



**TRIOBULAR**<sup>TM</sup>

**Applications &  
Solutions**



# Applications & Solutions

The **TAPTITE®** and **POWERLOK®** families of **TRILOBULAR™** fasteners have maximized cost savings and assembly performance for a diverse range of industries including automotive, consumer products, electronics, and construction. Our high performance, vibration resistant thread-rolling fasteners eliminate tapping and the need for secondary locking features, creating cost savings benefits for any industry.

No matter your fastening application, chances are that one of our products will be able to save assembly costs and provide enhanced performance to your product design.

The collection of applications shown on these pages demonstrate the versatility of our family of fasteners. This document only scratches the surface of what's possible.

Our team of engineers and application specialists are eager to discuss your project to determine whether a **TAPTITE®** or **POWERLOK®** fastener can maximize performance and cost savings in your own application.

## Improving Quality and Lowering Costs Past, Present and Future

**R**esearch Engineering & Manufacturing, Inc. (REMINC) and its sister company, CONTI Fasteners AG, have been leading technical innovations in fastener design for over 50 years. Our high performance, vibration resistant thread-rolling fasteners eliminate tapping and the need for secondary locking features, creating cost savings for industry.

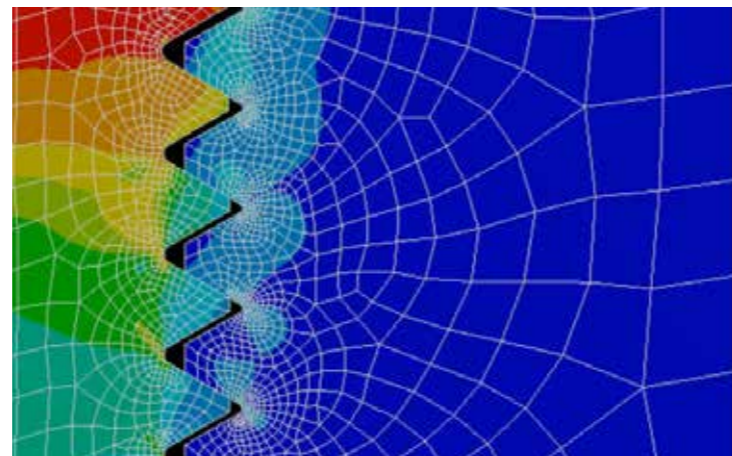
Originally introduced in the late 1950s as a way to efficiently affix telecommunications equipment in the field, **TAPTITE® TRILOBULAR®**-shaped thread-forming fasteners are now embraced by the automotive, industrial, electronics, appliance, and countless other industries.

**TAPTITE®** fasteners form their own internal thread directly into the nut member, conforming perfectly to the **TAPTITE®** screw. This results in excellent grounding properties. Many of today's largest automotive OEMs, electric vehicle manufacturers and tier suppliers now use **TAPTITE PRO®** thread-forming fasteners in both grounding and general use joining applications.

**POWERLOK®** thread-locking fasteners provide mechanical resistance to vibrational loosening, eliminating the need for expensive physical and chemical locking solutions.

**REMFORM®** fasteners allow direct fastening into a wide range of modern plastics, eliminating the cost and weight of inserts.

REMINC and CONTI continue to invest in pioneering the future of fastening technology. Our research team is developing new products geared to maximize performance and profitability gains in applications such as electric vehicles, alternative energy, and lightweight manufacture.



## Table of Contents

<b>FEATURED CASE STUDIES.....</b>	<b>4</b>
OTHER APPLICATIONS, BY CATEGORY:	
<b>AUTOMOTIVE .....</b>	<b>12</b>
<b>CONSUMER GOODS .....</b>	<b>20</b>
<b>CONSTRUCTION .....</b>	<b>26</b>
<b>ELECTRONICS .....</b>	<b>28</b>

## Electrical Grounding Performance



Maintaining voltage consistency is vitally important for electrical grounding applications in any industry, and REMINC thread-forming and thread-locking fasteners have set the performance benchmark in grounding applications over the years.

In 2020 REMINC contracted Element Materials Technology, an A2LA-certified independent testing lab in Warren, MI to evaluate the electrical grounding performance of **TAPTITE PRO®** thread-forming fasteners and **POWERLOK® II™** mechanical thread-locking fasteners against that of a conventional machine screw. The testing was performed as prescribed by SAE International in their Test Procedure for Electrical Ground Attachment specification also known as SAE / USCAR-26.

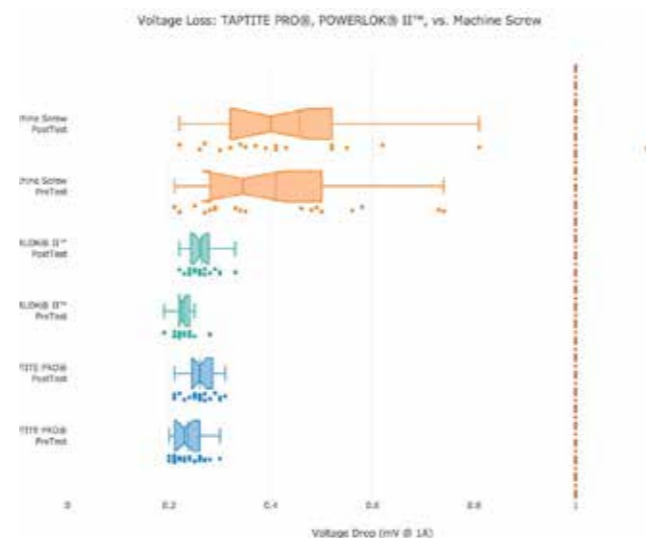
The test compared the performance of 20 TAPTITE PRO® thread-forming fasteners in untapped steel weld nuts, 20 POWERLOK® II™ thread-locking fasteners in tapped weld nuts and 18 machine screws in tapped weld nuts (two machine screw sample terminals were damaged during setup and eliminated from the test). All nuts were E-coated, as consistent with common automotive practices.

The results, summarized at right, reveal that TAPTITE PRO® thread-forming fasteners and POWERLOK® II™ mechanical thread-locking fasteners yielded **60% less voltage drop with 80% more consistency than conventional machine screws.**

In addition to their exceptional grounding performance, these

fasteners also reduce product cost and weight by eliminating parts, processes and associated overhead as well as the energy required to produce, ship, process and install these unneeded solutions.

For a copy of the complete Element electrical grounding report, please visit [taptite.com/groundingreport](http://taptite.com/groundingreport)



## Threadforming in Light Alloy Castings



Soft alloys are the defining material for the lightweight, energy efficient transportation vehicles of the future. Rapid advancements in modern alloy casting technology and a commitment by several EV automakers to aluminum as a material of choice underscore the importance and relevance of aluminum in modern assembly.

REMINC and CONTI have long recognized the the cost-savings potential and manufacturing efficiencies that light alloys can deliver to automotive manufacturers. In March 2012, the United States Council for Automotive Research (USCAR) performed extensive testing of thread-forming fasteners driven into light alloy castings with pre-cored holes.

The report, titled : **USCAR FAS 1005 - Machining Elimination through Application of Thread Forming Fasteners in Net-Shaped Holes**, determined whether cost-savings in light alloy castings could be achieved as had been done for many years with thread-forming fasteners being driven into unthreaded steel nut members. The report concluded that this recommended thread-forming fastener application would generate significant cost-savings for automotive manufacturers.

The tests confirmed that drilling, reaming, tapping, gaging, cooling and cleaning operations could be eliminated while retaining clamp load values consistent with industry expectations for steel nuts and bolts. In summary, TAPTITE® thread-forming fasteners deliver:

- **\$.07-\$.09 cost savings per fastener driven**
- **Significant reduction in electrical energy required to power unnecessary machines**
- **Elimination of all lubrication fluids and solvent washes necessary to the drilling/tapping process**
- **A shorter length assembly line footprint**
- **Less capital investment in plant and equipment.**

The 2012 USCAR report concluded that if this application were universally adopted in North America, with its estimated car build of 16 million vehicles, approximately 500 fasteners per vehicle, and a savings of \$.08 average per fastener, the total net cost-savings would total **US\$640 million per year for automotive manufacturers.** This number would be even higher when calculated in today's dollars.

## The Electrical Grounding Standard



Ford Motor Company uses the newest REMINC design, **TAPTITE PRO®** fasteners, for electrical grounding applications in their range of vehicles.

The engineers at Ford recognize reliable electrical grounding as a key property for vehicle performance. As such, Ford's own manufacturing standard **WD957** specifies **only TAPTITE PRO® fasteners for use in electrical grounding applications.**

TAPTITE PRO® fasteners tap their own threads directly in the nut member when installed, and this feature is perfectly suited to grounding applications.

Since TAPTITE PRO® fasteners form their own threads, they

inherently clear any debris, paint, or oxidation present in the hole prior to assembly. This insures a positive metal-to-metal contact even in painted or coated nut members. And clean contact is the key to insuring optimum electrical conductivity.

There is simply no better electrical grounding screw than a **TAPTITE PRO®** fastener.

## Architectural Curtain Wall



In the 2009 expansion of the San Francisco International Airport, architects and builders chose **TAPTITE®** fasteners for their thread-forming ability, providing a quick and cost effective solution to install attractive wall panels throughout the airport.

TAPTITE® fasteners are commonly used in these types of **architectural applications**, where facades of glass, steel, and other dissimilar materials are applied in front of the structural portion of a building.

Similar applications for TAPTITE® fasteners include the installation

of **solar panel arrays, fenestration systems**, and related scenarios involving dissimilar materials and blind fastening challenges.

## Hedge Trimmer



Without reliable vibration resistance, hedge trimmer blades will loosen over time and use. The cutting blades will separate and the trimmer will no longer cut efficiently. This exact problem led one leading manufacturer of garden tools to seek a more robust solution.

Their design team reworked the trimmer blade assembly to incorporate five **TAPTITE®** screws driven directly into pilot holes in the steel stationary bar of the trimmer. The inherent locking action of these thread-forming **TAPTITE®** screws eliminated the vibrational issues present in the old machine screw/nut design. The product now performed as expected over time, ensuring efficient cutting over the service life of the tool.

But the product benefits didn't stop there. In the improved design, the old crimped nut assembly was eliminated altogether. Since **TAPTITE®** screws form their own threads in the stationary retaining bar, they don't require a separate nut. The customer realized simultaneous cost savings and performance gains.

## On-Board Electric Vehicle Charger



LG Chem offers complete component package solutions for automakers designing electric vehicles. The company not only produces batteries for electric cars, but also motors, inverters and now on-board chargers.

LG also knows the history of performance success and cost savings that **TAPTITE®** fasteners earned in internal combustion engine (ICE) vehicles, and is quickly adapting them into their EV components suite.

LG Chem's on-board EV charger is assembled using **TAPTITE®** fasteners, chosen not only for their thread-forming properties that eliminate cross-threading, but also for the inherent vibration resistance and cost savings they provide.

## Faucet Stem Assembly



A manufacturer of plumbing fixtures was using nylon patch Monel machine screws as bibb screws to assemble neoprene washers to brass faucet stems. These expensive nylon patch machine screws lost their locking torque after multiple cycling, requiring excess torque to tighten the neoprene washer to the faucet stem.

As a design solution, the manufacturer replaced the nylon patch machine screws with round head brass **POWERLOK®** screws. **POWERLOK®** screws retain their locking action through multiple cycles, exceeding IFI locking standards by as much as 400%. **POWERLOK®** screws also provide locking action over the entire length of the engaged shank. This immediately solved the locking issue on the faucet assembly.

As a side benefit, **POWERLOK®** fasteners eliminated the costly nylon patch application, saving considerable costs while improving product reliability.

## Consumer Electronics Devices



Computers, peripherals, cell phones and other electronic devices require a delicate combination of high performance and cost-savings. Contaminants produced by chips and dust generated by conventional drilling and tapping operations are not only costly, but can potentially ruin the performance of an electronic device.

Hewlett Packard is one manufacturer using both **TAPTITE®** and **REMFORM®** fasteners in the thin sheet metal and molded plastic components of Hewlett Packard chassis.

**TAPTITE®** and **REMFORM®** fasteners form their own threads and thereby eliminate any contaminants produced by any drilling and tapping operations. **TAPTITE®** and **REMFORM®** fasteners also eliminate cross-threading repairs and damaged components, saving significant costs and production time.

## Truck Bed Box Bolts



Ford Motor Co. had a manufacturing problem to solve. They had been installing conventional machine screws into pre-tapped floating nut members to secure the bed (pickup box) to the chassis of F-Series pickup trucks. Any misalignment between the floating nut and machine screw resulted in a costly cross-threading problem that cost time and new materials to fix.

The **TAPTITE®** "box bolt" was introduced at Ford Motor Co. in the mid 1990's as the solution to this costly problem. By design, all **TAPTITE®** thread-rolling fasteners form their own mating internal thread upon installation, eliminating any chance of cross threading. An additional benefit to using **TAPTITE®** thread-forming technology is the cost savings realized in the elimination of the tapping operation altogether.

This **TAPTITE®** box-bolt example clearly demonstrates the problem solving and cost-savings benefits of **TAPTITE®** thread-rolling fasteners.

## Automotive Applications



### Rear Axle Trailing Arm Support

**PROBLEM**

- Cross-threading
- Costly rework from assembly and repair

**SOLUTION** M8 x 25mm TAPTITE® CA point fastener with CORFLEX® I hardening

**BENEFIT**

- Closely controlled specification limits
- Easy service removal



### Seat Track to Floor

**PROBLEM**

- Cross-threaded joints due to assembly through carpet into contaminated weld nuts

**SOLUTION** M8 x 20mm TAPTITE® fastener

**BENEFIT**

- Elimination of tapped anchorage points
- Considerable off-line rework and repair cost savings



### Rear Axle Assembly

**PROBLEM**

- Too much seating torque
- Application required high resistance to vibration

**SOLUTION** M8-1.25 x 25mm DUO-TAPTITE® CORFLEX® I Grade 10.9 with SEMS flat washers

**BENEFIT**

- Easier assembly into untapped holes
- Positive alignment
- Less end load when starting
- Lower driving torque



### Hatchback Strut

**PROBLEM**

- Limited access prevented rear nut replacement

**SOLUTION** M6 TAPTITE 2000® bolt with shoulder

**BENEFIT**

- Eliminated the need for nut entirely, eliminating the need for repair
- Reduced overall cost of assembly

## Automotive Applications



### Steering Wheel Lock

**PROBLEM**

- Vibration caused loosening of steering lock components

**SOLUTION** M4 x 20mm TAPTITE® fastener

**BENEFIT**

- Eliminated tapping operation
- Reduced service claims



### Engine Strut Bracket

**PROBLEM**

- Paint contaminatin and misaligned weld nuts
- Loss of pre-load in joints caused loose assemblies and stripped fasteners

**SOLUTION** M8 x 25mm DUO-TAPTITE® fastener

**BENEFIT**

- Eliminated cross-threading
- Achieved better alignment
- Lowered warranty service claims



### Automatic Transmission Cover

**PROBLEM**

- Metric screws with SEMS washers resulted in high assembly costs

**SOLUTION** M6 x 18mm TAPTITE® fasteners into tapered cored holes

**BENEFIT**

- Eliminated the entire tapping process, including chip removal and solvent wash
- Eliminated SEM



### Hub & Bearing Assembly

**PROBLEM**

- Automated assembly required hand-starting of metric bolts to avoid cross-threading

**SOLUTION** M12 x 45mm TAPTITE 2000® bolt with CORFLEX-I® heat treatment

**BENEFIT**

- Eliminated hole tapping and cross threading
- Eliminated hand starting operation
- Increased assembly line speed and profits

## Automotive Applications



### Steering Shaft

**PROBLEM** – Threaded stud on steering column shaft was very expensive to reproduce

**SOLUTION** M10 x 20mm DUO-TAPTITE® CORFLEX-I® bolt

**BENEFIT**

- No tapping of hole required
- Resulted in a secure joint
- Substantially reduced manufacturing cost



### Door Latch Assembly Attachment

**PROBLEM** – Metric screws combined with star lock washers would crack and fall out

**SOLUTION** M6 x 15mm TAPTITE II® fastener

**BENEFIT**

- Eliminated tapping, cleaning, and loosening problems
- Additional locking devices eliminated
- Lowered service and warranty costs

## Automotive Applications



### Amplifier Mounting Optimization

**PROBLEM** – Vibrational loosening

**SOLUTION** TAPTITE 2000® screw with captive isolation washer

**BENEFIT**

- Excellent fastening performance
- High process capability
- Complete assembly, ready-to-fit
- Reduced materials management costs



### V6 Engine Timing Belt Cover Attachment

**PROBLEM** – Attaching timing belt cover to aluminum die cast housing with metric screws required costly drilling, tapping, and cleaning operations

**SOLUTION** M6-1.0 x 15mm external TORX® flange head DUO-TAPTITE® fasteners in cored holes

**BENEFIT**

- Eliminated drilling, tapping, and cleaning costs
- Inherently resistant to vibrational loosening
- Reduced component cost



### Automotive Underbody Drivetrain Support

**PROBLEM** – Pre-threaded weld nuts clogged with weld spatter, primer, and paint

**SOLUTION** M10-1.5 x 35mm TAPTITE® CORFLEX-I® fastener

**BENEFIT**

- TAPTITE® fastener cleared weld spatter and paint debris while thread forming
- Eliminated tapping, cleaning, and vibrational loosening issues



### Fender Rail

**PROBLEM**

- A part redesign reduced the material thickness of the steel rail
- Recommended seating torque now caused stripping in material

**SOLUTION** M6 FASTITE 2000® fastener

**BENEFIT**

- FASTITE® fasteners achieved the desired seating torque while eliminating any stripping in thin steel



### Front Seat Belt Assembly

**PROBLEM**

- Recurring cross-threading of metric screws with expensive nylon patch
- Contaminated nut threads
- Necessary rework caused additional time and assembly damage

**SOLUTION** 7/16-20 TAPTITE 2000® CORFLEX-I® fastener

**BENEFIT**

- Eliminated tapping, cross-threading, contamination of nuts and nylon patch
- More accurate component positioning in robotic assembly
- Enhanced joint integrity
- Eliminated returns for bolt replacement



### Front Suspension Attachment

**PROBLEM**

- Frequent cross-threading of metric bolt into weld nut with locking insert
- 12% of all model vehicles repaired off-line

**SOLUTION** M12 DUO-TAPTITE 2000® CORFLEX-I® bolts

**BENEFIT**

- Eliminated cross-threading
- Eliminated oversize flanged weld nuts
- Eliminated helicoil inserts
- Eliminated hand-starting of fasteners



## Automotive Applications

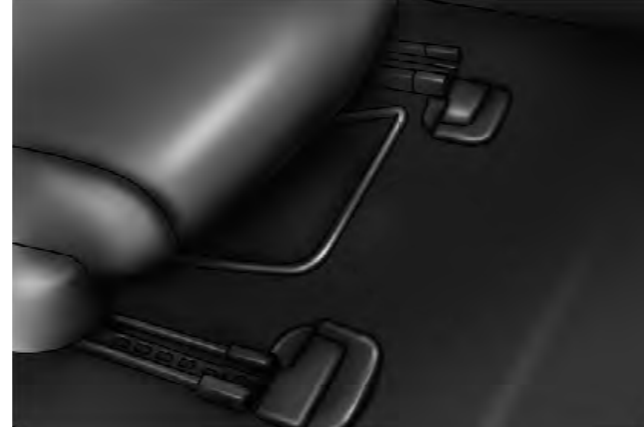


### Front Stabilizer Plate Attachment

- PROBLEM**
- Tapped weld nuts clogged with heavy primer when car frame dip painted
  - Pre-load achieved with paint in threads caused joint relaxation

**SOLUTION** M10 x 36mm TAPTITE® CA™ point with CORFLEX®-I

- BENEFIT**
- Eliminated pre-tapping of weld nuts
  - Eliminated clogged threads during dip painting
  - Reduced assembly costs
  - Provided more secure joint

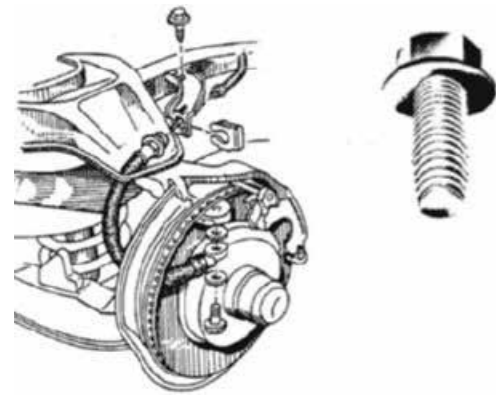


### Front Seat to Seat Track

- PROBLEM**
- Robotic sub-assembly hampered by location & alignment issues with metric screws and tapped weld nuts

**SOLUTION** M8 x 20mm TAPTITE® fasteners into stamped component

- BENEFIT**
- Eliminated costly weld nuts and cross-threading
  - Extruded holes ensured more accurate jiggling of components, improving alignment



### Front Brake Line Brackets to Vehicle Frame

- PROBLEM**
- High drive torque required to seat metric screw
  - Constant screw breakage

**SOLUTION** M8 - 1.25 x 25mm TAPTITE® fastener with CORFLEX®-I

- BENEFIT**
- Eliminated screw breakage
  - Increased vibrational resistance
  - Increased resistance to environmental stress



### Pick-Up Truck Tailgate Lock

- PROBLEM**
- Failed tailgate support strut due to high shock loading
  - Cross-threading of both lock and support strut

**SOLUTION** M6 x 25mm DUO-TAPTITE® CORFLEX®-I fastener

- BENEFIT**
- Eliminated cross-threading
  - High resistance to vibrational loosening and shock load loosening

## Automotive Applications



### Oil Pan Assembly

- PROBLEM**
- None, designed into the application

**SOLUTION** M6 x 200 TAPTITE 2000® screws

- BENEFIT**
- No tapping into cored holes
  - Excellent resistance to vibrational loosening



### Aluminum Powertrain Transfer Case

- PROBLEM**
- None, designed into the application

**SOLUTION** M8 x 40mm TAPTITE 2000® fasteners

- BENEFIT**
- Cost savings through elimination of tapping process
  - Eliminated vibrational loosening issues in past designs



### Motor Mount

- PROBLEM**
- Vibration during transit from assembly plant to dealer caused fasteners to loosen

**SOLUTION** POWERLOK® fasteners

- BENEFIT**
- Maximum vibration resistance
  - Unaffected by drastic temperature variations
  - Easy inspection with simple tools



### Front Wheel Bearing Assembly

- PROBLEM**
- Assembly must be delivered completely assembled, while maintaining clamp load

**SOLUTION** M6 x 25mm POWERLOK® fasteners

- BENEFIT**
- Fastener overcame driving torque differentials caused by variations in tapped holes
  - Consistent clamp load and high prevailing torque
  - Re-use without changes in clamp load due to vibrational loosening

## Automotive Applications



### Engine Rocker Arm Post Stud

**PROBLEM** – Different rates of thermal expansion & lack of ductility allowed round studs to vibrate free

**SOLUTION** POWERLOK® fasteners

**BENEFIT**

- Locking action maintained its full effectiveness despite thermal expansion and contraction
- No problem with lubricating oils or additives loosening chemical bonds



### Power Brake Piston for Large Trucks

**PROBLEM**

- Easy starting and low drive torque required
- Chips from tapping operation in hydraulic system

**SOLUTION** M6-1.0 x 38mm TORX® pan head shoulder TAPTITE® screw

**BENEFIT**

- Eliminated tapping process, no chips
- No rework due to cross-threading or stripped threads
- Achieved high prevailing torque



### Engine Manifold

**PROBLEM** – Constant temperature changes caused thermal loosening

**SOLUTION** POWERLOK® fasteners

**BENEFIT**

- Mechanical locking of POWERLOK® fasteners eliminated the thermal loosening issues



### Steering Assembly

**PROBLEM** – Cross-threading in production line led to high reject / scrap rates

**SOLUTION** TAPTITE 2000® fasteners

**BENEFIT**

- Eliminated cross-threading
- Additional benefit of resistance to vibrational loosening

## Automotive Applications



### Buffer Plate - Automotive Engine

**PROBLEM** – None, designed into the application

**SOLUTION** M6 x 20mm TAPTITE 2000® SP™ screws

**BENEFIT**

- Eliminated tapping and chips
- Eliminated cross-threading
- Maximized cost savings by eliminating nuts



### Seat Belt Bolt

**PROBLEM** – None, designed into the application

**SOLUTION** M12 x 20mm TAPTITE 2000® screws

**BENEFIT**

- Screw must resist high vibration
- Critical performance required
- Eliminates cross-threading potential
- Reduced cost



### Engine Timing Belt Cover

**PROBLEM** – None, designed into the application

**SOLUTION** M6 x 15mm TAPTITE® fasteners

**BENEFIT**

- Reduce component cost
- Improved assembly time
- eliminated vibrational loosening



### Engine Bolts

**PROBLEM** – None, designed into the application

**SOLUTION** M6 x 38mm TAPTITE® CORFLEX®-N fasteners

**BENEFIT**

- Cost savings
- Vibration resistance
- Increased adoption by automotive engineers

## Consumer Goods



### Briefcase Handle

**PROBLEM** – Metric machine screws were difficult to align and created high driving torque

**SOLUTION** #10-24 x 3/8" TAPTITE® screw

**BENEFIT** – Assured quick alignment  
– Lowered starting and driving torque  
– Increased prevailing off-torque



### Motor for Cabbage Cutter

**PROBLEM** – Vibrations caused joint relaxation in the assembly over time

**SOLUTION** M4 x 30mm TAPTITE® screw

**BENEFIT** – Eliminated vibrational loosening  
– Eliminated threading and extrusion

## Consumer Goods



### Buffer Plate - Automotive Engine

**PROBLEM** – None, designed into the application

**SOLUTION** M6 x 20mm TAPTITE 2000® SP™ screws

**BENEFIT** – Eliminated tapping and chips  
– Eliminated cross-threading  
– Maximized cost savings by eliminating nuts



### Putty Knife - Handle to Blade Assembly

**PROBLEM** – Two 2-piece rivet assemblies were required to join halves  
– Assembly occurred from two sides

**SOLUTION** #10-12 x 3/4" PUSH TITE II® screws

**BENEFIT** – Allowed for more efficient single-sided assembly  
– Reduced assembly cost and time



### Adjustable Office Chair

**PROBLEM** – Cross-threading at assembly

**SOLUTION** TAPTITE 2000® fasteners

**BENEFIT** – Eliminated security components required to protect against spontaneous loosening under dynamic load



### Dishwasher Leg Leveling Assembly

**PROBLEM** – High assembly cost as a bushing welded to frame was required for increased strength

**SOLUTION** TAPTITE fasteners in deep extruded hole

**BENEFIT** – Eliminated bushing and welding operation  
– Lowered in-place cost  
– Extrusion design provided additional strength



### Cooling Fan Assembly

**PROBLEM** – Vibrational Loosening

**SOLUTION** M6 x 10mm stainless steel POWERLOK® fasteners

**BENEFIT** – Saved on tapping costs, labor, consumable tooling and lubricant  
– Multi-driving without cross-threading and rework



### Food Blender

**PROBLEM** – None, designed into the application

**SOLUTION** M3.5 x 30mm TAPTITE® fasteners

**BENEFIT** – Lowered service and warranty claims vs. previous models

## Consumer Goods



### Portable Work Bench

**PROBLEM** – Multiple tapping locations required to configure the bench options

**SOLUTION** TAPTITE® fasteners

**BENEFIT**

- Eliminated all tapping
- Eliminated cross-threading
- Easy alignment for assembly
- Reduced production costs



### Clothes Washer & Dryer

**PROBLEM** – Standard tapping screws loosening due to vibration despite use of external tooth lock washer

**SOLUTION** #8-32 x 3/8" TAPTITE® fasteners

**BENEFIT**

- Serrated flange head eliminated lock washers
- Eliminated vibrational loosening
- Reduced assembly costs

## Consumer Goods



### Refrigerator Handle

**PROBLEM** – Machine screws with lock washers caused frequent cross-threading

**SOLUTION** #10-24 TAPTITE® fasteners into cored die cast holes

**BENEFIT**

- Eliminated cross-threading and lock washers
- Reduced in-place costs



### Small Gasoline Engine Bearing Cap

**PROBLEM** – Constant axial loads in an oily environment  
– Vibrational loosening over time

**SOLUTION** #10-32 TAPTITE® screws neutral hardened

**BENEFIT**

- Eliminated tapping
- High breakaway torque and achieved a high resistance to vibrational loosening



### Cookware Handle

**PROBLEM** – Handle assembled with machine screws, nylon patch, and lock washers were loosening

**SOLUTION** 1/4-20 POWERLOK® fasteners

**BENEFIT**

- Eliminated loosening
- Eliminated SEMS lock washer
- Eliminated nylon patch
- Lowered cost of assembly



### String Trimmer

**PROBLEM** – Generic case-hardened thread forming screw broke when driven into aluminum casting  
– No accurate control over assembly torque

**SOLUTION** TAPTITE 2000® SP™ CORFLEX®-N fasteners

**BENEFIT**

- Reasonable assembly torque could be set.
- Stress corrosion eliminated
- Joint secure without breakage



### Refrigerator Door Hinge Posts

**PROBLEM** – Hole Misalignment  
– Excessive paint buildup caused hard starting  
– Readjustment caused screw to loosen

**SOLUTION** 10-32 x 5/8" TAPTITE® screws

**BENEFIT**

- Easy alignment of hinge spacers while locating pilot hole in frame bracket
- Reduced end loads and starting torques
- High back-off resistance
- Eliminated warranty claims for misaligned doors



### Helmet Screws

**PROBLEM** – Screw must be able to retain its lock into helmet after removal and reinsertion

**SOLUTION** POWERLOK® fasteners

**BENEFIT** – As a mechanical thread-locking fastener, POWERLOK® screws can be removed and reinstalled while retaining their locking behavior

## Consumer Goods



### Scissors

- PROBLEM** – Locking ability of machine screws and special nuts ineffective after continuous multiple cycling
- SOLUTION** 8/32" x 1/2" PWERLOK® screw
- BENEFIT** – Superior resistance to loosening  
– 15% total in-place cost savings



### Outboard Motor

- PROBLEM** – Vibrational loosening after hours of operation required frequent field service
- SOLUTION** #10-32 x 13/16" TAPTITE® stainless steel screw
- BENEFIT** – 80-90% thread engagement achieved at lower torque with uniform drive torque throughout  
– Cross-threading eliminated  
– Assembly cost lowered  
– Vibration issues eliminated



### Chainsaw Motor

- PROBLEM** – Chips from tapped holes causing issues  
– Assembly torque too high  
– Screws cross-threading at assembly
- SOLUTION** M5 TAPTITE 2000® SP™ fasteners
- BENEFIT** – Reduced assembly torque from 9Nm to 2.6 Nm  
– Eliminated tapping operation, no chips  
– Reduced cost of nut member without thread  
– Increased joint integrity



### Dishwasher

- PROBLEM** – Rapid screw starting at hing location is critical to assembly  
– Starting torque excessively high
- SOLUTION** 10-32 x 3/8" TAPTITE® fasteners
- BENEFIT** – Reduced starting torque  
– Stabilizing point keeps fastener from falling out of the hole before driving begins

## Consumer Goods



### Folding Chair - Seat Fastener

- PROBLEM** – None, designed into the application
- SOLUTION** M6 x 15mm TAPTITE 2000® screws
- BENEFIT** – Resists vibrational loosening  
– Eliminates cross threading  
– No external nut reduces in-place costs



### Power Drill Housing

- PROBLEM** – Screws in magnesium housing were coming loose in the field
- SOLUTION** M5-0.8 x 20mm TAPTITE 2000® SP™ fasteners
- BENEFIT** – Very high failure torque  
– Screw can be replaced in the field with standard machine screw

## Construction / Industry



### Golf Course Drum Aerator

**PROBLEM** – Spike tines must be replaced when worn or damaged

**SOLUTION** TAPTITE® fasteners

**BENEFIT** – Screws can be removed and reinserted as many times as needed  
– Provides prevailing torque and superior vibration resistance to a conventional machine screw



### Power Tamping Rammer

**PROBLEM** – Severe vibration during usage loosens screws and causes oil leakage

**SOLUTION** 1/2-13 x 1 1/2" TAPTITE® CORFLEX®-I screws

**BENEFIT** – High prevailing torque maintains clamp load  
– Superior resistance to vibrational loosening prevents oil leaks

## Construction / Industry



### Overhead Garage Doors

**PROBLEM** – Most assembling done in-field and screws must start easily  
– Nut material is thin  
– Must resist vibrational loosening

**SOLUTION** 1/4-20 X 1/2" TAPTITE® fasteners

**BENEFIT** – Low end load and starting torque  
– Maximum pull-out resistance in relatively thin material  
– Elimination of external nuts and lock washers yielded cost savings



### Stadium Seating

**PROBLEM** – Tens of thousands of seat require an easy, reliable, and cost-effective installation solution

**SOLUTION** TAPTITE PRO® fasteners

**BENEFIT** – Safe, reliable attachment of each seat  
– Significant cost savings over tapped hole assemblies or external nut members



### Indoor / Outdoor Bleachers

**PROBLEM** – In-field assembly difficult in certain situations  
– Maximum safety required

**SOLUTION** 1/2-13 x 2 3/4" TAPTITE® fasteners

**BENEFIT** – Secure joint guaranteed  
– Easier in-place assembly  
– Lowered assembly cost



### Interior Door Rolling Hardware

**PROBLEM** – Customized door installation required drilling and tapping multiple holes for optimum use in aligning door

**SOLUTION** #8-32 x 3/8" TAPTITE fasteners

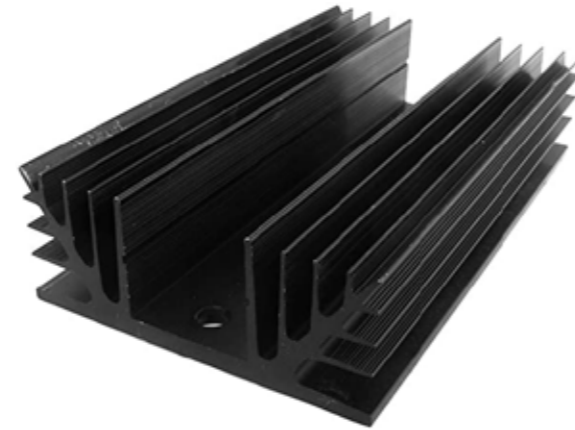
**BENEFIT** – Eliminated multiple tapped holes in each assembly  
– Drastically reduced overall cost to produce roller bracket

## Electronics



### LED Television Assembly

- PROBLEM**
- Misalignment of assembly with conventional sheet metal screws
  - High drive torque
- SOLUTION** M6 TAPTITE 2000® fasteners
- BENEFIT**
- Fasteners seat in alignment with the joint
  - Driving screw into joint more easily
  - Reduced cam-out
  - Higher quality joint



### Aluminum Heat Sink

- PROBLEM**
- RIVSCREWS distorted internal threads, creating service problems in the field
- SOLUTION** TAPTITE® fasteners
- BENEFIT**
- Eliminated drilling, tapping and cleaning
  - Cost savings
  - Can be replaced with conventional machine screws if service or replacement is required

## Electronics



### Photocopier

- PROBLEM**
- None, designed into the application
- SOLUTION** M4 x 12mm TAPTITE® fasteners
- BENEFIT**
- Eliminated cross-threading issues and reduced the scrap/reject rates of previous models of copiers



### Power Supply Unit

- PROBLEM**
- Chips from tapping operation causing random electrical problems
- SOLUTION** #10-32 TAPTITE 2000® screws
- BENEFIT**
- Eliminated chips
  - Created a vibration-resistant assembly
  - Reduced cost of assembly



### Desktop Printer

- PROBLEM**
- Manufacturer recognized the expense and time costs of the drill / tapping process
- SOLUTION** TAPTITE® fasteners into cast holes
- BENEFIT**
- Drilling, tapping, and debris generation all eliminated
  - Significant reduction in assembly time
  - Lowered assembly cost



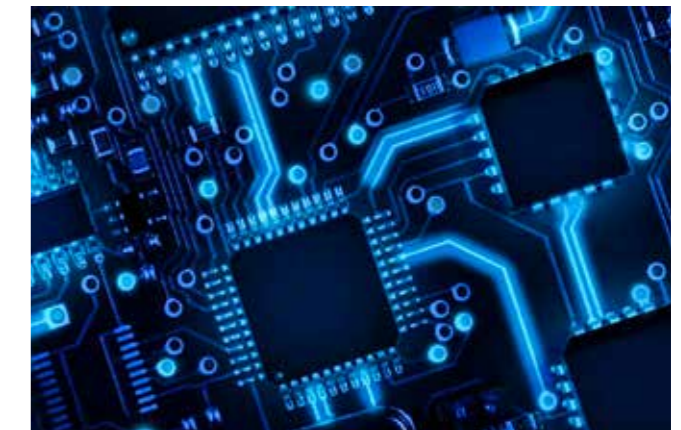
### Stepper Motor

- PROBLEM**
- Chips generated from thread cutting contaminated bearings and caused electrical shorts
- SOLUTION** TAPTITE® fasteners
- BENEFIT**
- Eliminated chip contamination
  - Increased clamp load and breakaway torque
  - Eliminated vibrational loosening



### Telephone Terminal Board

- PROBLEM**
- Screws coming loose during assembly
  - Costly operating procedure
  - Slow assembly times
- SOLUTION** #4-40 TAPTITE® fasteners
- BENEFIT**
- Eliminated loosening of joints
  - Reduced operating overhead
  - Increased manufacturing efficiency



### Cable TV Hardware

- PROBLEM**
- Solder filling the holes in aluminum casting created threading problems for machine screws
- SOLUTION** TAPTITE® CA-point fasteners
- BENEFIT**
- Solder cleared from holes during the thread-forming process
  - Reduced drive torque
  - Inherent vibration resistance from TRILOBULAR™ shape of TAPTITE® fasteners



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