



Delrin® and Kevlar® Ensure Car Doors Close Smoothly and Silently

A cladding of tough, abrasion-resistant Delrin® DE 9455 acetal resin modified with Kevlar® brand resin on the door-checks of BMW's Series 5 limousines and estates ensures that the doors open and close smoothly and silently without lubrication.

A door-check is a retarder installed between the door and the bodywork of a car. It serves two purposes: 1. it holds the door open when the car is standing at an angle; 2. it prevents damage to the hinge and the door-jamb from a heavy, free-swinging door.

A door-check consists of a shaped steel strip which slides between pre-tensioned steel rollers. The rollers keep the strip under compression, so each door movement tends to abrade any cladding material on it. The standard all-steel door-check is lubricated with grease, to allow it to slide freely. While this design works well, the grease leaves marks on garments that come in contact with it. So, in search of a better solution, BMW decided to give the steel strip a permanent cladding of a plastic material.

The cladding had to be able to withstand considerable mechanical abuse from the pressure of the rollers on the strip, from the impact at the end of the door's swing, and from the abrasion caused by every door movement.

Together with systems supplier Ed. Scharwächter GmbH of Remscheid, BMW undertook extensive tests on several candidate materials. These tests showed that Delrin® DE 9455 modified with Kevlar® met the requirements between -40 °C and +85 °C better than all the other materials tested.

“The abrasion resistance of this special type of Delrin®, and its ability to withstand mechanical abuse were decisive in our choice of material,” says Werner Schmitt, project leader at Scharwächter. “The hook-shaped end of the door-check is particularly critical in this respect, because it has to stop a heavy swinging door abruptly when it reaches its maximum opening angle.”

The cladding presents a further advantage. On standard all-steel door-checks metal-to-metal contact between the strip and the rollers forms an ‘acoustic bridge’ between the bodywork and the door, which tends to amplify noise in the car. With the steel strip clad in Delrin® DE 9455, there is no ‘acoustic bridge’, so the car’s occupants enjoy a quieter ride.

After good experiences with the new door-check on its Series 5 models, BMW intends to adopt the same design for other models, too.

DuPont is one of the largest and most diversified companies in the world with operations on all six continents and annual sales over \$44 billion. It is active in chemicals, fibres, polymers, speciality products energy and life sciences. Its Engineering Polymers

business manufactures and sells Crastin® PBT and Rynite® PET thermoplastic polyester resins, Delrin® acetal resin, Hytrel® thermoplastic polyester elastomer, Minlon® mineral reinforced nylon resin, Tynex® nylon filament, Vespel® polyimide parts, Zenite™ LCP liquid crystal polymer and Zytel® nylon resin. These products serve global markets in the aerospace, appliance, automotive, consumer, electrical, electronic, industrial and sporting goods and many other diversified industries.

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Note to Editor:

® DuPont registered trademark.

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Caption: A cladding of Delrin® acetal resin modified with Kevlar® brand resin ensures that the un-lubricated door-checks slide smoothly and silently on the BMW Series 5 limousines and estates. The cladding also helps to reduce noise when opening and closing the doors.