Phantom Racing Chassis

#TechTipTuesday

Hubs, Studs, and Impact Wrenches

Over the years, the tendency in the pits has evolved from using hand held ratchets to high powered battery operated impact guns for tightening wheels. For obvious reasons, the battery operated impact gun has become the choice for most teams. The speed and ease of an impact gun allows for quicker changing of tires in the pits.

Like most things in life, battery operated impact guns come in a variety of sizes and are available in different speeds, voltages, sizes, and price ranges. As with most power tools: the higher the voltage, the stronger the tool. For example, a 10 volt impact gun will not supply as much torque as a 12 or 14 volt. But, bigger may not always be better for our specific application.

99.9% of domestic racing karts use ¼-28 wheel fasteners. Some have different configurations and mounting designs, but nearly all use a ¼-28 fastener. We did some quick research on the recommended maximum torque specifications for various ¼" fasteners. The highest torque spec that we could find for this fastener was 12 ft-lbs or 144 in-lbs. Then, we also did some research on the torque output for three of the battery operated impact guns commonly used by karters. See the chart below:

Impact Brand	**Type**	**in-lbs of Torque**
Recommended wheel stud torque: 144 in-lbs.		
Bosch	10.8V	800 (555% overkill)
Makita	12V	1,110 (770% overkill)
Dewalt	12V	1,150 (798% overkill)

That makes it pretty clear. These impact guns are 500-800% over-powered for the application. This is why racers commonly deform hubs, strip nuts and break studs. A fastener rated for 144 in-lbs will simply not hold up to 800+ in-lbs!

Another component that compounds this problem is aftermarket “big” ¼-28 nuts which use ½” sockets. We’ve discovered that the thread pitch of these aftermarket nuts is slightly off; which requires excessive over-torqueing on the studs to tighten the nuts properly. We recommend using common ¼-28 nuts with a smooth flange (PN 1115152).

The secret to tightening your lug nuts properly is control. A quick zip that allows the hammer to hit for just a split second on each nut is enough to secure the wheel. A good rule of thumb when tightening your wheels is to start each nut by hand, then tighten the nut by using the impact (to avoid crossthreading). The ratchet hammer should hit six to 10 times, no more. Do this one time for each wheel nut and stop. Don't keep going over the pattern again and again. If you're unsure about it the first time, get a socket and ratchet out and check it. Once you get used to it, it will become second nature, and you will never have a hub and/or stud problem.