



## **M12 and M14 Lug Nut Installation Notes:**

- Designed for use with wheels that require 60° taper seat only.
- Always thread lug nuts on to the wheel studs by hand.
- DO NOT install or remove using an impact wrench – we will not replace lug nuts or keys installed or removed with an impact wrench.
- Hand torque to specification – do not over torque!
  - 65 – 86 ft/lbs (88 – 118 Nm)
  - Re-torque after 60 miles

## **Wheel Stud Installation Notes:**

- Requires 5mm or 6mm hex Allen socket or Allen wrench depending on the stud.
- Use blue thread lock and hand tighten (18 ft-lb) on hub side – do not over torque!
- In corrosive climate use anti-seize ½ inch from the hub to the stud end then wipe off the excess with a paper towel or rag.
- Check to make sure wheel studs are tight before every track event.

## **Additional Information:**

Unbelievable as it may sound, the interface between the wheel and the hub carries the load. That's right, the vertical planes which contact each other transfer all shear loads by static friction. The source of the static friction is the compression imparted by the fasteners (lug bolts or studs). Tensile loads are taken directly by reducing the spring force stored in the flange compression, that is, the loads tend to reduce the compression between the flanges that is set up by the bolts. Since the bolts have a far smaller cross-sectional area than the flange faces (even collectively), they have a much smaller spring constant, so the force they contribute to the joint varies far less per unit distance than the flange compression. In other words, the forces due to lug tightening stay fairly constant as the load varies across the flanges. This is why your wheels don't fall off around a corner.

However, it IS the reason why some folks know someone whose wheels fell off after they lubricated the studs or bolt holes. If a little bit of lubricant gets between the wheel and the hub, then the friction between the two goes down, sometimes a LOT. In that case, the bolts cannot set up enough static friction between them, and the joint can slip, resulting in a high-powered tricycle adventure. Remember to keep the threads oiled and the flanges clean!

There's a lot more to the basic "four lugs and a wheel" interface than meets the eye, and nearly everyone misunderstands how it all works. This is why a thin layer of grime can cause a wheel to shear off, or why a wheel that is properly centered (by luck or by a really good cone lug fit) doesn't need centering rings. Centering rings only center the wheel during installation, and neither a centering ring nor wheel bolts/studs should carry a load.