

Design Analysis

After measuring the initial mass of Teflon, nylon, and silicone, Nylon absorbed the least amount of water. The initial mass of a 30.48 cm x 30.48 cm sheet of Teflon was 9.00 grams. After submerging the sheet of Teflon in a bucket of water for 5 minutes, it was put in a Thermo Scientific MaxQ 4450 at 50 rpm for 10 minutes to simulate the time taken to swim a 500 meter freestyle and wait for the next event to begin. After 10 trials were completed, the average was taken of the mass, which was 9.314 grams after being submerged in water and then shaken, which is shown in Figure 1. The change in mass was 0.31 grams.. The same dimensions were used for the silicone. The initial mass of this sheet was 15.20 grams. This was subjected to the same tests as the Teflon, and the average mass, which was 15.385 grams after the tests is shown in Figure 2. The change in mass was 0.21 grams. The initial mass of this material was 3.92 grams. The tests that were performed on Teflon and silicone were repeated on this material, and the average mass was 4.162 grams after the tests is shown in Figure 3. Every trial result is shown in Figure 4. The change in mass was 0.24 grams..

The similarities and differences between the three materials was that the nylon was taken from a TYR swimsuit that is used by many competitive swimmers. This was the control for this experiment. The Teflon and the nylon were both able to repel most of the water from the testing sheets, but silicone absorbed more of the water that it came in contact with. The results from the tests showed that the silicone in most of the commercially made swimsuits is used for comfort and not to repel water.

Conclusion

The purpose for my project was to create a more effective design for a technical swimsuit. We first used a tech suit that is made by TYR, and compared it to two different materials. Those materials were Teflon and silicone. We were testing the amount of water that was absorbed and the compression of the different materials. The materials were submerged in water for 5 minutes then they were put in the MaxQ 4450 for 10 minutes at 50 rpm, and then the mass of the different materials were taken to see how much water was absorbed. We believed that the Teflon would absorb the least amount of water and have about the same amount of compression that the suit had, but according to the data that was collected, the TYR suit had the most water resistance. With our data, it was found that the commercially made suit was best although not significantly different from Teflon . Also, for a redesign, it was proposed that we would combine the silicone on the inside of the suit for the wearer to have more comfort when wearing the suit.

Abstract and Safety