

Ultimate materials testing

The landscape in California's Death Valley National Park is desolate and beautiful at the same time. It is clearly an unforgiving place as evidenced by the names the early settlers selected for the land's prominent features in the landscape – Funeral Mountains, Furnace Creek, Badwater Basin, Stovepipe Wells and, of course, the name Death Valley itself. There seem to be two recurring themes – heat and death, neither of which I find very appealing. So why have I left New England on a beautiful Sunday morning in July for the blistering desert heat?

I've come here to witness the Badwater Ultramarathon, a 135-mile (217km) footrace from Badwater Basin (282 feet, 86m, below sea level), the lowest point in Death Valley (and the US) to Whitney Portals (8,360 feet, 2,548m, above sea level), more than half way to the top of the highest point in continental USA. The sponsors describe the race as "the world's most difficult ultra running event". The average daily high temperature in Death Valley, where the race starts, is 115°F (46°C) in July and, as if the heat wasn't enough of a challenge, the route also takes the runners over

three mountain passes for a total vertical ascent of 13,000 feet (3962m), with the longest and steepest at the very end.

Matched against nature

As a lifelong runner and occasional marathoner I'm interested in seeing the 72 entrants test themselves against this brutal course but my real purpose for attending is professional. The company I work for, the Rogers Corporation, has helped to sponsor Robert Wimmer, an accomplished German ultramarathoner, and winner of the 3,050-mile (4908km) Trans Europe footrace from Lisbon to Moscow in 2003, who has entered the event. Rogers signed on as sponsors because Robert is running on insoles developed from a combination of its Poron polyurethane foams and polyolefin materials.

The insole is a collaboration of efforts between BÄR Shoes in Germany and Rogers. BÄR, with Robert's help, has designed a new running shoe and insole and Robert is here to test both the shoes and himself in this hostile environment. It's hard to imagine a more demanding test for the athletes or their equipment.

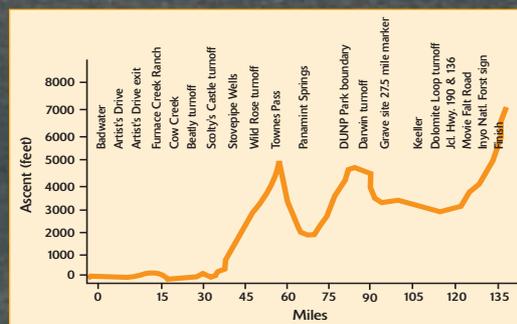


The list of entrants for the event is surprising. There are sixty-five men and seven women in the field. They range from 32 to 70 in age and they have come from eleven different countries. More than three quarters of the field is over the age of forty and is almost evenly split between first-timers and returning veterans.

An uphill start

The runners start in three waves, roughly 25 each at 6:00, 8:00 and 10:00 a.m. Robert is in the 10:00 group. An hour before the start the temperature is already up to 106°F (41°C). Robert has trained in Egypt for this event and standing there before the start he exudes confidence. When you start at the lowest point in the US, there is no place to go but up and, fittingly, the toughest footrace in the US starts with an uphill.

By the time the runners have covered the first few miles, the temperature has climbed to 112°F (44°C). Robert starts strongly. He covers seven and a half miles in the first hour. By the time he reaches twenty miles, at around 1:00p.m., the thermometer reads 118°F (48°C). Just six miles later, as Robert completes the first of five marathons he will run as



*Soul on the road.
Robert Rimmer's feet
on their way through
Death Valley*

 Marc Cotnoir

part of this event, the heat has intensified to a blistering 122°F (50°C), where it will remain for the next four hours.

It's hard to fathom what these athletes and their equipment are enduring. The heat, coupled with a strong wind is like a blast furnace. There is no shade within 100 miles (161km) and the temperature of the asphalt approaches 200°F (93 °C). Heat waves ripple visibly over the undulating blacktop. The scene looks surreal. If there is a hell on earth surely this is it. The runner's support crews are frantic with activity, providing constant liquid replacements, spraying the runners with water and monitoring their condition.

BÄR Performance - Marathon shoe

The 'low heel' design chosen by BÄR Footwear for its Performance-Marathon shoe is intended to place the foot in a natural horizontal plane through all phases of the runner's gait. The toe box is broader than average, allowing the toes to spread rather than sliding forward to impact on the front of the shoe.

In general the foot is held firmly but comfortably, says BÄR, by the marriage of Rogers Senflex elastomeric polyolefin foam insoles with its Poron urethane heel inserts. The effect is to lessen foot slide and cushion heel strike in one assembly. More impact is absorbed by the EVA inserts in the lightweight midsole construction.

The uppers are in kangaroo leather, chosen for its low weight and toughness, with mesh inserts for ventilation. Sole profiles are in low-hysteresis rubber for longevity and the shoes can be resoled. 🌐



1. Last insole
light anti-shock technology with Poron high performance foam.



2. Lightweight kangaroo-leather
combined with breathable mesh zone.



3. Lightweight midsole
with EVA insert.



4. Rubber profile sole
long wear-and-tear and resolvable.

Feet to the fore

The runners sport a variety of fabrics, equipment, and medical supplies. There are full body reflective solar suits, shirts, socks and shorts of the latest fabrics for wicking moisture, sun blocks, blister creams, and a wide variety of running shoes and insoles. In fact, most of the runners will wear several different pairs of shoes during this event, increasing their shoe size as their feet swell and change size from the heat and effort.

Thirty miles into the race, Robert, smiling broadly, declares in his thick German accent, that the Poron insoles feel great, "like running on a trampoline." The heat is so intense that the air conditioners in the support vehicles can no longer keep the cars cool. The support crews, too, face the dangers of heat exposure.

After five hours, as if the extreme conditions weren't enough, Robert is hit by a passing tourist's vehicle. The impact knocks the rear view mirror off the car, and leaves Robert with a bruised hip. Undaunted, Robert collects himself and resumes running, though it is impossible to know how much the physical and psychological trauma will have affected his overall performance.

After a little over forty miles of running in the most intense heat Death Valley has to offer, the runners ascend the first of three mountain passes. They will run uphill for the next eighteen miles and, while the elevation gain will get them away from the worst heat, temperatures will remain over 100°F (38°C). Only nightfall will bring significant relief from the gruelling heat.

High Sierra views

By the next morning Robert has covered nearly 100 miles (161km) and conquered two mountain passes. Unbelievably, he is still smiling. He runs along straight, flat and even downhill roads all day, with views of Mt. Whitney and the High Sierra in the background. Although the worst heat is behind him now, by mid-afternoon the temperature once again eclipses the century mark. As evening shadows fall and sunlight lingers only on the mountaintops, Robert begins the final, wicked ascent to Whitney Portals, the finish line. Shortly before 11:00 p.m. it's over. Not only has he survived a collision with a motor vehicle, but he has covered the course through blistering desert heat and over three mountain passes in thirty-six hours and fifty-three minutes. He is the ninth finisher and, by virtue of finishing in less than forty-eight hours, he will receive the coveted Badwater belt buckle. Dean Karnazes, a forty-one year old Californian was the first to cross the line, with a time of twenty-seven hours and twenty-two minutes. Monica Scholz, a veteran Badwater competitor from Canada, was the first woman to finish (third overall), crossing the line two hours after Karnazes. In all, 57 of the 72 starters (80%) finished before the course was officially closed after 60 hours.

Conquering shoes

As for the shoes and insoles, they like Robert, have survived the world's most difficult ultra running event. In fact, such

events present opportunities for real life testing of materials and equipment that far exceed standard laboratory tests normally used to predict performance. The materials used to manufacture Robert's insoles, for example, had tested extremely well for compression set resistance, shock absorption and moisture transfer – characteristics that should translate to superior performance in actual use. But laboratory tests lack the human element. Not only would it be next to impossible to re-create the Badwater Ultra conditions in a test lab, you would miss the wide smile on Robert's face as he crossed the finish line confirming beyond doubt that indeed the materials did perform. 🌐

Story and photography by Marc Cotnoir

