REMINC Education & Outreach

October 21, 2019 – Detroit Michigan

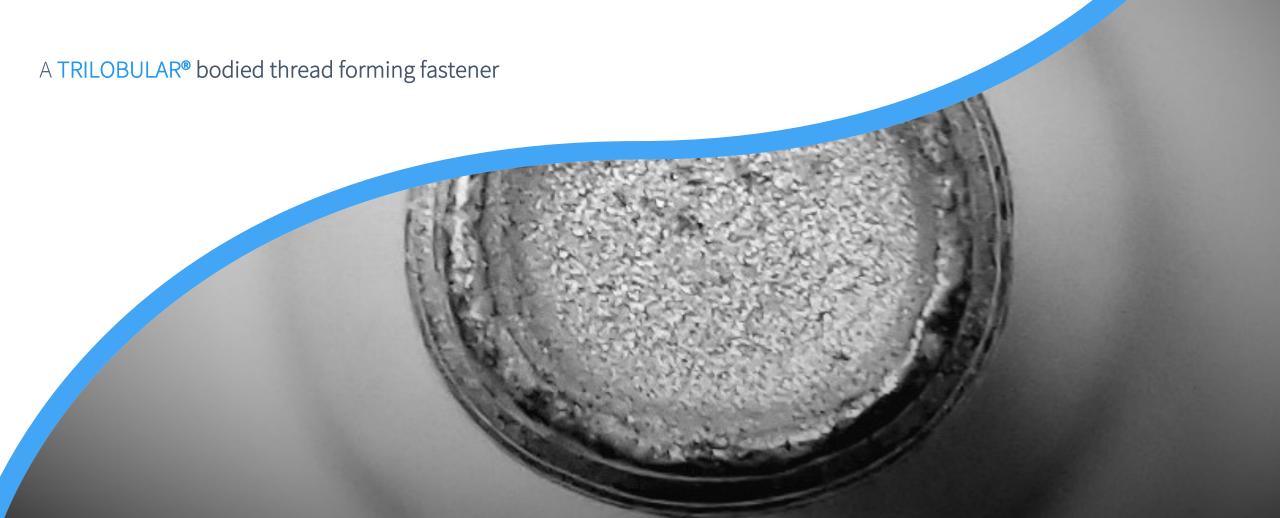
Companies in Attendance



Welcome all!



Product Evolution



Superior Design

DESIGN GOALS

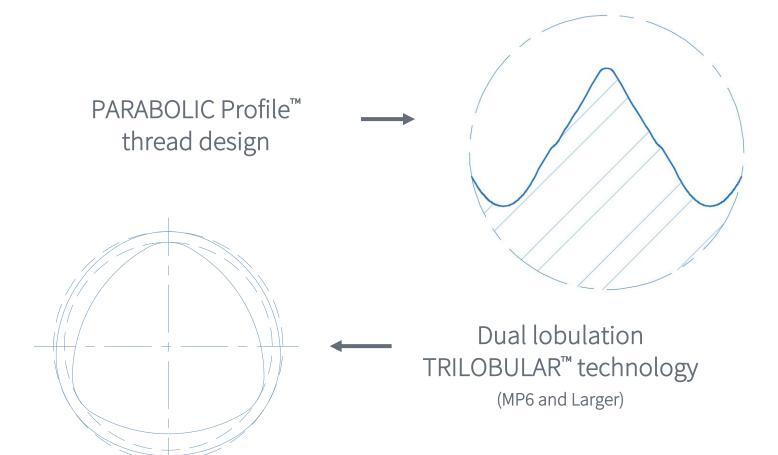
- Eliminate failure mode of stripping in standard depths of engagement
- Maintain:
 - Axial alignment
 - Low end load
 - Low thread forming torque
 - Efficient torque-tension relationships
 - Resist vibrational loosening
 - Resistance to axial pull-out





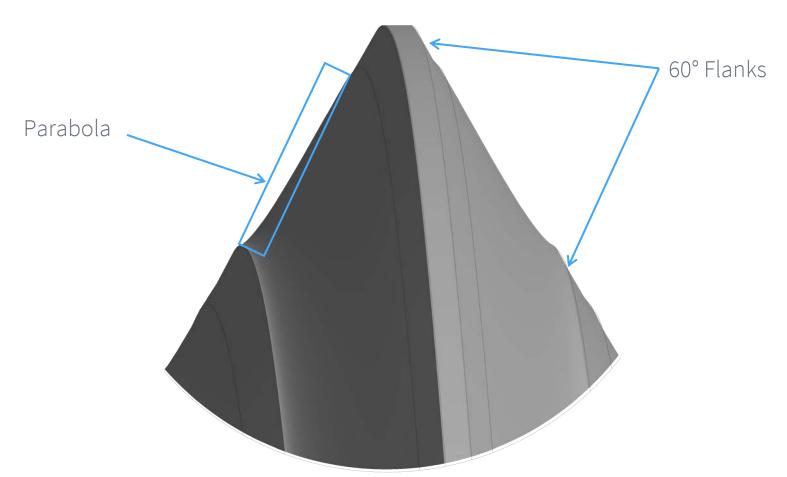
Conti Fasteners, AG

Superior Design



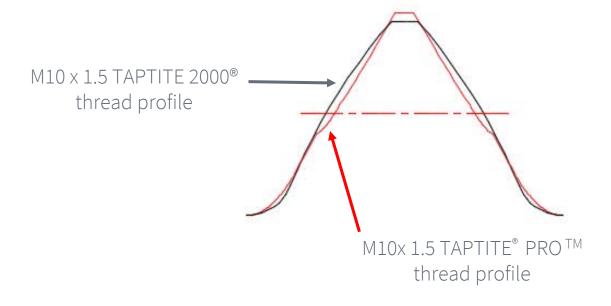


Parabolic Profile™



All Materials Copyright 2019

Thread Form



ATTRIBUTE

Parabolic Profile™

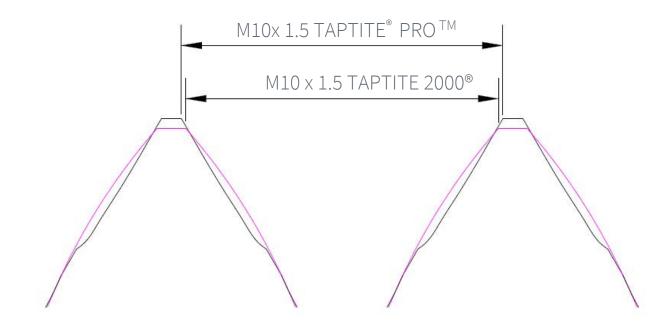
ADVANTAGES

- Increased engagement
- Reduced displacement
- Stronger nut member



All Materials Copyright 2019

Thread Form



ATTRIBUTE

• Increased internal thread shear plane

ADVANTAGES

- Preferred failure mode
- Good axial pullout performance
- Stronger nut member



All Materials Copyright 2019

Thread Form



ATTRIBUTE

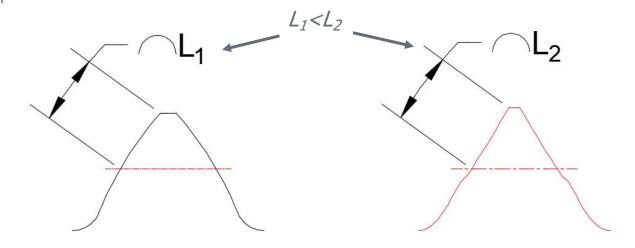
• Reduced volumetric displacement

ADVANTAGES

- Resistance to failure
- Torque-tension relationship



Thread Form



M10 x 1.5 TAPTITE 2000° thread profile

M10x 1.5 TAPTITE® PRO™ thread profile

ATTRIBUTE

Increased contact area

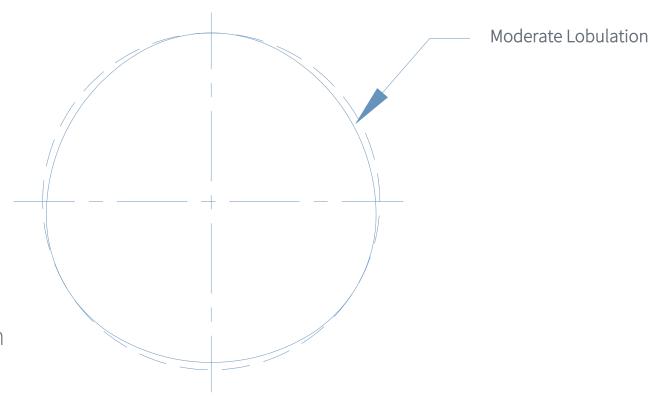
ADVANTAGES

- Vibration resistance
- Torque-tension relationship



All Materials Copyright 2019
Research Engineering & Manufacturing, Inc.
Conti Fasteners, AG

Body Lobulation



ATTRIBUTE

• Moderate Lobulation

ADVANTAGES

- Resists vibrational loosening
- Efficient torque-tension performance

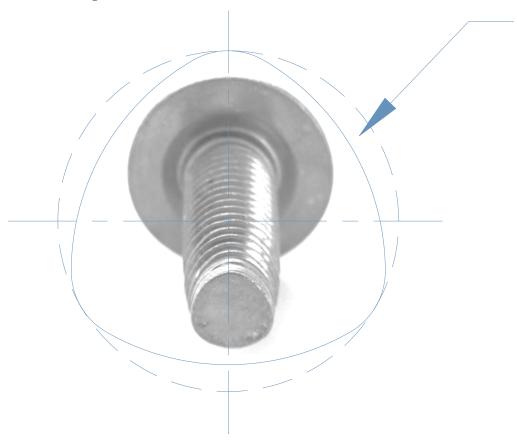


All Materials Copyright 2019 **Research Engineering & Manufacturing, Inc.**

Conti Fasteners, AG

Point Lobulation

(MP6 and Larger)



Large lobulation

ATTRIBUTE

• Large lobulation

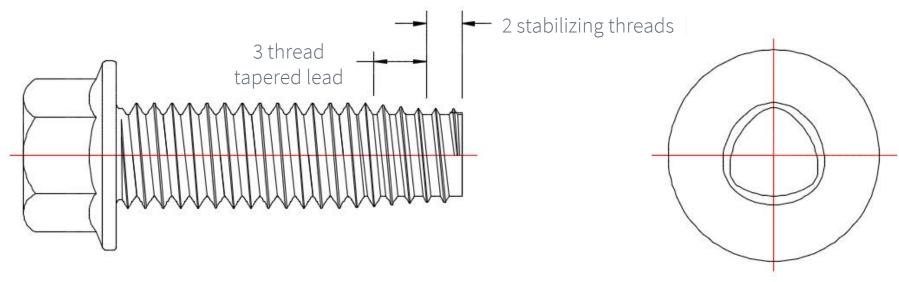
ADVANTAGE

• Low thread forming torque



All Materials Copyright 2019

MP6 and Larger



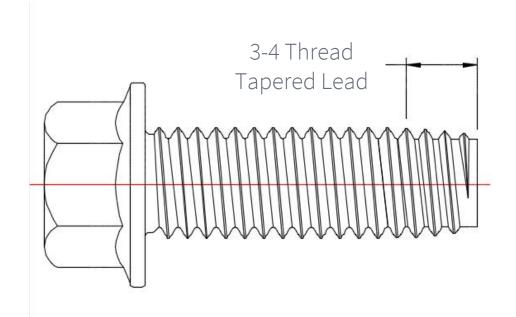
Heat Treatment

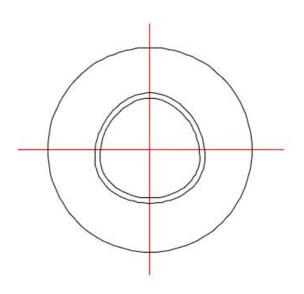
- CORFLEX®-'I' for steel applications
- CORFLEX®-'N' for aluminum, magnesium & zinc applications



TAPTITE® PRO™ Screws

MP5 and Smaller



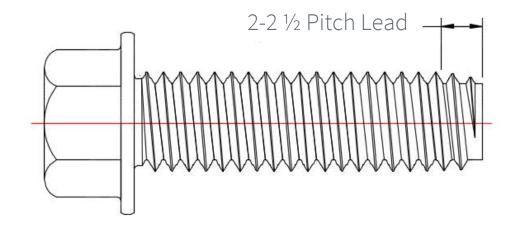


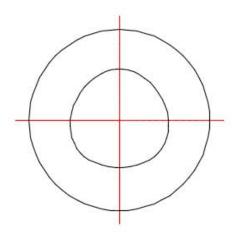
Heat Treatment

- Case hardened for steel applications
- CORFLEX®-'N' for aluminum, magnesium & zinc applications



For Soft Metals



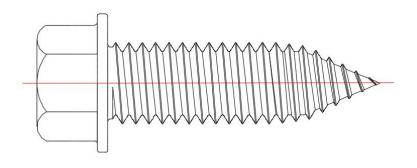


Heat Treatment

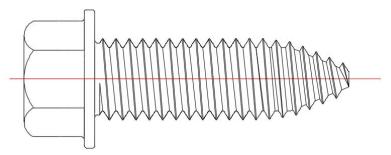
• CORFLEX®-'N' for aluminum and zinc applications



For Hole Finding



Sharp Point Cut Off Style



Dull Point: Non-Cut Off Style

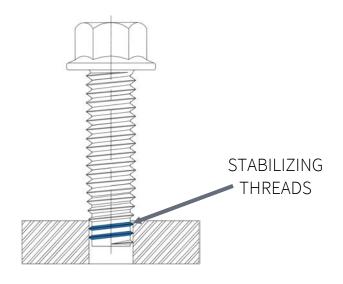
Heat Treatment

- CORFLEX®-'I' for steel applications (MP6 and larger)
- Case hardened for steel applications (MP5 and smaller)
- CORFLEX®-'N' for aluminum, magnesium & zinc applications

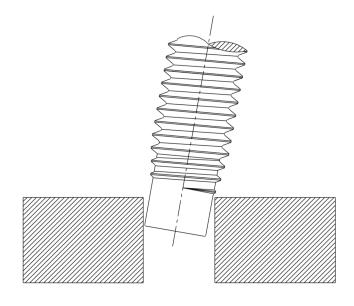


All Materials Copyright 2019

Stabilizing threads



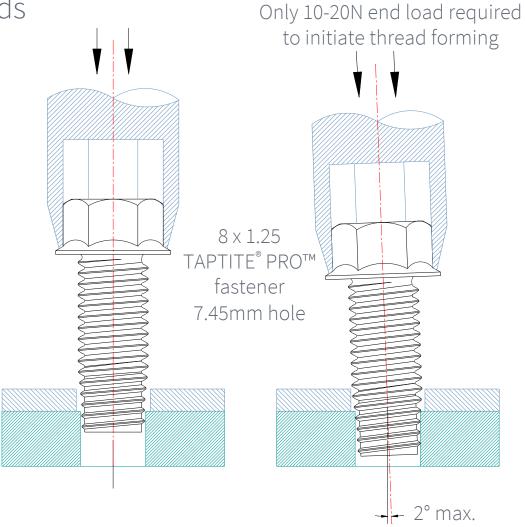
- Near pilot hole diameter
- Excellent axial alignment
- Low end load required



- Manufactured to root diameter or less
- Not effective in maintaining axial alignment



Stabilizing threads





All Materials Copyright 2019

Stabilizing threads

Unthreaded drilled hole



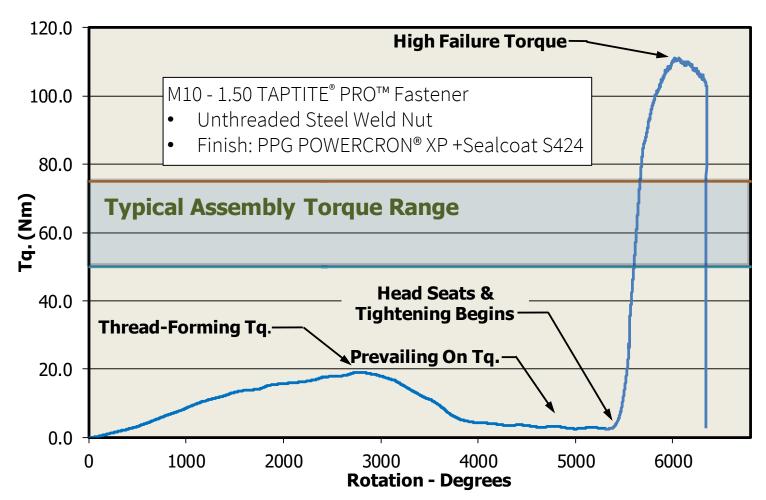


Unthreaded extruded hole



All Materials Copyright 2019

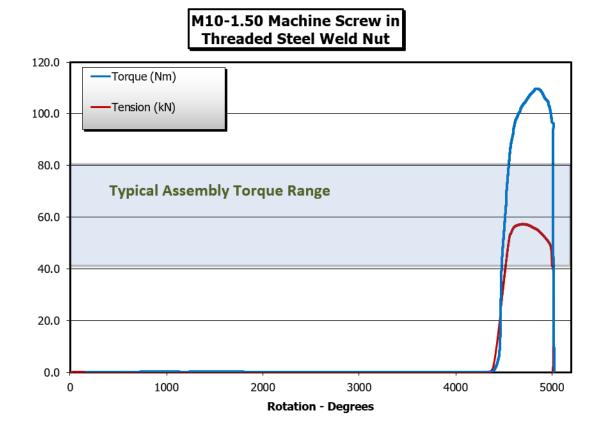
Torque tension



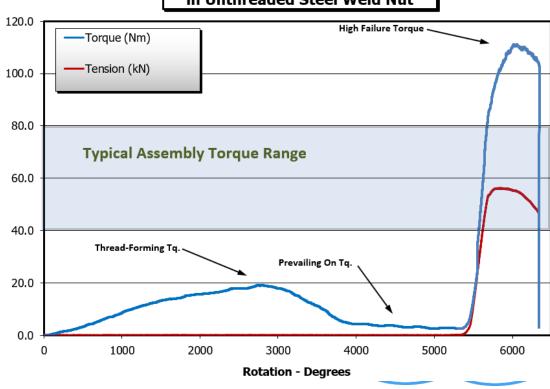


All Materials Copyright 2019

Torque tension

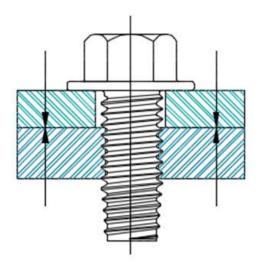




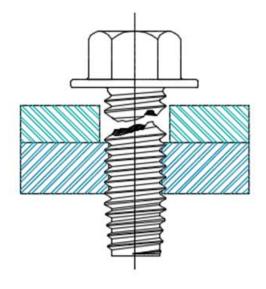


All Materials Copyright 2019

Performance



Torque - tension relationships similar to machine screws

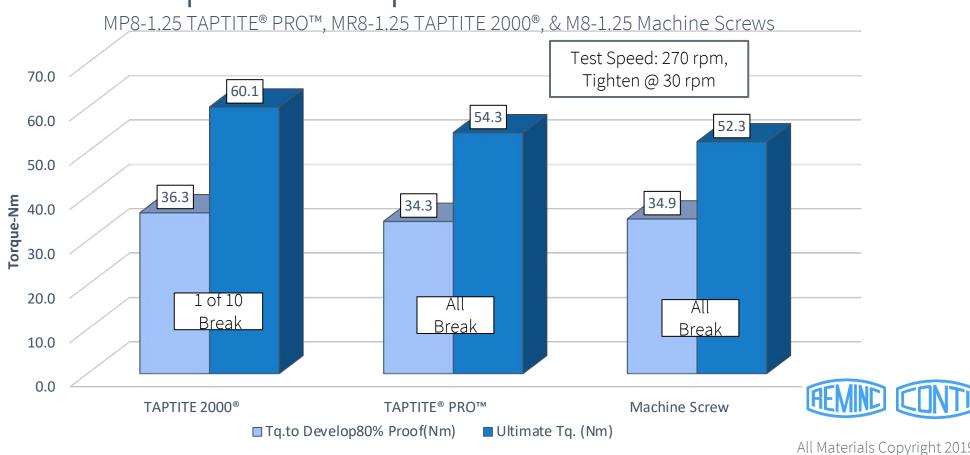


Failure mode of fastener fracture in steel & aluminum nut members similar to machine screws



Performance

Torque To Develop 80% Proof in Weld Nut

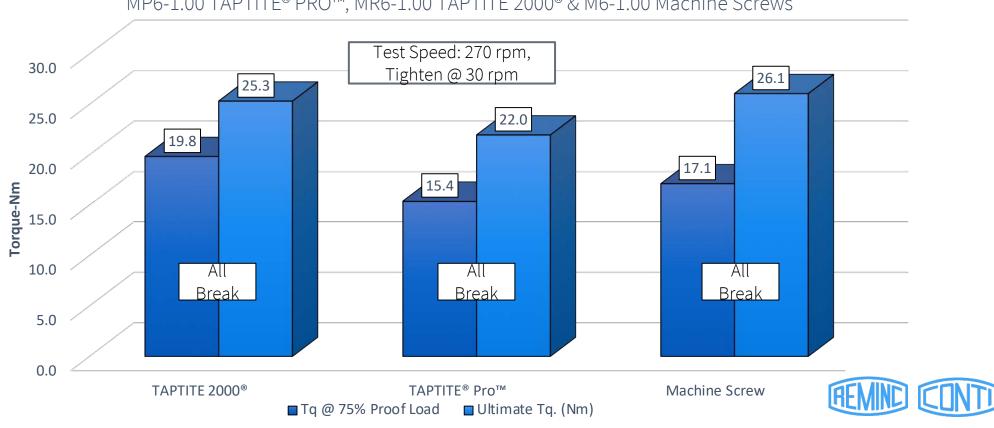


All Materials Copyright 2019

Performance

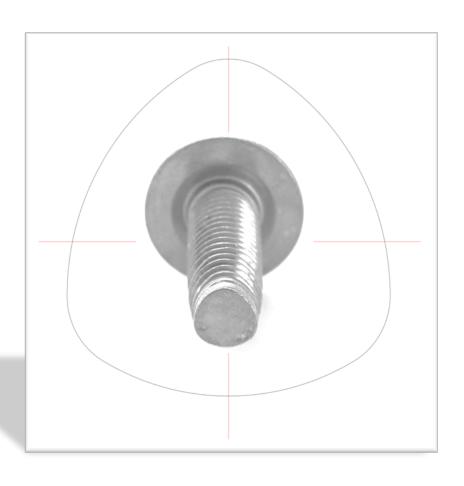
Torque To Develop 75% Proof in Aluminum Blocks

MP6-1.00 TAPTITE® PRO™, MR6-1.00 TAPTITE 2000® & M6-1.00 Machine Screws



All Materials Copyright 2019

Performance



ATTRIBUTE

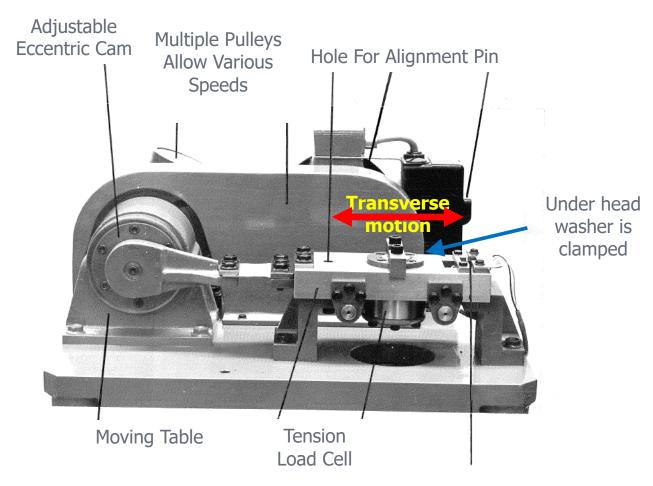
• TRILOBULAR® Shape

ADVANTAGES

- Provides prevailing torque
- Resists vibrational loosening
- Allows deep thread engagements

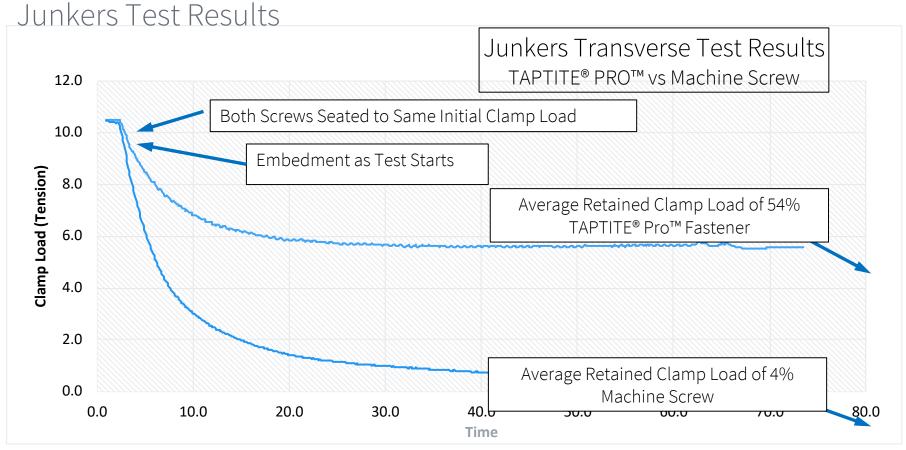


Vibration Resistance





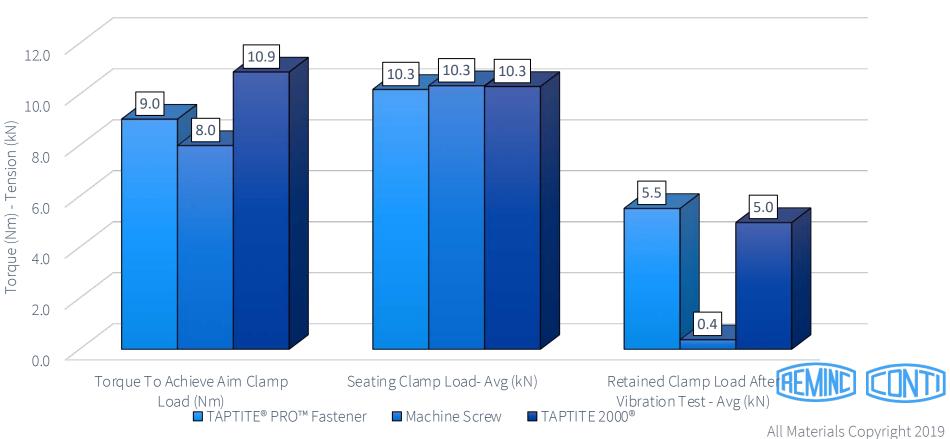
All Materials Copyright 2019



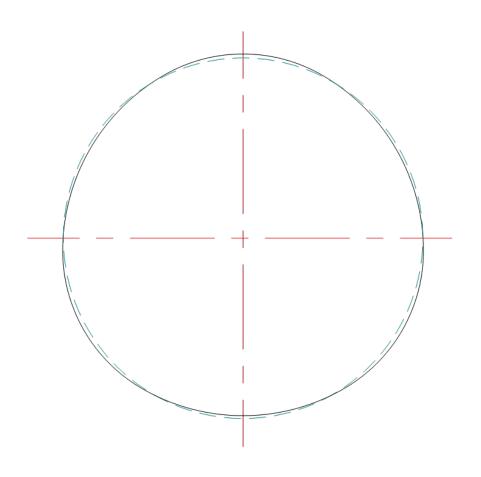


Junkers Test Results

Junkers Transverse Vibration Test MP6-1.00 TAPTITE® PRO™, MR6-1.00 TAPTITE 2000® & M6-1.00 Machine Screw



Stress Area



ATTRIBUTE

Body Lobulation

ADVANTAGES

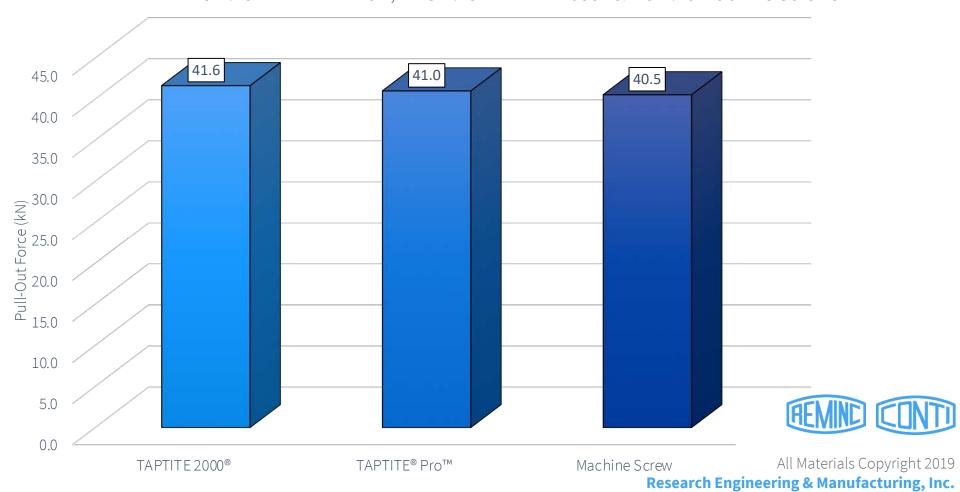
- High axial pullout loads
- Theoretical stress area comparable to machine screws
- Meets tensile requirements per ISO 898-1



All Materials Copyright 2019

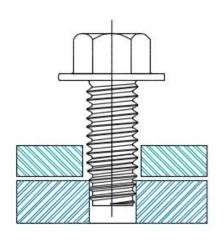
Axial Pull-out

Tensile Pull-Out Force MP8-1.25 TAPTITE® Pro™, MR8-1.25 TAPTITE 2000® & M8-1.25 Machine Screws

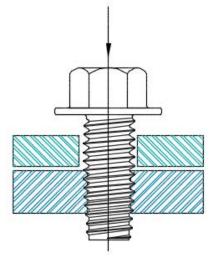


Conti Fasteners, AG

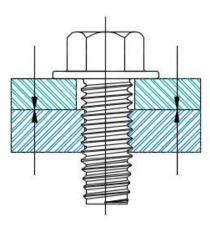
Superior Design



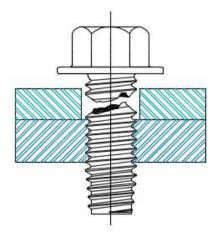
 Maintains good axial alignment



• Requires less starting end load



- High assembly clamp load
- High resistance to vibrational loosening

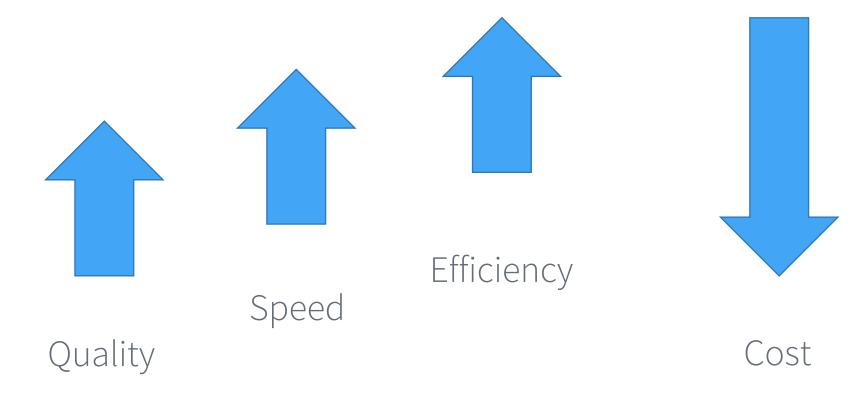


 Failure mode comparable to machine screws in standard depths of engagement



All Materials Copyright 2019

Ultimate Benefits



LOWER IN-PLACE FASTENING COSTS



All Materials Copyright 2019

TAPTITE® PRO™

Ford WD-957 Spec



WORLDWIDE FASTENER STANDARD

WD 957

2018 12 17

MECHANICAL AND PERFORMANCE REQUIREMENTS OF (090) THREAD ROLLING SCREWS WITH INDUCTION HARDENED POINTS FOR USE AS GROUNDING SCREWS OR GENERAL USE

. SCOPE

This standard specifies the requirements for high performance through hardened thread rolling screws with induction hardened points for use as grounding (earthing) screws or general use applications. The standard relates to TAPITE PRO® screws with the Parabolic Profile™ and standard 60 degree thread form ranging from sizes M5 to M14. This standard was originally released for screws with electroplated finishes used to attachment components requiring grounding. Not recommended for cast iron due to its low ductility.

Fastener mechanical properties are in line with ISO 898/1 property class 9.8.

An additional "XD" lubricant per WX 100 may be released with the finish to improve thread forming capability.

2. REFERENCES

ISO 262 General purpose metric screw threads – Selected sizes for screws, bolts and nuts ISO 898-1 Mechanical properties of fasteners – Part 1: Bolts, screws and studs.

ISO 6157-3 Fasteners - Surface Discontinuities

ISO 6507-1 Metallic Materials - Vickers Hardness, Part 1: Test Method

SAE/USCAR-8 Grain Flow Pattern for Bolts and Screws

WSS-M99A3-A Embrittlement Avoidance

ES-DU5A-9661270-BA Specification for Aluminum Cold Formed Extrusions with T72 Heat Treat

ES-9L34A-1526590-AB Cold formed extrusion performance in steel

3. REQUIREMENTS

3.1. MATERIA

Screws must be made from cold heading quality fully killed, fine grain, spheroidized annealed steel wire. Material must meet the chemical composition limits for property class 9.8 per ISO 898 Part 1.

3.2 MECHANICAL PROPERTIES

Mechanical properties and test methods defined in ISO 898/1 for property class 9.8 apply except for decarburization. The induction hardened point is not included.

3.3 DECARBURIZATION

During the hardening process, the carbon potential of the atmosphere should be maintained at a level above the mitipoint of the carbon content range specified for the steel grade. Carbon enrichment at the surface is allowed provided the hardness requirements are met.

3.4 SURFACE AND CORE HARDNESS

The surface hardness must not be less than the measured core hardness or greater than 30 Vickers points above the measured core hardness with a maximum value of 382 HV.

Core Hardness per ISO 898/1 for PC 9.8: 290 - 360 HV

Rockwell measurements may be used for in process checks. If test precision and hardness conversion raise a compliance issue, then Vickers measurements of both surface and core hardness on the HV 0.3 scale must be performed.

Copyright © 2018 Ford Global Technologies, Inc.

Page 1 of 5



All Materials Copyright 2019

REMINC-CONTI Trademarks

Brand Protection

TAPTITE® PRO™, TAPTITE 2000®, TYPE TT 2K®, TAPTITE 2K®,

TYPE TT 2000®, TAPTITE®, TAPTITE II®,

TYPE-TT®, DUO-TAPTITE®, CORFLEX®, TRILOBULAR™



Research Engineering & Manufacturing Inc. 55 Hammarlund Way, Tech II Middletown, RI 02842 Conti Fasteners, AG Albisstrasse 15, CH-6340 Baar, Switzerland



POWERLOK® II™ Screws

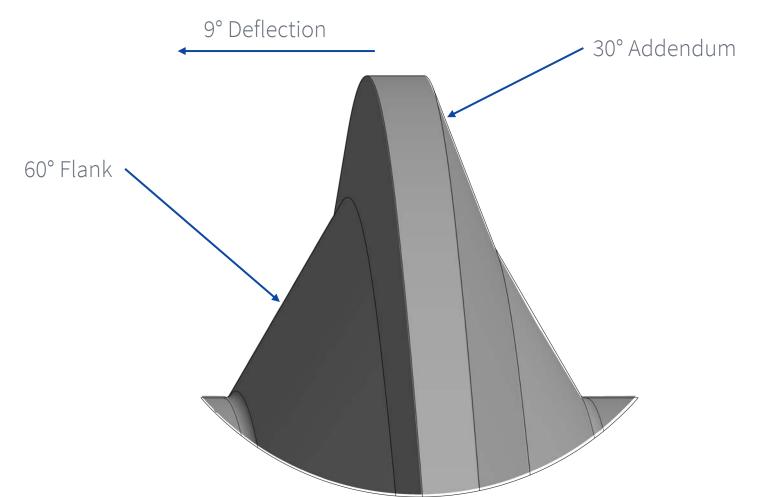


A TRILOBULAR® bodied locking fastener



POWERLOK® II™ Fastener

Increased Strength

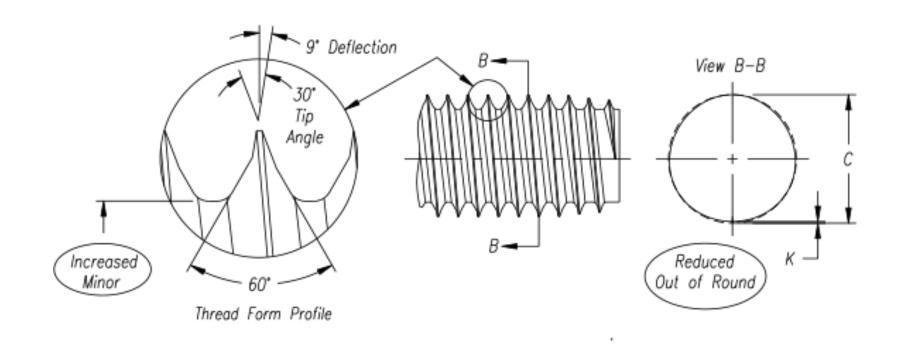




All Materials Copyright 2019

POWERLOK® II™ Fastener

Performance by Design





Increased Strength



ATTRIBUTE

Increased cross section

ADVANTAGES

- Improved strength
- Meets ISO 898-1 tensile requirements

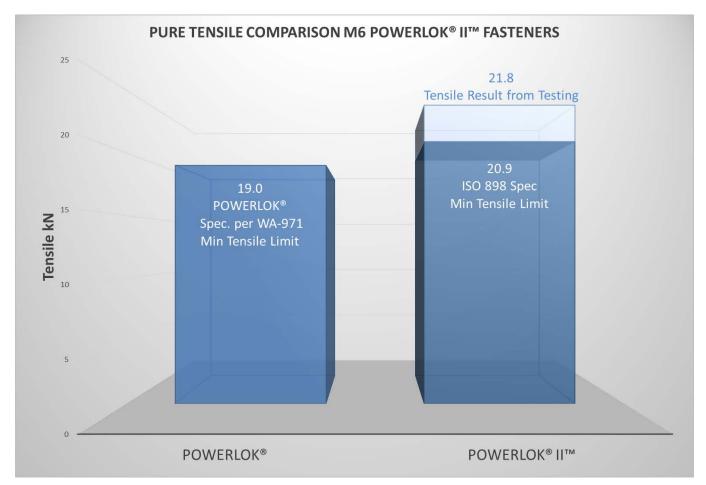




All Materials Copyright 2019 **Research Engineering & Manufacturing, Inc.**

Conti Fasteners, AG

Increased Strength





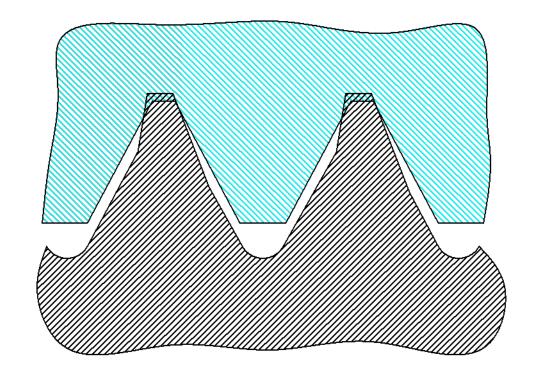
Locking Action

ATTRIBUTE

• Thread height

ADVANTAGES

- Interference in root
- Use standard 6H taps
- Most accurate dimension of nut member
- Easy running change







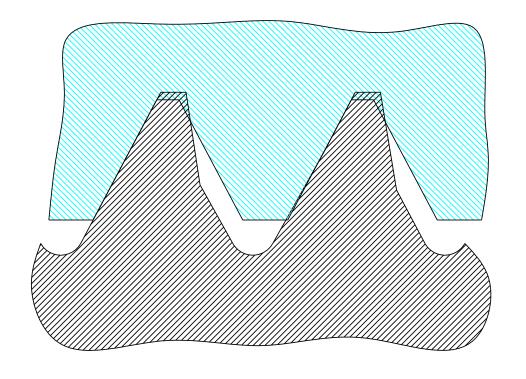
Locking Action

ATTRIBUTE

• 30° addendum

ADVANTAGES

- Tip deflection
- Spring action along pressure flank

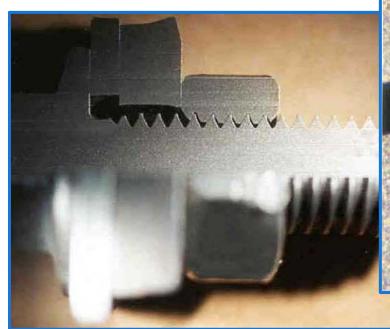


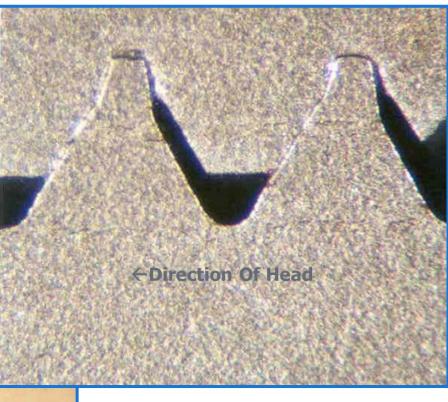
UNDER TENSION ■

DIRECTION OF HEAD



Locking Action







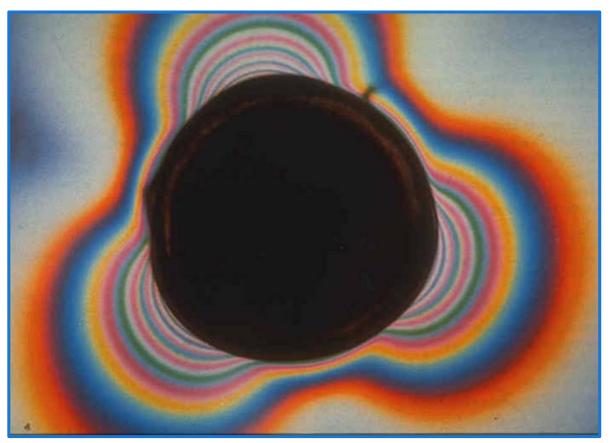
Locking Action

ATTRIBUTE

• TRILOBULAR® shape

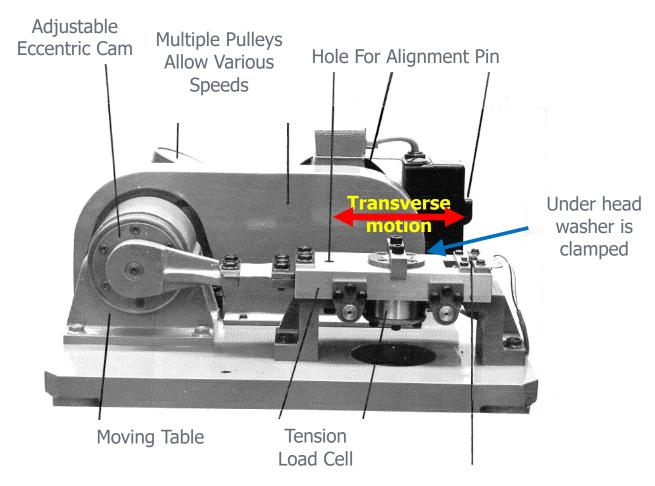
LOCKING ACTION

• Relaxation between lobes





Vibration Resistance

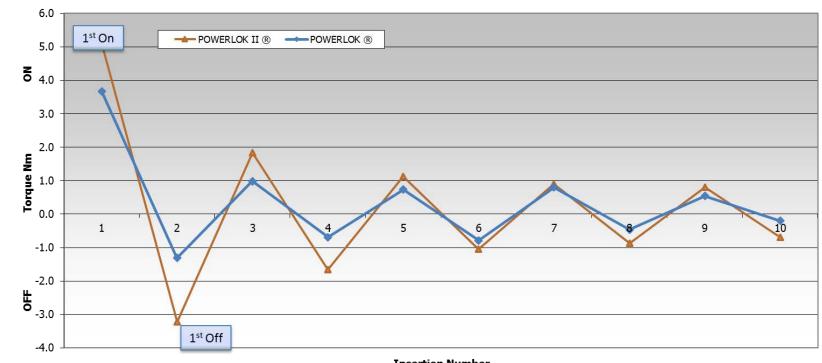




All Materials Copyright 2019

Vibration Resistance

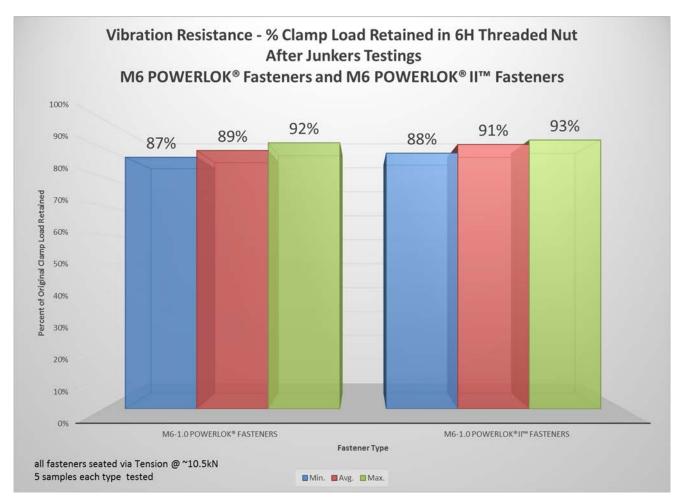
Prototype Evlauation
M6-1.0 POWERLOK® II™ Fastener and M6-1.0 POWERLOK® Fasteners in a Weld Nut
Multi-Cycle Torque Performance Averages



Insertion Number On-odd : Off-even rpm 30



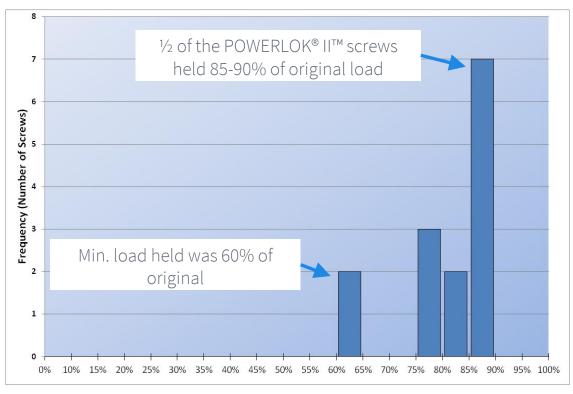
Vibration Resistance



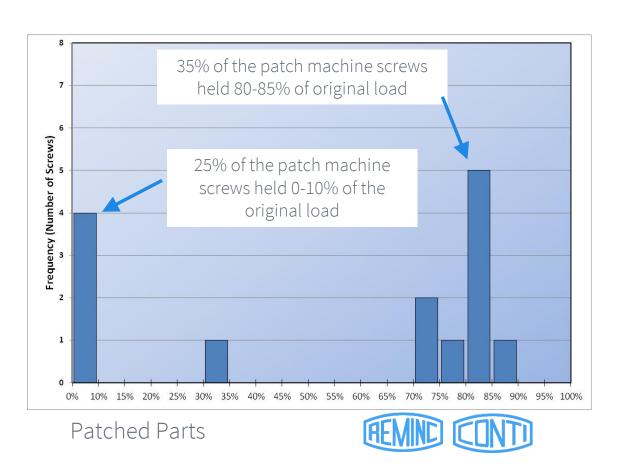


All Materials Copyright 2019

Consistent Performance



POWERLOK® II™



All Materials Copyright 2019

Anti-Cross thread





All Materials Copyright 2019
Research Engineering & Manufacturing, Inc.
Conti Fasteners, AG

Anti-Cross thread

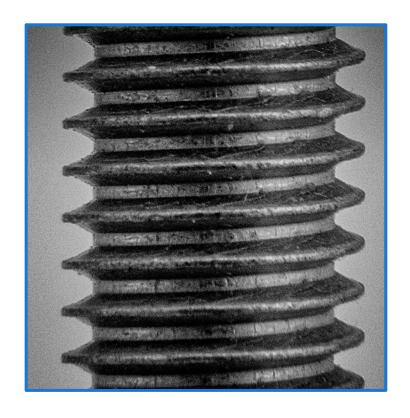
| | | | GS | | Α | | NS | С | T | AC | CT |
|-----------------|------------------------------|--------------------|------------------|---------|--------------|---------|------------------|---------------|------------|---------|------------|
| Angle | Fastener Type | # of 30 | % of total | # of 30 | % of total | # of 30 | % of total | # of 30 | % of total | # of 30 | % of total |
| 7 deg. | Machine Screw | 22 | 73% | 1 | 3% | 2 | 7% | 4 | 13% | 1 | 3% |
| | MATpoint®Screw | 30 | 100% | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% |
| | POWERLOK® II™ Screw | 30 | 100% | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% |
| | | | | | | | | | | | |
| | | | | | | | - | | | | · |
| | | | GS | | A | | NS | СТ | | AC | T |
| Angle | Fastener Type | # of 30 | GS % of total | # of 30 | A % of total | # of 30 | NS % of total | CT # of 30 | % of total | # of 30 | % of total |
| Angle | Fastener Type | | | # of 30 | 1 . | | | | % of total | | |
| Angle 9 deg. | Fastener Type Machine Screw | | | # of 30 | 1 . | | | | % of total | | |
| | , | # of 30 | % of total | | % of total | # of 30 | % of total | | | | % of total |
| | Machine Screw | # of 30 5 29 | % of total | 4 | % of total | # of 30 | % of total | | 7% | | % of total |

GS = Good Start
A = Additional end load – started
NS = No Start
CT = Cross Thread
ACT = Additional end load – cross thread



All Materials Copyright 2019
Research Engineering & Manufacturing, Inc.
Conti Fasteners, AG

Benefits



ADVANTAGES

- Full length of fastener
- All metal locking feature
- Not temperature dependent
- Consistent performance
- Reusable
- Simplified value stream
- Improved quality
- Anti-Cross thread



TRILOBULAR® Grounding Screws



Ideal fasteners for creating conductivity

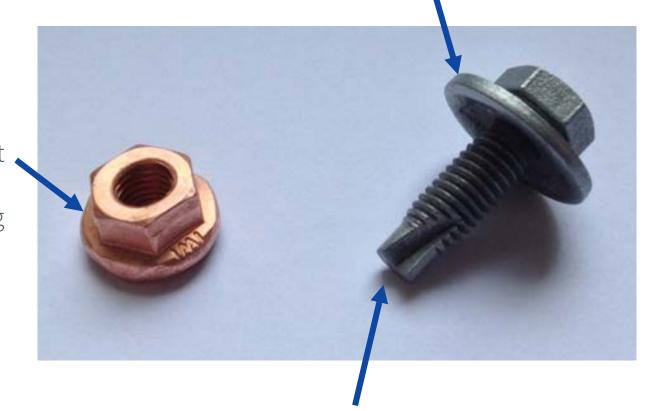


Standard Solution

Expensive Washer Assembly

Copper coated lock nut

- Expensive
- Inconsistent locking



Mechanical plating for better conductivity, but reduced corrosion resistance

Screw with thread cutting/paint clearing feature

- Prone to cross threading
- Poor performance clearing paint, e-coat, etc.

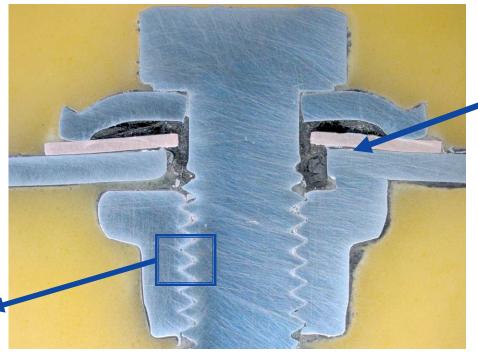


All Materials Copyright 2019

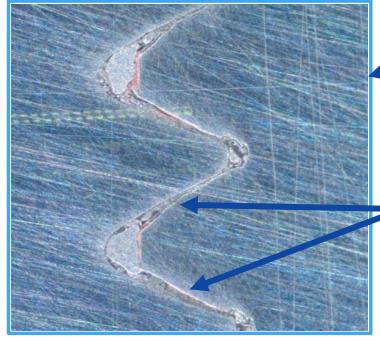
Research Engineering & Manufacturing, Inc.

Conti Fasteners, AG

Standard Solution - Cross section



Material deflection due to spring washer assembly



Limited metal to metal contact between nut & fastener thread



All Materials Copyright 2019

Research Engineering & Manufacturing, Inc.

Conti Fasteners, AG

TAPTITE® Fastener Solution

Standard unthreaded nut member

- No tapping
- No locking required
- No copper plating



Electrolytic Zinc Nickel plating

Standard Hex Flange Head

- Excellent corrosion resistance

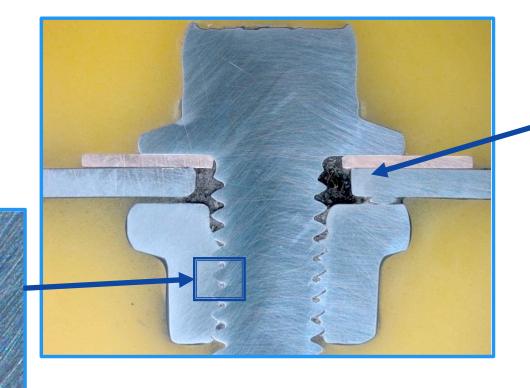
Standard TAPTITE® design;

- Eliminates cross threading
- Clears e-coat & other finishes in nut member to create metal to metal contact
- Built in locking action



All Materials Copyright 2019 **Research Engineering & Manufacturing, Inc.**

New Solution – Cross section



Material deflection due to spring washer assembly eliminated





All Materials Copyright 2019



SAE/USCAR-26

Issued August 2003

Test Procedure for Electrical Ground Attachments

| SUMMARY OF CONTENTS | |
|--|---|
| 1. SCOPE | 2 |
| 2. REFERENCES | 2 |
| 3. DEFINITIONS | 2 |
| 4. GENERAL REQUIREMENTS | 2 |
| | |
| Test Equipment and Tolerances | 2 |
| 4.1.2. Test equipment required is shown in table 1 | 2 |
| 4.1.3. Test Fixture | 3 |
| 4.2. Test Samples | |
| 4.2.1. Sample Quantity | |
| 4.2.2. Test Coupons | |
| 4.2.4. Ground Wire Attachment to Test Coupon | |
| 4.2.5. Assembly of Test Samples | 5 |
| 4.2.6. Grouping of Samples | 5 |
| 4.3. Test Procedures | 5 |
| 4.3.1. Biasing Samples | |
| 4.3.2. Test Schedule | |
| 4.4. Thermal Shock | |
| 4.5. Random Vibration | / |
| 4.6. Temperature/Humidity Cycling4.7. Salt Fog | 7 |
| 4.8. Resistance Measurement | 7 |
| | |
| 5. ACCEPTANCE CRITERIA | / |
| 6. SUMMARY OF TEST DATA | 8 |
| 6.1. Test Information | 8 |
| 7 FIGURES | 8 |

The research data, analysis, conclusion, opinions and other contents of this document are solely the product of the authors. Neither the Society of Automotive Engineers, inc. (SAE) nor the United States Council for Automotive Research (USCAR) certifies the compilance of any products with the requirements of nor makes any representations as to the accuracy of the contents of this document nor to its applicability for purpose. It is the sole responsibility of the user of this document to determine whether or not it is applicable for their purposes.

Copyright © 2003, USCAR All rights reserved.

Printed in U.S.A.

QUESTIONS REGARDING THIS DOCUMENT: TO PLACE A DOCUMENT ORDER: (72

T: (724) 772-8518 FAX (724) 776-3036 (724) 776-4970 FAX (724) 776-0790 Voltage Drop Test according to SAE/USCAR-26

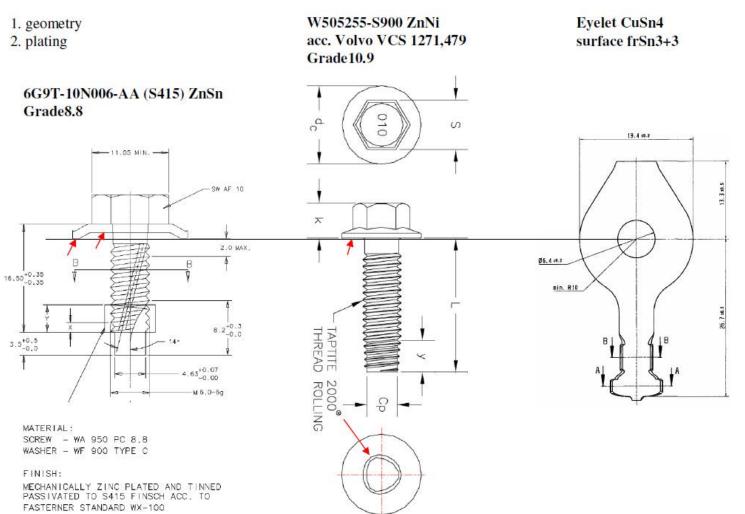


All Materials Copyright 2019

Products tested

Weld Nut W711455-S403

Grade8; copper coating



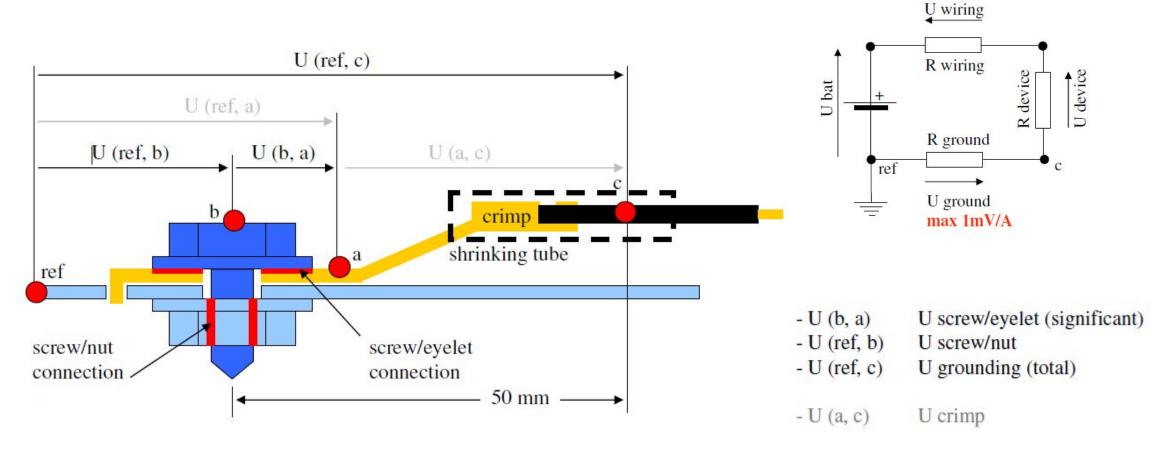
Weld Nut W703193-S300

Grade8



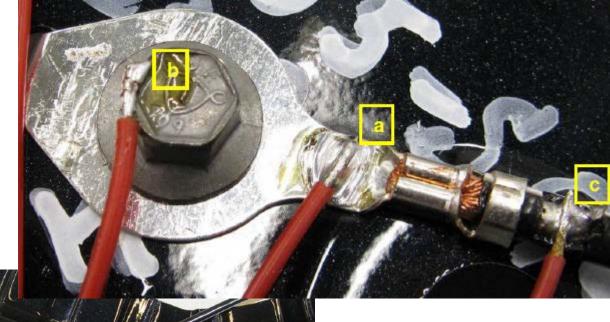
All Materials Copyright 2019 neering & Manufacturing, Inc. Conti Fasteners, AG

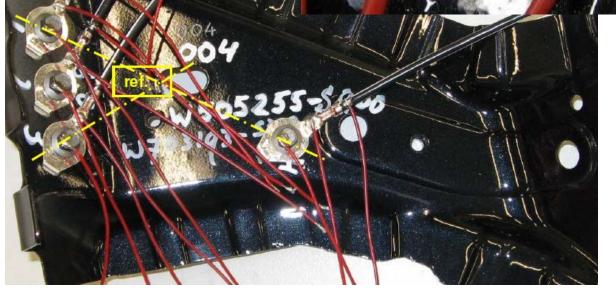
Schematic test arrangement



All Materials Copyright 2019

Test arrangement

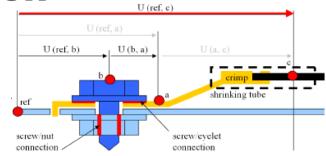






All Materials Copyright 2019

Test Results - Before Corrosion



U (ref, c) 0% R343-Lommel aging/corrosion





All Materials Copyright 2019

Test Results After Corrosion

U (ref, c)

U (ref, a)

U (ref, b)

U (b, a)

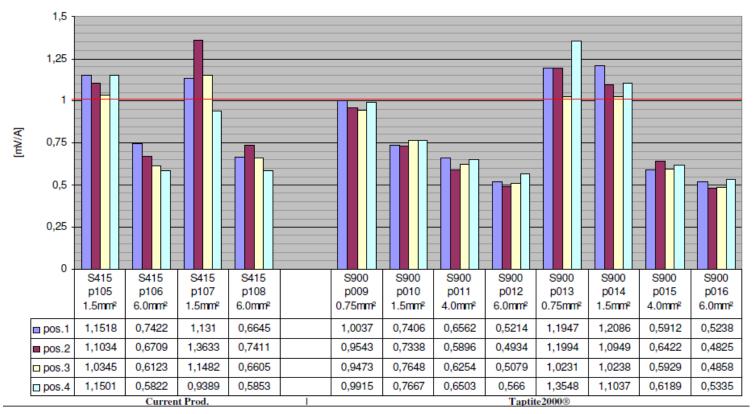
U (a, c)

crimp

shrinking tube

screw/eyelet
connection

U (ref, c) 100% R343-Lommel aging/corrosion





All Materials Copyright 2019

Summary

- The both Grounding Systems meet the USCAR-26 voltage drop requirements of U < 1mV/A
- The Taptite2000® and Current Prod. Screw show constantly very good elect. connection to nut and eyelet
- The Taptite2000® has the best corrosion resistance!
- Current Prod. Screw has a poor corrosion resistance!

| Screw Type / Plating | Screw/Eyelet Resistance | De-/Torque | Corrosion | Recommendation | | |
|---------------------------|----------------------------|------------|-----------|----------------|---|--|
| Taptite2000 ® (S900) ZnNi | OK | ок | OK | ОК | good electrical properties! good corrosion resistance! hot melt shrinking tube recommended! no cross threading | |
| Current Prod. (S415) ZnSn | OK | OK | NOK | NOK | poor corrosion resistance! good electrical properties! see "GND screw TEST REPORT 080822" 15-20% cross threading | |



Summary

TAPTITE® Fasteners eliminate the need for:

- Pre-tapped nut members
- Conductive coatings on the nut member
- Locking features in the nut member
- Paint clearing features
- Anti-Cross threading features
- Special washer assemblies



TAPTITE® fasteners provide excellent grounding characteristics and Cost Savings



TAPTITE®® PRO™ & POWERLOK® II

Testing in Progress



- Threaded and non-threaded steel nut members, e-coated, provided by ACT Test Panels
- Testing being performed by Element labs
- M8 X 1.25 Hex Flange Head TAPTITE® PRO™ and POWERLOK® II screws, Zinc Nickel finish



All Materials Copyright 2019

Research Engineering & Manufacturing, Inc.

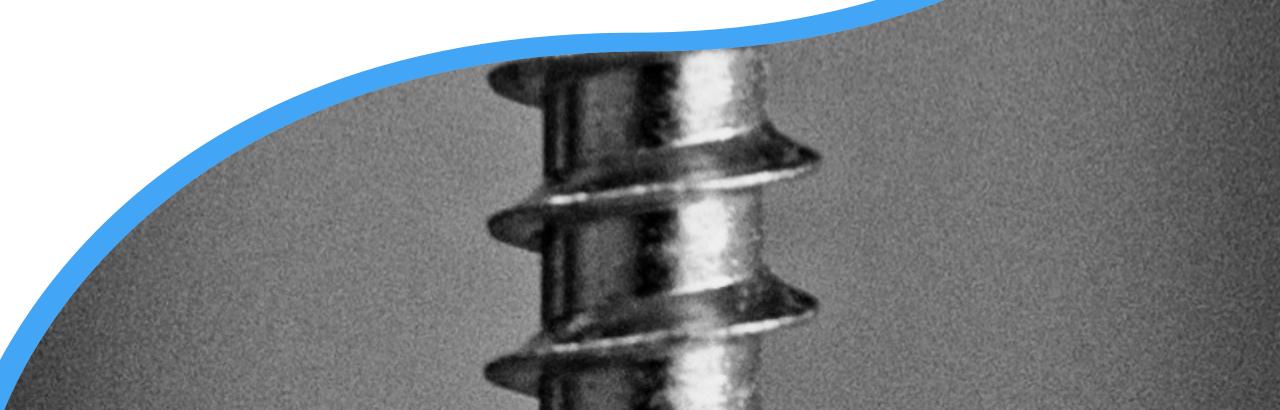
Conti Fasteners, AG

REMFORM[®] II™ Fasteners

Product Development Update

REMIND CONTI

The fastener for today's plastics



For today's plastics

DESIGN GOALS

- Low radial hoop stress
- Increased strip resistance
- Easy manufacturing
- High torsional strength





Unique Radius Flank™

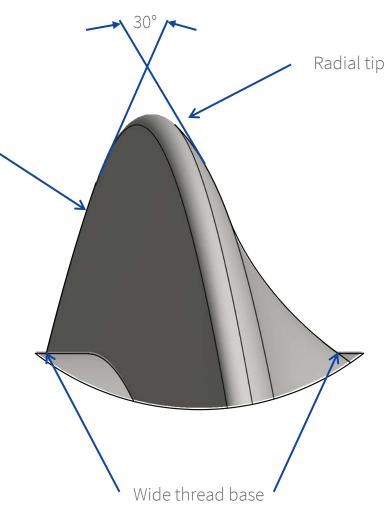
Steep pressure flank

ATTRIBUTE

Unique Radius Flank™ thread

ADVANTAGES

- Low radial hoop stress
- Good resistance to pullout and stripping
- Efficient tension production
- Ease of manufacturing





All Materials Copyright 2019

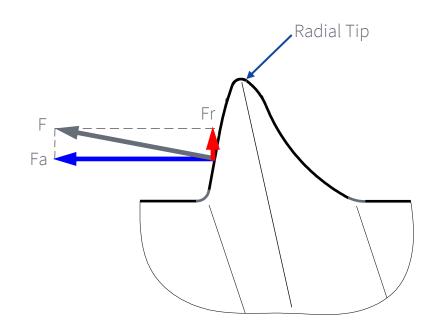
Performance by design

ATTRIBUTES

- Steep pressure flank
- Radial tip

ADVANTAGES

- Axial force, Fa, is more than 4.5 times greater than the radial force, Fa
- Tightening force, F, in mostly axial direction
- Elimination of sharp edges
- Reduced risk of boss bursting
- Increased resistance to axial pullout





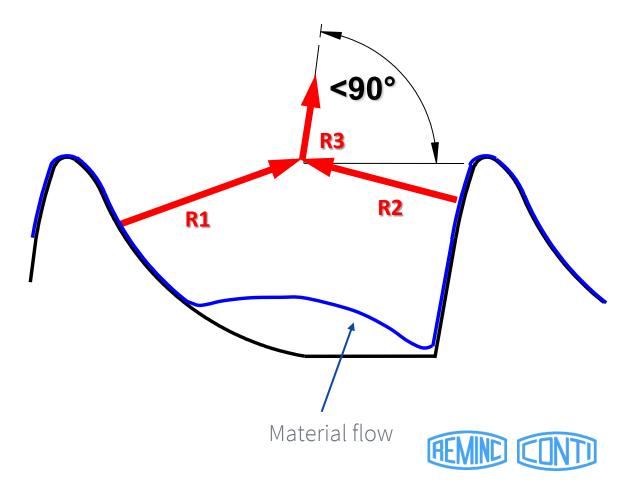
Performance by design

ATTRIBUTE

- Wide thread spacing
- Unique Radius Flank™ design

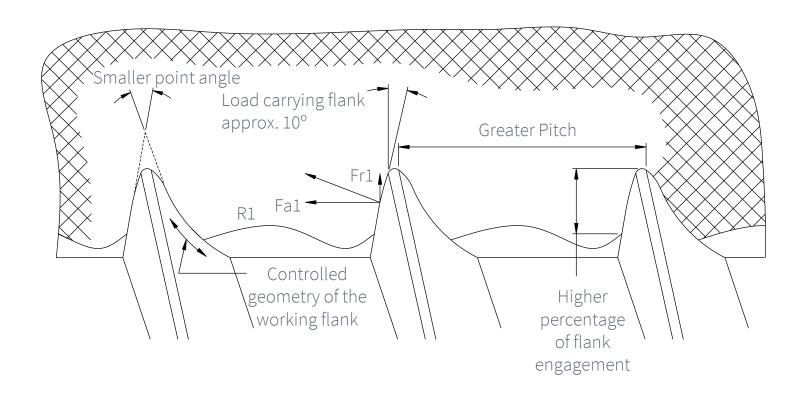
ADVANTAGES

- Reduced resultant force is less than 90° off axis
- Further reduced radial hoop stress
- Less risk of boss bursting
- Increased material movement to the pressure flank



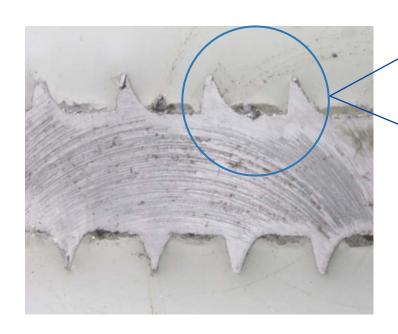
All Materials Copyright 2019

Performance by design

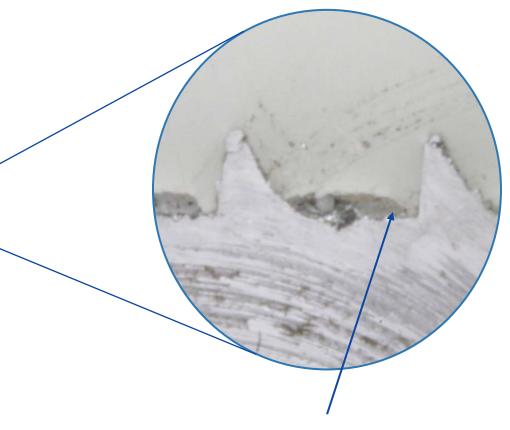




Performance by design



REMFORM® II™ fastener in Nylon



Material movement to the pressure flank

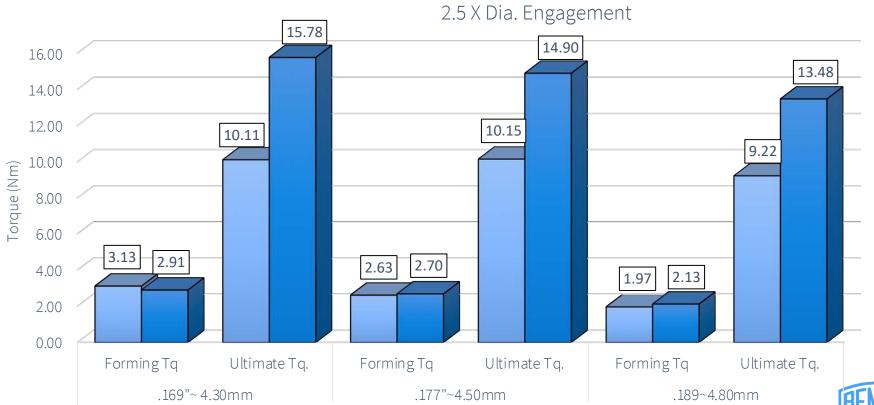


All Materials Copyright 2019

Performance

REMFORM® II™ Fastener Evaluation

Torque Performance, 6mm Dia, Fasteners in ABS



All Failures by Formed Internal Threads Stripping

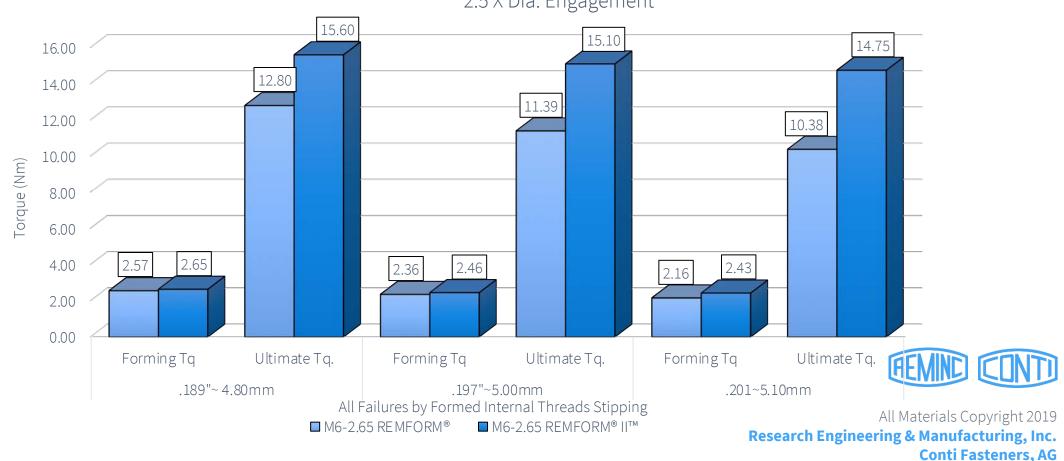
■ M6-2.65 REMFORM® II™

■ M6-2.65 REMFORM®

All Materials Copyright 2019

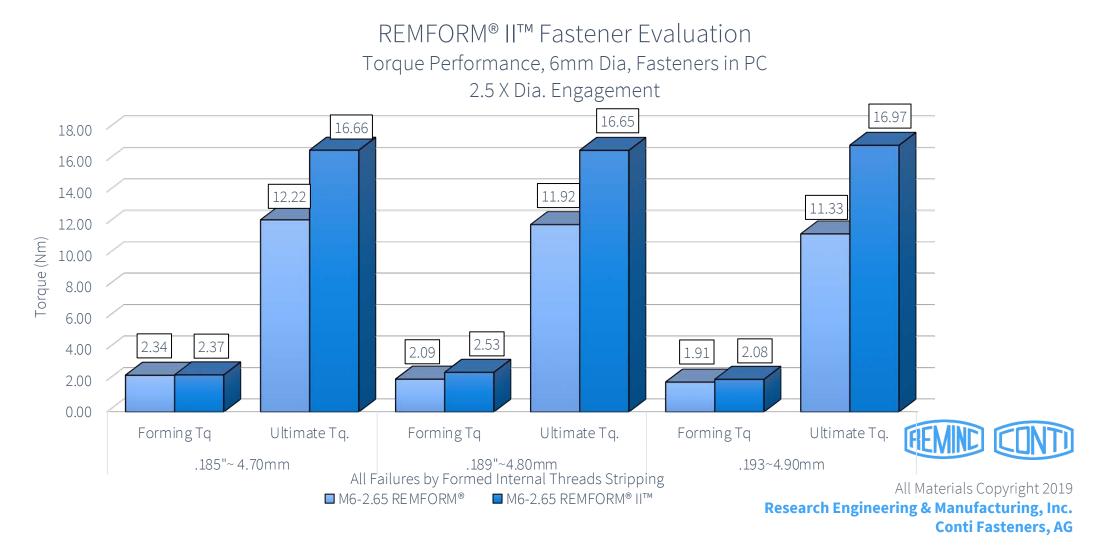
Performance

REMFORM® II™ Fastener Evaluation
Torque Performance, 6mm Dia, Fasteners in Nylon 30% GF
2.5 X Dia. Engagement



REMFORM® II™ Fasteners

Performance



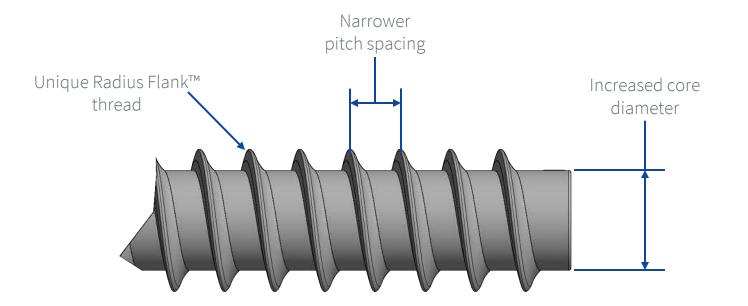
High Strength

FEATURES

- Unique Radius Flank™ thread
- Narrower thread spacing
- Increased core diameter

BENEFITS

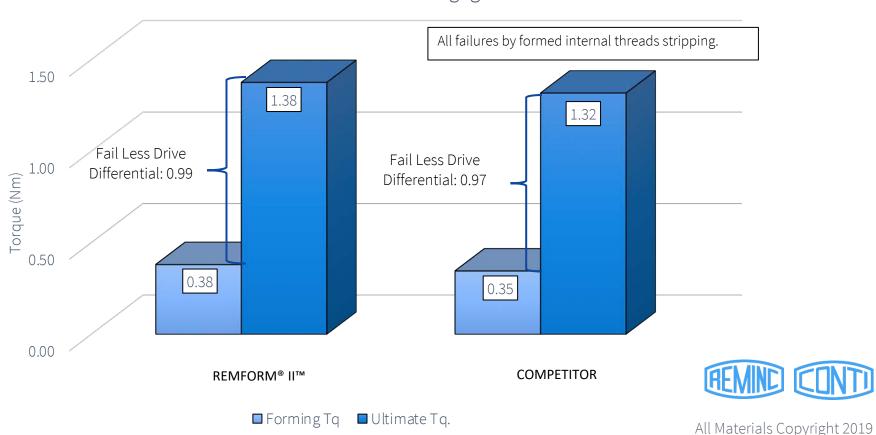
- High torsional strength
- Low radial hoop stress
- Good resistance to pullout and stripping
- Efficient tension production
- Ease of manufacturing
- Direct replacement for Delta PT®





Competitive Performance

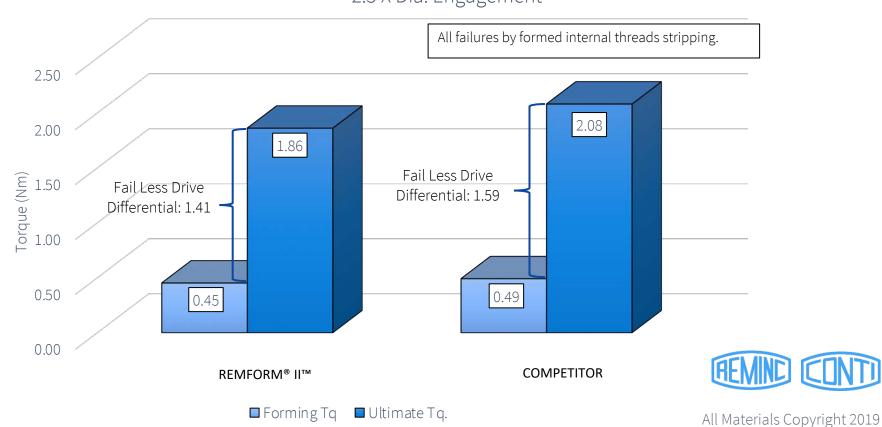
REMFORM® II™ "HS" vs. COMPETITOR Screw Evaluation 3mm Dia., Torque Performance in ABS 2.5 X Dia. Engagement



Competitive Performance

REMFORM® II™ "HS" vs. COMPETITOR Screw Evaluation

3mm Dia., Torque Performance in Nylon 30% GF 2.5 X Dia. Engagement

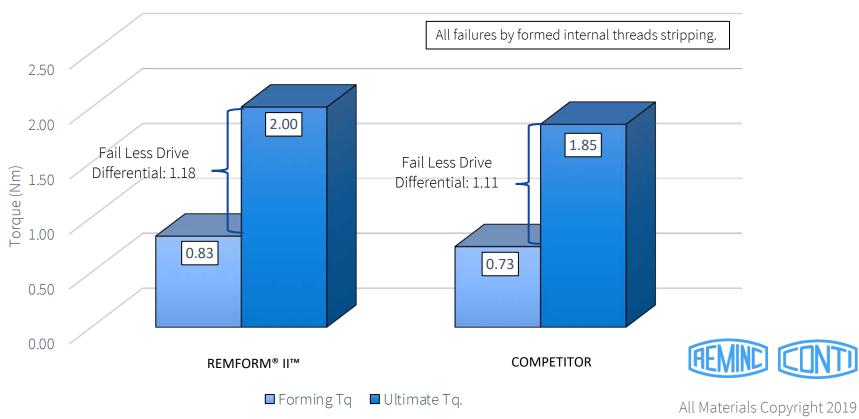


All Materials Copyright 2019

Research Engineering & Manufacturing, Inc. Conti Fasteners, AG

Competitive Performance

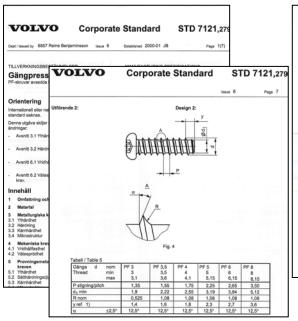
REMFORM® II™ "HS" vs. Competitor Screw Evaluation 3mm Dia., Torque Performance in Polycarbonate 2.5 X Dia. Engagement

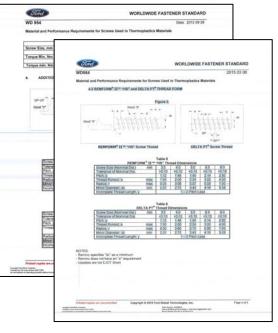


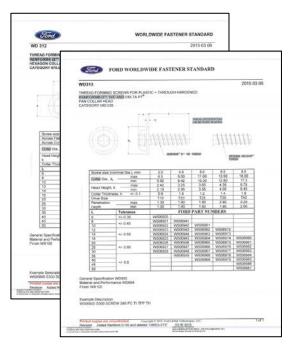
Research Engineering & Manufacturing, Inc.

Conti Fasteners, AG

Competitive Performance







ATTRIBUTE

- OEM Adoption
- Competitive product

ADVANTAGES

- Competitive market participation
- Potential for increased market share



All Materials Copyright 2019

Research Engineering & Manufacturing, Inc. Conti Fasteners, AG

REMFORM® II™ F

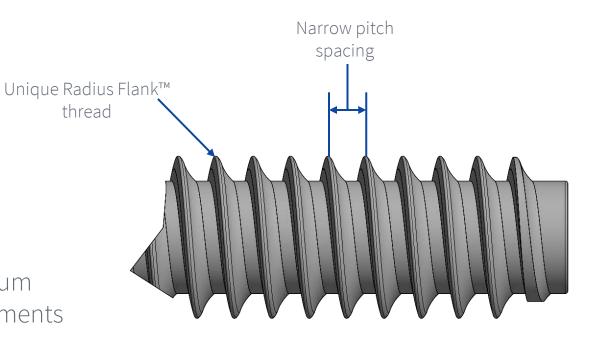
Fine Pitch

FEATURES

- Unique Radius Flank™ thread
- Narrow thread spacing

BENEFITS

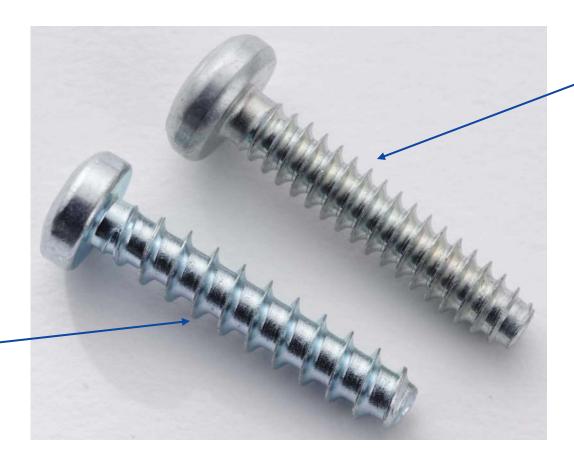
- Effective in Aluminum and Magnesium
- Good performance in short engagements in plastic
- Low radial hoop stress
- Good resistance to pullout and stripping
- Efficient tension production
- Ease of manufacturing





REMFORM[®] II[™] F

Pitch Comparison



REMFORM® II™ F Fastener

REMFORM® II™ Fastener -



REMFORM[®] II[™] F

Aluminum Extrusions

USAGE

• Aluminum c-channel extrusions

ADVANTAGES

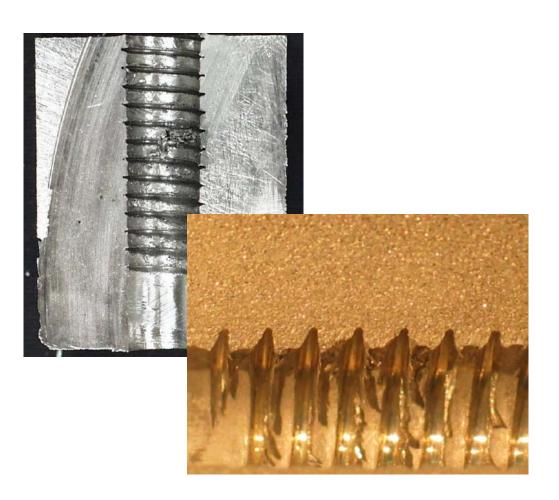
- Lower required depth of engagement
- Reduced risk of stripping





REMFORM® II™ F

Magnesium



USAGE

Magnesium castings (in small sizes)

ADVANTAGES

- Creates well defined internal thread
- Reduced risk of stripping
- Low hoop stress reduces risk of cracked bosses



REMINC-CONTI Trademarks

Brand Protection

TAPTITE® PRO™, TAPTITE 2000®, TYPE TT 2K®, TAPTITE 2K®,

TYPE TT 2000®, TAPTITE®, TAPTITE II®,

TYPE-TT®, DUO-TAPTITE®, CORFLEX®, TRILOBULAR™



Research Engineering & Manufacturing Inc. 55 Hammarlund Way, Tech II Middletown, RI 02842 Conti Fasteners, AG Albisstrasse 15, CH-6340 Baar, Switzerland



Product R&D Update

Product Innovation Activities

October 21, 2019

Ed Hebert REMINC Research & Development





Delivering product ideas to sustain and grow business.

Survey · Sustain · Disrupt



Active strategy to sustain and grow business

Survey

Evaluate emerging tech, anticipate industry trends, target unmet needs.



Delivering product ideas to sustain and grow business.

Survey

Evaluate emerging tech, anticipate industry trends, target unmet needs.

Sustain

Maintain competitive edge in near-term with incremental innovation.



Delivering product ideas to sustain and grow business.

Survey

Evaluate emerging tech, anticipate industry trends, target unmet needs.

Sustain

Maintain competitive edge in near-term with incremental innovation.

Disrupt

Fuel new business growth through breakthrough product innovation.

R&D delivers product ideas that maintain steady product improvement.



Sustain

Sustaining IP



Incrementally improving the current state of the art.



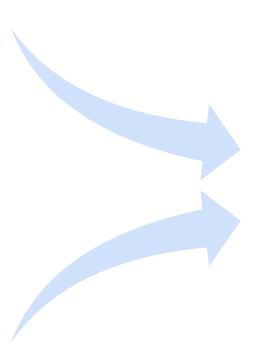


Sustaining IP



Incrementally improving the current state of the art.



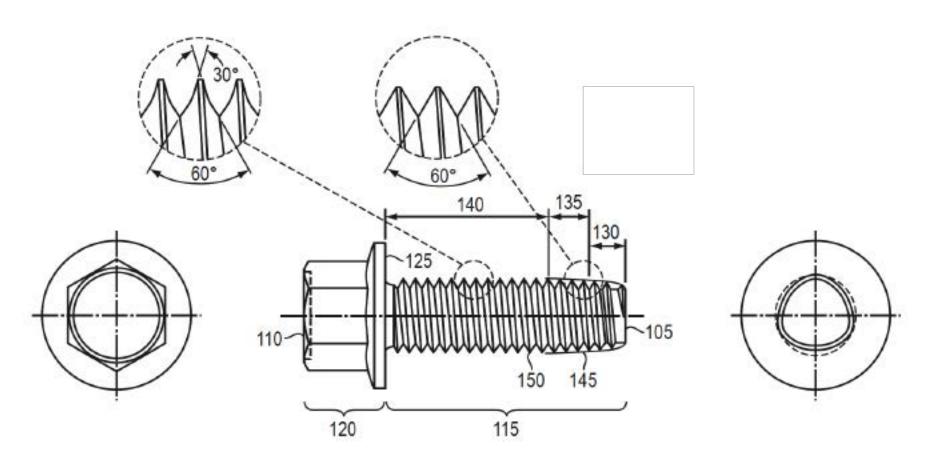


Thread Forming AND Thread Locking Fastener

Thread Forming, Thread Locking Fastener



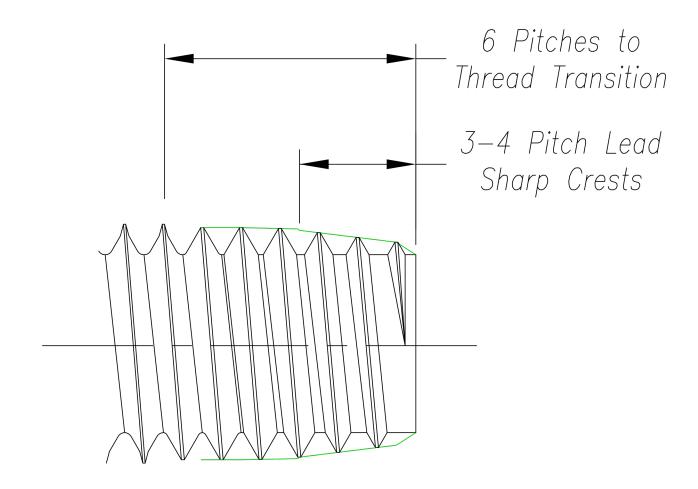
US Patent Application 16/598,288



Thread Transition

REMINC

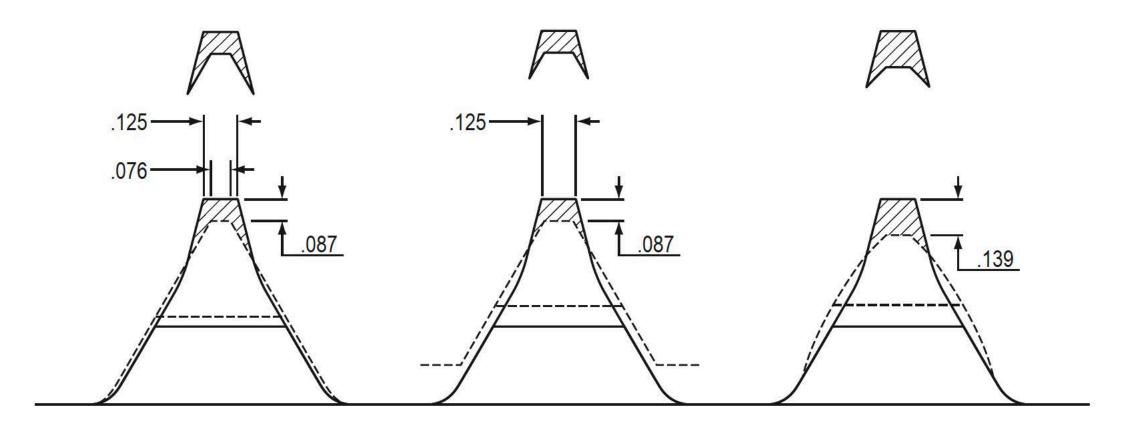
Detail view



Thread Interference



Customize locking behavior as needed (minimum to maximum)



Thread Forming, Thread Locking Fastener



Product Features

Thread forming tip – Thread profile of tip threads inspired by TAPTITE® family of fasteners. First several threads will leverage this profile, allowing stabilizing threads and/or induction hardening of tip as needed.

Transition from thread forming to locking thread profile - Once threads are formed, the fastener's thread profile becomes thread locking in design.

Consistent nut diameter, consistent locking action- The fastener sizes its own nut member at formation, hence nut dimensions are accurately known. Thread penetration is more accurate, and wcrew can be optimized to suit application (minimum locking and/or maximum locking variants?)

Consistent thread volume- Design will aim to use a single-diameter blank with constant thread volume through the screw, for cost-effective ease of manufacture.

R&D delivers product ideas that open new markets.



Disrupt



Deliver products that open new markets

Disrupt

"Disruptive innovation sometimes sacrifices performance along dimensions important to current customers, and instead offers a very different package of attributes not (yet) valued by those customers."

"Established companies typically see it as unattractive. New technology gets ignored in favor of what's currently popular with the best customers."

"Disruptive Technologies – Catching the Wave" *Harvard Business Review Jan/Feb 2015*

Deliver products that open new markets



Disrupt

"Disruptive innovation sometimes sacrifices performance along dimensions important to current customers, and instead offers a very different package of attributes not (yet) valued by those customers."

"Established companies typically see it as unattractive. New technology gets ignored in favor of what's currently popular with the best customers."

Lightweight Fastener Concepts



Several prototypes in progress

Strategically significant – A successful disruptive design would be of immediate interest and significance. Relevant to EV and ICE auto, aerospace, sporting goods, etc.

Active IP category – Competitive patent activity in this space for many years, and continues to this day. Nothing yet found in prior art similar to our concepts.

Leveraging emerging technology – New manufacturing technologies are rapidly evolving that enable new design considerations.

Identify proper target niche(s) – Research appropriate applications with maximum market impact.

CFRP / Aluminum Interfaces



Developing solutions for composite manufacture

Galvanic isolation – Carbon fiber is electrically conductive, and creates an extremely corrosive environment. Exploring ways to isolate and protect these interfaces

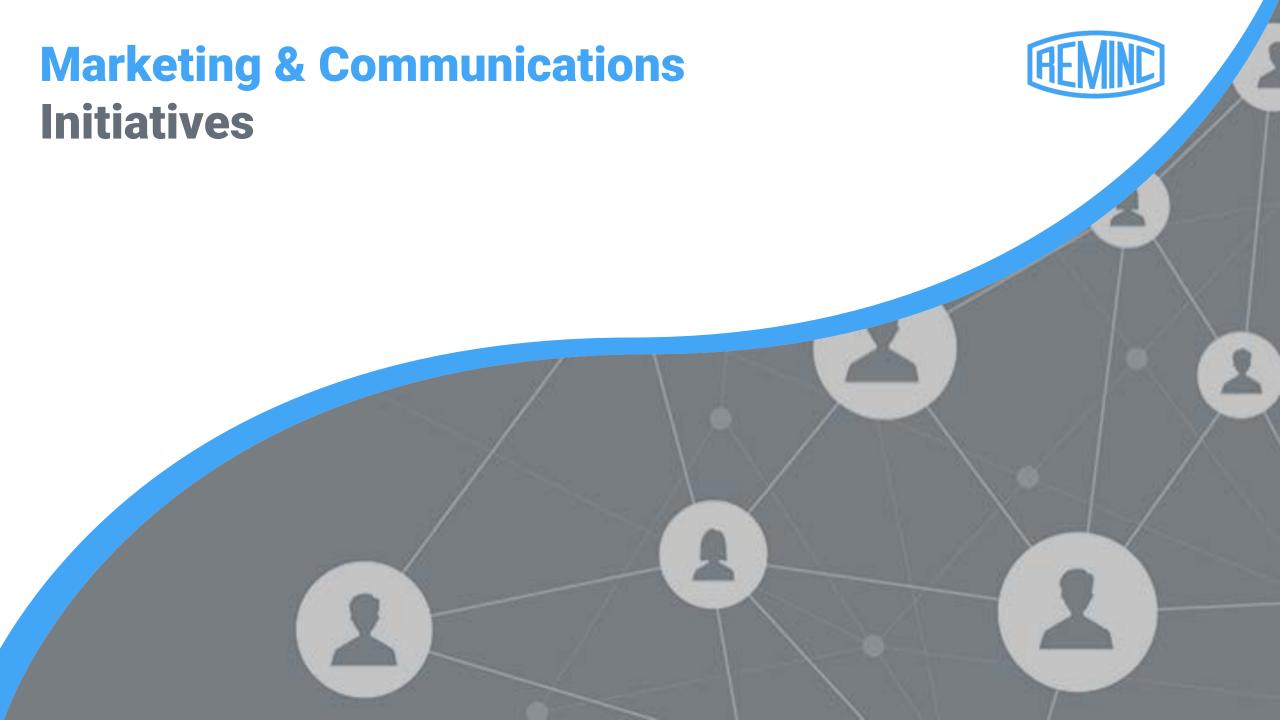
Difficult to fasten – CFRP assemblies typically require adhesives (+ time, heat, etc). Evaluating mechanical fastening strategies for composites to offset/eliminate resin.

New Markets? REMINC is working on prototypes with influential design partners in the marine industry, military, and the Rhode Island Composites Alliance

Identify proper target niche(s) – Research appropriate applications with maximum market impact.



See you in 2020!



Communications & Branding Goals



Enhancing Engagement, Effectiveness & Perception

Speak - Improve dialog with licensees and end-users – more frequent, more platforms, more personal

Smart – Reinforce our relevancy and expertise – current and comfortable with technology

Serve - Provide more value to our licensees through easier access to relevant information

Save - Use affordable ways to send rapid and trackable communications whenever needed

Strengthen – Maintain the REMINC brand image as influential, innovative, and iconic

Communications & Branding Initiatives



New changes in 2019

English-speaking Website Tour & review

Localized Websites Preview of translations workflow

Licensee Web Resources – taptite.com & digify.com

Improved Hole Calculator Tour

Intranet Internal communications, content, culture, and

collaboration hub website

Newsletters – Electronic and print

E-Invitations – New outreach strategy

Presentation Format – (You're looking at it!)

Social Media – improving **LinkedIn** and **YouTube**,

retiring Facebook

Brochures – New formats, different sizes / uses

Communications & Branding Tour



A few of the highlights...

- English-speaking Website take the tour
- Localized Websites <u>preview</u>
- Licensee Web Resources <u>taptite.com</u> & <u>digify.com</u>
- Improved Hole Calculator Tour
- **E-Newsletters** <u>Electronic format</u>
- E-Invitations personalized and "flyers"
- Social Media LinkedIn and YouTube

