



What's Special About the Design of TAPTITE 2000® Screw Joints? - Part 2
By Matthias Jokisch *

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The first part of this article dealt with the basic relationships when designing a connection or joint with TAPTITE 2000® screws. Building on this, the second part will discuss the comparability of the joint properties of TAPTITE 2000® screw joints to metric screw joints with pre-assembled female threads on the basis of experiments and results.

As already mentioned in part 1, the nature of the nut member material is decisive for the choice of suitable property class as regards the screws' heat treatment process. If the nut member material is a ductile, easily-deformed non-ferrous metal, CORFLEX®-'N' tempering with strength classes 8.8, 9.8 or 10.9 is adequate. If steel materials with a strength of up to 770 N/mm² are used, we recommend reinforcing the thread forming zone by induction hardening. This heat treatment is also known as CORFLEX®-'I'. In the case of smaller screw sizes (M5 and below) a higher hardness can be produced for economic reasons by case hardening the complete screw. Individual tests have shown that TAPTITE 2000® screws with case hardening or CORFLEX®-'I' heat treatment can generally be screwed into steel materials with strengths approaching 1000 N/mm² with no problems whatsoever.

The estimation of a pilot hole size for initial design tests should also be taken into account. The component thickness can be used here as a selection guide.

Thickness of the nut member material	Recommended percentage of thread engagement
Less than 0.3 x nominal diameter of the screw	90 %
0.3 – 0.7 x nominal diameter of the screw	80 %
0.7 – 1.0 x nominal diameter of the screw	70 %
1.0 or more x nominal diameter of the screw	65 %



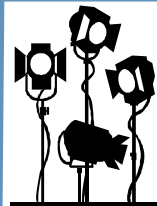
If the nominal diameter of the screw is known, a pilot hole size can be selected for an initial test from the REMINC documents on the basis of the component thickness and resulting thread engagement. Corresponding documents can be downloaded from the REMINC website for TAPTITE 2000® screws.

The following example should show the comparison between a conventional metric and a TAPTITE 2000® screw joint with respect to the preloads that can be achieved with appropriate tightening torques. The material used for the tests was provided by an automobile manufacturer and prepared for tests in the application lab at REMINC.

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SPOTLIGHT ON MAT HARA



Mat Hara recently joined REMINC/CONTI as our new representative in Japan. Prior to joining our program Mat served as the Japanese Manager of Reflexite Corporation, a supplier of retro-reflective products to the automotive industry. Mat's duties include market development and licensee support. Mat will be regularly meeting with prospective end-users in Japan, actively expanding TAPTITE 2000® and REMFORM® applications, in addition to training licensees in the application and use of our licensed products. Please join us in welcoming Mat to the REMINC/CONTI team!



PRESIDENT'S PERSPECTIVE by Tim Egan

Looking back, I think that most of us can agree that the eight calendar quarters beginning in mid-2008 have been the worst for business in our collective memory. At REMINC when we experienced sales volume reductions both quickly and dramatically, we reassessed our business plan and strategy and made the commitment to retain our entire staff and not only "stay the course", but actually increase our support of licensees and end-user customers. This commitment meant a continuation of our marketing, education, training and application-engineering activities with their related expenses. Our decision to fully remain active has proven to have been a prudent one, as current licensing program interest and activity is at an all-time high level and we are confident that global product sales will achieve and exceed former peaks within the next year or so.

With some exceptions, many of our licensees globally are experiencing an improvement in business. Some of the improvement is due to a moderate upswing in demand, but much of it is due to a widespread resurgence of interest by end-user customers in cost-saving opportunities. Most companies have been forced to improve their efficiency during this slow period and have closely examined where they can improve productivity and implement assembly cost-savings. Consequently we see an increase in application-engineering activity, the only proven way to convince assemblers that the TAPTITE® and REMFORM® families of products can in fact lower the cost of assembly.

There is also a renewed global interest in genuine trademarked fasteners, as opposed to the generic variety, because assemblers are now insisting on dependable quality, consistent, repeatable performance and global availability, not just low-priced look-alike alternatives.

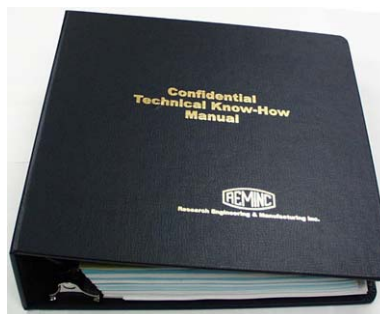
Additionally, we have recently and selectively licensed several new manufacturers to meet the increased interest for our licensed products in North America, Europe and Asia. These new licensees should expand and contribute to our license program, as in general, they are focusing on geographical and industrial markets where our licensed products are unknown and under-utilized. Some of the new licensees were specifically requested by end-user customers desiring genuine product in their local territory.

The 24-month recession no doubt presented many challenges to us and all our licensees, but challenges usually present opportunities as well. Like us at REMINC, those that steadfastly continued to market and promote cost-savings utilizing genuine trademarked products, successfully "weathered the storm" and are now experiencing a rebirth of business. The lesson we have learned is that if you have a viable business plan, stay with it and you will be rewarded.



Confidential Technical Information Control

If your company is an authorized licensee of REMINC, you may have access to our Confidential Technical Manuals and other Confidential Materials relating to the Licensed Products named in your license agreement. All this information is provided in order that you can manufacture our proprietary fasteners to our specifications and maintain required quality standards. Our Technical Manuals are initially assigned to a named individual in your company, one that is charged with its maintenance. It is important that all our confidential technical information be kept in a secure location or file and treated as "trade-secret" material. It is critical to our program that the information contained therein is not disclosed to any unauthorized or unlicensed company or person. Disclosing our confidential technical information is not only a violation of your obligation as a licensee but also a means by which counterfeiters can access this important information and data. Copies of any and all sheets in the manuals should never be copied for or sent to unlicensed companies or persons for any reason. Our tooling licensees are authorized to have such sheets, pages or drawings. Any unlicensed person or company is not! Please do your part to comply with the terms of our license agreement in order to strictly control access to this valuable intellectual property.



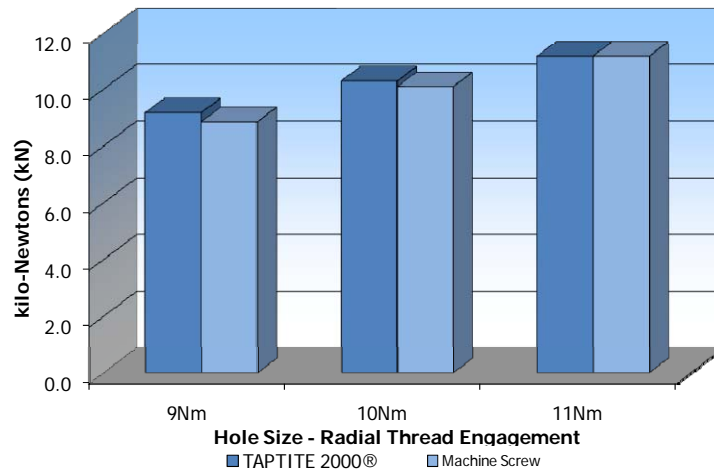
What's Special About the Design of TAPTITE 2000® Screw Joints? - Part 2

By Matthias Jokisch (*cont. from Page 1*)

- Screw:** 1.) TAPTITE 2000® M6; strength class 9.8
2.) Metric screw, M6; strength class 10.9
- Surface:** Black organic and also provided with lubricant
- Nut member material:** Cast aluminium hardness HB 85 (HRB 52)
- Bore:** 1.) Mating thread for metric screw made by automobile manufacturer
2.) TAPTITE 2000® screw - drilled, Ø 5.51mm corresponds to @ 75% thread engagement
- Length of engagement:** 1.) Metric screw - 13mm (corresponds to original application)
2.) TAPTITE 2000® screw - 18mm drilled (corresponds to 13 mm load-bearing thread + 5mm thread forming zone)
- Clamped part:** Cast aluminium

Type of Screw (all values Mean)	Thread Forming Torque (Nm)	Preload (kN) measured at		
		9Nm	10Nm	11Nm
TAPTITE 2000® Screw	5.7	9.2	10.3	11.2
Metric Screw	-	8.9	10.1	11.2

Tension Developed @ 9.0, 10.0 & 11.0Nm of Torque with M6-1.0 Hex Flange Head Metric Machine Screws & TAPTITE 2000® Fasteners in Cam Carrier in an Aluminum Cylinder Head



The results show that with an optimum choice of the pilot hole and suitable surface and lubricant, TAPTITE 2000® screws produce almost identical preloads in the joint as metric screws. If the screw was tightened further it broke in every case, the desired failure mode. Furthermore, a quadruple repeat screw joint was performed with both types of screw, all of which achieved the same preloads as the initial screw joint at a pre-set tightening torque of 10Nm.

These test results of course only apply only for the described application and may not be transferred to other application cases without prior testing. More detailed information on the described example can be found in the REMINC test report TS-916 which can be provided on request.

Similar trends in a comparison of metric and TAPTITE 2000® screws were also determined in steel nut member materials in our laboratory with a suitable selection of the pilot hole. The effect of the surface coating and lubricant has to be taken into account here too.

In principle, these tests have shown that metric screw joints can be replaced by TAPTITE 2000® screws provided the preconditions have been checked and defined in preliminary tests. This allows users of TAPTITE 2000® technology to achieve a high quality of joints with a simultaneous reduction of costs in the preparatory phase of the connection point, since no thread tapping and associated cleaning operations are necessary.

Summing up, it can be said that with a correct design of the screw joint, a metric screw can be replaced by a TAPTITE 2000® screw without any problems. The preloads achieved in the example described above prove this statement. Innumerable further tests, that have been carried out by REMINC, our licensees and users in various branches of industry, come to the same or similar results. Don't hesitate to send for further test results or additional information! It has been proven that the use of TAPTITE 2000® screws in place of metric screws leads to savings in process costs which can amount to 50-70% of conventional solutions in certain application cases. We and our partners will be more than happy to help you lower your assembly costs and improve your profits! Get in touch with us now for more information!

REMINC Training / Brochure Request Form

Name:

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- Contact me regarding a training visit
- REMINC General Products Catalog
- TAPTITE 2000[®] Products Application Guide
- TAPTITE 2000[®] Product Brochure
- REMFORM[®] Product Brochure
- TRU-START[®] Product Brochure
- FASTITE[®] 2000[™] Product Brochure
- "54 Ways TAPTITE 2000[®] Fasteners Lower the Cost of Assembly" Request Form
- Receive Newsletter by e-mail

Mail this form to REMINC at 55 Hammarlund Way, Tech II, Middletown, RI 02842 USA or fax it to (401) 841-5008

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