

Ribbed Swimsuit

Invented by Langley Research Center in the early 1980s, riblets are small, barely visible grooves that can be placed on the surface of an airplane to reduce skin friction—hence reduce aerodynamic drag—by modifying the turbulent airflow next to the skin. Although the grooves are no deeper than a scratch, they have a surprisingly beneficial influence on the airflow near the surface.

Riblets have found a wide range of non-aerospace applications, for example, they can be used to reduce friction or drag inside pipes and ducts, contributing to increased efficiency of pumps, heat exchangers and air conditioners. They have been used to good effect on

eight-oared shells in regatta competitions and in America's Cup races (the *Stars and Stripes* racing yacht that brought the Cup back to the U.S. in 1987 had a hull whose underside was coated with riblets).

A new application of riblets has appeared in the Strush SR® competition swimsuit, marketed by Arena North America, Englewood, Colorado. Arena, which is the official supplier of apparel to the Triathlon Federation U.S.A., the national organizing committee of triathlons, combined the Langley riblet technology with company-developed innovations to produce a swimsuit that, says Arena, "has been flume tested to be 10 to 15 percent faster than any other world class swimsuit."



The Strush SR competition swimsuit employs NASA-developed riblets to reduce water resistance.

The Strush SR design employs a silicon ribbing in the areas of the swimsuit (chest and buttocks) subject to the most turbulence in the water, reducing hydrodynamic resistance. In addition to the ribbing, Arena uses micro fibers and special treatments to reduce the amount of water absorbed by the suit.

The Strush SR swimsuits are "stroke specific," meaning that they are constructed differently to maximize the effectiveness of the silicon ribbing for each of four different stroke disciplines: freestyle, backstroke, butterfly and breaststroke. The stroke specific swimsuits made their debut in competition in 1995, at the Pan American Games in Mar Del Plata, Argentina. The results were impressive: swimmers wearing Strush SR suits won 13 gold medals, three silver and one bronze.

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