

# Rubber Motors - Which Lube, How Many Strands?

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I have been using Dow Corning 33 as my rubber lubricant for about 10 years and have been satisfied with it. I've also tried Armor All and Son of a Gun, but which is the best?

Also, I've been flying some rather large Old Time rubber models that use pretty big motors (40 grams). I tend to use the fewest strands possible for the large motors because it's easier to handle. For instance, for my Wren, I use 240 inches of 1/4" rubber in six strands as opposed to 480 inches of 1/8" in twelve strands. Over the years, I've heard that more strands would result in more turns and/or more torque. That didn't seem to make sense, but was it true?

It's winter, and even here in Northern Virginia, it gets pretty cold and not much flying gets done. I ordered one pound of 1/4" FAI Tan Supersport in January and conducted tests to satisfy myself as to the above questions. The rubber received and used was stamped August 2006 on the box. About half the box was stripped into 1/8". For all tests, the motors were made as equal as possible. However, there were slight variations in weight, even when the motors were the same length.

These tests were conducted to reflect the way I fly models. I usually end up making motors in the field, lubing them, putting them in the model, and winding up and flying. I don't usually let motors soak in lube or pre-stretch them. From my experience, this appears to be the way many of us fly.

But first, a few comments about the lubes. Dow Corning 33 really preserves the rubber. I've put models away in October with the motors in the model and taken the models out in April and flown them with the motors untouched with no noticeable change in performance. However, rubbing the grease on 20 feet of rubber motor is time consuming and generally a pain. Armor All is also a good preservative and easy to spray on the motors, but it is hard to wash off hands and clothes. Son of a Gun doesn't seem to preserve as well as the others, but it's easy to use and cleans up easily with water.

## Lube Tests

For each test, three motors of 10 feet of 1/8" were cut and knots were tied. Each motor was weighed, made into four strands (about 29" total length), lubed, weighed again, stretched to 75 inches, and wound to breaking. A Rees 10: 1 winder with an electronic counter (from Bob Marchese) was used. The counter counts by 10's so all readings are to the nearest ten. The intent was to have the lubricant as the only variable.

## Number of Strands Test

For each test, two motors were made up. One motor was 180 inches of 1/8" made into eight strands and the other 90 Inches of 1/4. made into four strands. Both motors were about 25" total length. They were weighed, lubed with Son of a Gun,

weighed again, stretched to 72 inches, and wound to breaking. Torque readings were taken at 250, 500, 750, and 1000 turns. A Sidewinder 3.75:1 winder with a mechanical counter a Wilder torque meter was used.

## Conclusion

As the lube tests show, Dow Corning 33 provides average 8% more turns over the others. It also adds some weight. Armor All and Son of a Gun are about equal in number of turns and add no weight. The strands tests indicates no difference in the torque, but there was an average 6% more turns when using the 1/8" motor with more strands.

Tan Super Sport – August 2006 batch

Lube Test - ten feet of 1/8" - four strand motor (29") stretched to 75"

Test #1

| Lube           | Motor Weight (gr.) | Wgt. W/ Lube | Turns to Break |
|----------------|--------------------|--------------|----------------|
| Armor All      | 9.9                | 9.9          | 1800           |
| Son of a Gun   | 10.0               | 10.0         | 1820           |
| Dow Corning 33 | 10.0               | 10.2         | 1960           |

Test #2

| Lube           | Motor Weight (gr.) | Wgt. W/ Lube | Turns to Break |
|----------------|--------------------|--------------|----------------|
| Armor All      | 9.8                | 9.8          | 1820           |
| Son of a Gun   | 9.8                | 9.8          | 1790           |
| Dow Corning 33 | 9.6                | 9.9          | 1940           |

Test #3

| Lube           | Motor Weight (gr.) | Wgt. W/ Lube | Turns to Break |
|----------------|--------------------|--------------|----------------|
| Armor All      | 10.0               | 10.0         | 1840           |
| Son of a Gun   | 10.2               | 10.2         | 1810           |
| Dow Corning 33 | 10.1               | 10.4         | 1990           |

## Number of Strands Test

1/8" motor 180 inches in 8 strands; 1/4" motor 90 inches in 4 strands  
Each motor about 25" stretched to 72"; Son of a Gun lube

Test #1

| Motor Size | Motor Weight Lubed (grams) | Torque Meter Reading at Turns |     |     |      | Turns to break |
|------------|----------------------------|-------------------------------|-----|-----|------|----------------|
|            |                            | 250                           | 500 | 750 | 1000 |                |
| 1/8"       | 14.8                       | 3                             | 4   | 9   | 15   | 1081           |
| 1/4"       | 14.6                       | 3                             | 4   | 9   | 15   | 1045           |

Test #2

| Motor Size | Motor Weight Lubed (grams) | Torque Meter Reading at Turns |     |     |      | Turns to break |
|------------|----------------------------|-------------------------------|-----|-----|------|----------------|
|            |                            | 250                           | 500 | 750 | 1000 |                |
| 1/8"       | 14.8                       | 3                             | 4   | 9   | 15   | 1057           |
| 1/4"       | 14.5                       | 3                             | 4   | 9   | -    | 1000           |

Test #3

| Motor Size | Motor Weight Lubed (grams) | Torque Meter Reading at Turns |     |     |      | Turns to break |
|------------|----------------------------|-------------------------------|-----|-----|------|----------------|
|            |                            | 250                           | 500 | 750 | 1000 |                |
| 1/8"       | 14.4                       | 3                             | 4   | 9   | 15   | 1091           |
| 1/4"       | 14.3                       | 3                             | 4   | 9   | 15   | 1008           |