

Yet another victory for Evonik's lightweight ROHACELL®? Solar vehicle preparing for the 2011 world championship in Australia

July 29, 2011

It bears a strong resemblance to a flying saucer, but the latest Nuna 6 solar powered vehicle, designed by a student team at Delft University of Technology in the Netherlands, was actually built right here on earth over the last 18 months—through sheer hard work, creativity, and materials from Essen, Germany-based Evonik Industries. Its bodywork consists entirely of a fiber composite sandwich containing ROHACELL® structural foam, and its cockpit glazing of PLEXIGLAS®. This makes the vehicle, weighing just 145 kg, the lightest that the Dutch team has ever built, and about twice as light as the first Nuna model of 2001. Nuna 6 will participate in the 2011 World Solar Challenge in Australia in October, and the team hopes to be the first to cross the finish line of the 3,000 kilometer stretch, a feat it has already achieved four times.

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Lighter and further

Every gram of weight saved in electric vehicles helps improve mileage and increase range. This is why many student teams, with Evonik's support, rely on a tried-and-proven lightweight construction material for their racing models: a sandwich structure with carbon fiber-reinforced facings and a structural core of ROHACELL® polymethacrylimide (PMI) rigid foam. This design has been used with much success for many years in aircraft, helicopters, trains, and ships, and is also rapidly gaining ground in automotive construction. ROHACELL® structures allow weight savings of 60 percent or more over conventional steel parts. The high rigidity of the foam also improves the inherent rigidity of the components. The high degree of design freedom allows, for example, realization of the extraordinarily favorable aerodynamic properties of the bodywork of the Nuna 6 solar vehicle. And three-dimensional ROHACELL® cores are easily and reliably produced by thermoforming with short cycle times.

A wealth of ideas for using ROHACELL®

Tests at KTH Aeronautical and Vehicle Engineering in Stockholm and the University of Cranfield, and by Lotus Engineering, testify to the excellent crash properties of ROHACELL®. So it is hardly surprising that a number of teams from, for instance, URE Eindhoven in the Netherlands, Sardar

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Patel College of Engineering in Mumbai, India, and Rennstall Esslingen with its Stallardo '11 racing car are using the structural foam for the crash part prescribed for the Formula Student international races. This must be mounted in front of the chassis and should absorb energy in the event of an accident. At the Hochschule Ravensburg–Weingarten, on the other hand, ROHACELL® is being used for the steering wheel, designed as a sandwich structure with integrated display. Weight saving is particularly effective in moving masses, which is why, for example, Munich's TU Fast Racing Team is using ROHACELL®, even in their wheel-rim design.

“We support the student teams with materials and our knowledge, and they in turn use their creative ideas to show us and the automotive industry what ROHACELL® can do,” says Stefan Plass, who is responsible for the business of high-performance foams at Evonik, explaining why Evonik sponsors about 20 student teams in Europe with ROHACELL®.

Figure caption:

The aerodynamic bodywork of the Nuna 6 solar car from the Nuon Solar Team of Delft University in The Netherlands consists of a fiber composite sandwich using ROHACELL® structural foam. It has passed wind tunnel tests with flying colors. (Photo: Nuon Solar Team)



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Company information

Evonik is the creative industrial group from Germany. In our core business of specialty chemicals, we are a global leader. In addition, it has energy and residential real estate operations. Our performance is shaped by creativity, specialization, reliability and continuous self-renewal.

Evonik is active in over 100 countries around the world. In fiscal 2010 more than 34,000 employees generated sales of around €13.3 billion and an operating profit (EBIDA) of about €2.4 billion.

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