

**Technical Bulletin
Torque Explanation**

The purpose of a terminal block is to clamp bare wires or lugs to the terminal plate as an electrical interconnecting device. The fastener acts as the clamp holding the wire or lug to the terminal plate and passing current. It is important the fastener produces adequate clamping force to hold the wire/lug securely over the life of the product. The issue isn't torque; it's clamping force. Torque is really a poor indicator of clamping force. But, it is the only practical measure available today. The following is an excerpt from the International Fastener Institute standards book:

"PRELOAD CONTROL BY TORQUE MEASUREMENT."

The information most frequently requested by fastener users involves tightening torque. Or, more specifically, "How much torque is needed to tighten this fastener? There is no precise "over-the-phone" answer.

Over the years, more research has been concentrated on investigating the mysteries of torque-tension relationships than any other single facet of fastener application engineering. More data has been generated, more reports issued, more technical reports published. Although knowledge continues to grow, definitive answers remain elusive. Regardless, torque measurement is still the most popular preload control method in practice today.

When bolts are tightened, they become stressed in tension. Analysis shows that approximately 50% of the tightening torque applied is needed to overcome the friction between the nut (or bolt head) turning against the joint surface. Another 40% is consumed overcoming friction between mating threads. The remaining 10% develops useful tension in the bolt."

As you can see 90% of torque is influenced by friction in the joint. Changes in plating or lubrication can significantly affect the outcome. Our terminal blocks have been tested and approved with a specific combination of plating and lubrication by UL and CSA. These combinations provided enough clamping force to pass the agency secureness and pullout test. If the combination is changed, the torque values may also change, thus becoming the end users responsibility to verify that the new torque required will pass the necessary secureness and pullout requirements.