Look and stay cool in leather

A chance meeting on a business trip eight years ago led to the innovation by TFL of solar reflective leather, which dazzled the judges and won the ICIS Innovation Award this year for best product

EMMA CHYNOWETH/LONDON

IT WAS several thousand feet above the US on a flight that Jurgen Christner, head of research applications for leather chemicals business TFL Ledertechnik, found himself sitting next to inventor Gerd Hugo of IPS Innovations. Hugo had already developed a solar reflective technology that has subsequently been used in a number of fields, including construction.

When Christner returned to his office he wondered how the technology could be applied in his leather products.

He knew uncoated natural leather possesses very good solar reflective properties as its structure is made up of a fibrous collagen network. However, this property is lost when the leather is coated with a pigment finish. The pigments absorb most of the near-infrared (NIR) waves and heat builds up within the finish coat and material when it is exposed to sunlight. This is a problem particularly for dark-colored leather.

Christner wondered if the technology could have an application in car seats, and he contacted Hugo. The two exchanged ideas and tested a number of pigment samples. With positive results, Christner approached his president. He points out that TFL has a management culture that is very much open to innovation. "Our president was very excited and agreed to put resources behind the project."

In total, around €2m ($2.8m) was invested in selecting and testing the right pigments, and taking the product to market. No new chemicals were involved, as the pigments were not new products. "The new invention is the way we put the chemicals together, the way they are applied and used."

The patented technology comprises what the firm calls *Cool* dyes, to color the leather, and *Cool* NIR transparent pigments, which are applied as a finish coat. The pigments do not absorb NIR waves, so they allow them to pass through the finish coat. The leather's natural collagen fiber network reflects the NIR waves back through the finish coat. With no absorption, the result is that no heat is built up in the finish coat. The dyes also show good NIR reflection – only the right combination of dyes and pigments provide the optimum reflectance and so the best solar reflective performance.

Christner says the technology means that black leather can be 20–25% cooler than without the finish. Since the light energy is reflected in the NIR, less heat energy is formed and the leather remains cooler. The temperature difference between standard and *Cool* leather increases with the duration and intensity of sun exposure. In extreme cases, the temperature difference can be up to 20°C (36°F), according to TFL.

The company has developed the know-how across a wide range of colors, but the most interesting application is black, as without the *Cool* technology the material absorbs heat, making it uncomfortable when used in a range of applications such as car seats, shoes and garments, such as motorcycle leathers. "Our black reflects light like [it was] white," says Christner. The technology can be used across other textiles and substrates.

Getting acceptance by the leather industry was not easy. TFL supplies products to the leather and tanning industry, both described as very traditional by Christner. "People were very impressed, but the industry was slow to adopt it. They see it as a way for further product differentiation." Eventually, success came via the end-user. With automotive manufacturers and shoemakers specifying the technology, commercialization began in 2003.

Christner says it has been particularly successful when used in car seats of convertibles, steering wheels and traditional shoes. He is also looking to the international fashion arena, where he hopes designers will use it. "You can wear leather in summer and not get hot. It's a cool idea," he says. ■

» For more information on TFL and its products, go to **www.tfl.com**