installation presses and the StickScrew® System for small-screw insertion. [www.pemnet.com](http://www.pemnet.com)

Atlas Engineering® manufactures SpinTite®, MaxTite® and PlusTite® blind threaded rivets and installation tools. [www.atlas-eng.com](http://www.atlas-eng.com)

