

# RUBBER STRETCHING VS. TORQUE

By Earl Griffin

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This July while in Muncie practicing for the NATS Joe Williams noticed that I wasn't stretching my rubber motors as much as is often recommended. Joe commented that I was giving away turns and torque. Really, I had better look into this. Stretching rubber to seven times its relaxed state is an amount I have seen recommended although I cannot site a source. Also, although I have heard this recommendation and seen it practiced by other modelers I have never seen any data on the practice. So, I set up the following test. I made up ten motors of six strands of 1/8th inch rubber six inches in length. The motors were washed and lubed and of course came from the same batch of FAI (Super Sport) rubber. Five motors were stretched 2 times the relaxed length and immediately wound with turns to about one half of maximum torque, then I would start moving in until the motor broke. Torque recorded by research assistant, Jane. The second set of five motors were stretched 7 times the relaxed length and wound the same as the previous set.

This is the results of those tests.

## Rubber stretched 2X

Motor	Turns	Torque(Breaking)
#1	316	12
#2	332	12
#3	336	14
#4	320	11
#5	340	14
Average	328.8	12.6

## Rubber stretched 7X

Motor	Turns	Torque(Breaking)
#1	368	17.5
#2	352	16
#3	356	19.5
#4	360	16
#5	364	20
Average	360	17.8

Well wouldn't you know it, Joe was right on both accounts. The results show turns increased by about 9.5% and torque by about 41%. Jeepers. Although, these test are limited by small number, only five

motors in each group, there is no overlap between the two. The highest torque in the 2X group (14) is less than the lowest torque (16) in the 7X group. This is good to know.

Now You Know! Earl Griffith

*PFFT Editor's Note: Please understand that Earl is talking about the length of the motors in a "relaxed" state. When we start stretching those motors which are braided, I would assume you should keep in mind how long the motors were before braiding, and use tha length to determine what is 7 times the "relaxed" state.*