

Speedo's LZR: the World's Fastest Swimsuit

Introduction:

2008, the launch of Speedo's LZR fast skin swimsuit (Figure 1); a suit specially designed for Olympic athletes. The LZR suit is made of a unique fabric called LZR pulse. This pulse fabric contains small parallel grooves that imitate a shark's smooth skin. LZR Pulse is made up of very thin microfibers of nylon and spandex in a high-density weave. It is extraordinarily light-weight and water-resistant. It is also very flexible: it is tightly fitted to the body and creates the firmness needed to streamline the swimmer's body to lower drag on the athlete, and to decrease entry of water between the suit and the skin which can become a cause of resistance



Figure 1: Michael Phelps displaying Speedo's new LZR suit for the Olympic meet.
<http://www.mentalfloss.com/wp-content/uploads/2008/08/Picture%2046.png>

(Tang). The compression also lowers muscle fluctuation and skin vibration for more efficient and effective performance without losing swimmers' freedom of movement and flexibility. The LZR Racing suit was put together with ultrasonic welding versus the common sewing to unite the fabrics, as the thick shape of regular seams act as bumps and create drag (Tang). These specially designed suits took the work of Speedo and NASA scientists three years to finalize. The bottom layer of the LZR Racer is the Pulse material, and then come individual strips that are attached above the Pulse fabric. The panels are created with thin pieces of polyurethane, a more

rough and bumpy material than the bottom layer. An inner core stabilizer is inserted to the suit to create the next layer. The core layer is that of a stretchable material bound to the inner layer of the base. The core is used to constrict the abdominal muscles and the lower back areas (Tang). These rocket suits have now been released to the public for the use of any swimmers to purchase. The only catch: the price for the suits is astronomical. Each suit can come in different lengths for women, all varying in price: regular, which looks like a normal one piece suit costing \$98.00. The kneeskin suit, which is longer than the regular suit, reaches below the thigh for \$375.00. Lastly, ankle length suit, used by Olympic swimmers, reaches below the calf for \$550.00.

Statistics:

“Since its launch in February of this year, swimmers wearing the LZR Racer have set 62

world records (as of August 14, 2008). Of the swimmers

who set new records in Beijing, all but one wore the LZR

Racer swimsuit,” (Tang). The LZR suit decreases water

resistance by 38% versus an ordinary LYCRA swim suit

(Tang) (Figure 2). This decline in drag adds up to an

estimated a 4% increase in speed for swimmers (Tang).

The suit also takes 5% less effort to race at the same speed

(McKeegan). This means that an athlete can swim faster

and use less energy causing the swimmer to hold that

speed

for longer periods of time (Luebbers). One Olympic



Figure 2: The LZR suit reduces drag through the water by 38%.

http://www.popsoci.com/files/imagecache/article_image_large/articles/suit_swim.jpg

swimmer, Katie Hoff, of the American swim team who wore the particular suit in 2008 competitions, said that the snug fitting LZR assists the swimmer to move more rapidly through the water, because it “compresses [the] whole body so that [it’s] really streamlined.” Swimmers from the French, Australian, and British Olympic swim teams all participated in testing the new Speedo LZR racing suits.

High School Use:

Swimmers competing on the High school level are now allowed to wear certain types of the LZR suits to particular meets. Swimmers racing in high school meets are able to wear LZR kneeskin (Figure 3) suits but not the ankle level suits. Ankle skins are prohibited due to the extra speed increase that the swimmer in the LZR gets against the swimmer without the LZR. The high school level meets that these kneeskin suits are permitted at include District, Regional, and State meets. Any other meet that isn’t on this level says that there are to be no LZR suits of any kind worn. These rules differ from club level rules drastically. Athletes that swim on club teams are allowed to wear any length and type of LZR and may wear these suits to every meet on the schedule.



Figure 3: The kneeskin LZR suit is the longest form of the LZR accepted in high school meets. <http://s.wiggle.co.uk/images/speedo-8-06414-aw10ps-zoom.jpg>

History:

In 1996 Speedo created a new goal to create the fastest suit possible. At that time they had the Speedo Aquablade suit as their top of the line fastest gear. By the end of 1996, the

tables turned and the Fastskin was created. However, by

2004 the Fastskin was outdated and in need of an update. Shortly after the Fastskin FSII was invented and was the best of its time ("Swimfaster.com").

Speedo continued to conduct tests on athletes to ensure that they had to best information and took this into consideration. Tests inquiring body temperatures, arm movements, leg motions, and flip turns were taken to resolve any questions ("Swimfaster.com"). The makers were concerned about over heating in full body

suits as well has immobility in extremely tight suits. All these thoughts compiled and Speedo continued improve their Fastskin line. By 2008, new technology found a

flaw in the alleged "fast skin" which was drag from the seams and not enough suction in the abdomen. After discovering these flaws, the LZR was created which now holds the title as fastest suit (McKeegan) (Figure 4).



Figure 4: The Speedo LZR tightens abdominal muscles while still allowing flexibility.
<http://www.roadcyclinguk.com/news/images/speedo-suit-lo.jpg>

Problems:

There are some technical difficulties with this newly designed suit. The first of the problems is that the high priced suit only has a limited number of uses. For \$550.00, the suit is only good for ten different swims (Tang). There have been reports that the suits still work after more than ten uses but the suit is only guaranteed to provide a faster time within the first ten uses. Another flaw with the LZR suit is the results vary depending on each body type (Tucker, and Dugas). For a person with a lot of fat in the stomach area or in the thighs, the suit works better and provides better results, but for a person that doesn't have much fat and is mainly muscle, the results aren't as extreme.

Other Brands:

Each sporting company that sells swimwear has a different interpretation of the LZR. Nike, TYR, and Fina all have interpretations of the Fastskin suits sold by each company. Many tests have been completed to determine which the better of the suits is and the LZR was voted the best overall (Loftus). Each company promises different results including faster times, less drag, more energy, longer wear life and less wear and tear. Not all of the promised perks were successful according to buyers.



Figure 5: Olympic Swimmers wearing the United States version of the Speedo LZR at the 2008 Olympics.

http://www.wired.com/playbook/wp-content/uploads/2010/09/phelps2_f-660x958.png

Conclusion:

Overall, Speedo's LZR swimsuit is the most efficient and the fastest suit for swimmers. Swimmers of all ages wear these suits including Olympic Gold Medalist, Michael Phelps, as well as High School athletes. Speedo's three years work with NASA to produce this "rocket fast" suit was successful enough to take home the fastest suit title. (Figure 5)

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