



Press Release

New ceramic coating allows composites to be used in high temperature environments

Motorsport, aerospace and military applications to benefit from the opportunity to prevent composite delamination in high temperature environments

A new ceramic thermal barrier technology will allow high strength, lightweight materials to be used in high temperature environments for which they have previously been unsuitable. Believed to be the only product of its type available commercially, the process is so effective it allows composites to function in temperatures above their melting point; testing for a typical application gave a reduction in composite surface temperature of more than 125°C. The new process, for which a patent application has been filed, offers the opportunity to “engineer” the coating to suit specific customer requirements, adjusting the coating properties both through-thickness and across the surface of a component to cope with “hot spots” and differing forms of heat transfer such as radiant, conductive or convective heating. This new coating allows significant thermal protection with only minimal weight gain.

Zircotec’s range of plasma sprayed coatings is already successfully applied to metallic components reducing surface temperatures by over 170°C in some applications. The UK based firm, formerly part of the UK’s Atomic Energy Authority, has been developing its composite coatings for some time now, and has supplied examples of these coatings to a number of Formula 1 teams for race applications. The Zircotec “engineered” multi-layer solution can now be adjusted to suit the operating environment, preventing delamination or structural failure. Still based on Zircotec’s proprietary ThermoHold™ technology, the coating is designed to be robust and is highly resistant to vibration and mechanical damage. The coating is extremely well adhered to the underlying composite structure.

“The thermal environment in motorsport and aerospace applications is not always conducive to the use of composites,” says Zircotec’s sales manager Peter Whyman. “This results in the use of heavier materials or bulky heat shields, which can reduce overall performance. Our solution allows engineers to access a range of materials previously unavailable.” To ensure optimum results the Zircotec technical team prefers to work

alongside the customer to specify the coating arrangement that is most appropriate for the application. Drawing from a range of coating parameters Zircotec is confident to offer a solution to any thermal issue. “We can apply a reflective surface layer to help protect against radiant heat, or we can increase the thickness of the ceramic in certain areas where a hot spot can occur,” continued Whyman. “We also have the ability to build in a conductive sub-layer that will help to dissipate heat away from any hot spots, and can also help deal with transient heating situations. This means we apply just the right amount of coating to deliver the necessary protection whilst minimizing the weight impact of the coating (as low as 0.03g/cm² for some application). We are now able to vary and control parameters within our coating in all three dimensions.”

The new engineered solution is expected to be very popular with Formula One teams who look to improve thermal management in engine bays at the lowest possible weight. “Ceramic coating to date has not been able to offer a definitive solution. Now, we can deliver the optimum weight/temperature combination possible.”

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Photographs

Pictures are available electronically from the press agents

	<p>A new highly effective thermal barrier technology that will allow high strength, lightweight materials to be used in high temperature environments for which they have previously been unsuitable. Examples include coating composite components in motorsport and aerospace applications</p>
	<p>Zircotec can optimize the coating both through thickness and across a surface to offer the optimum weight/temperature production possible.</p>
	<p>A new patented option, developed for the highest levels of motorsport, military and aerospace, allows Zircotec to “engineer” the coating across a component to cope with “hot spots” and differing forms of heat transfer such as radiant or conductive.</p>

Prepared by Market Engineering, Europe's leading communications agency for the automotive technology industry.