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Lightweight Class-A automotive body panels: A bonnet hood made with Crush Core Wet-pressing Sandwich technology

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This paper describes a new technology for making a lightweight body panels with class A surface in a composite sandwich technology. The business case versus traditional bonnet hoods made from steel or aluminum shows significant advantages in cost and performance.

This bonnet hood with a class A surface is manufactured using an innovative crush core sandwich process made from paper honeycomb and glass fabrics impregnated with PUR resins. Magna has developed this technology based on Polyurethane and paper honeycomb core together with two partnering companies, Hennecke and Rühl Puromer, with the aim to achieve cost-efficient and competitive lightweight series-production for class A surface. It is a direct process, out-of-tool and ready-to-paint and includes the tool and equipment engineering. KATCON, the Mexican-based Automotive specialist is the exclusive licensee of Magna of this technology for the mass-production of automotive body parts in Europe and the Americas.

Sandwich components manufactured with the Crush Core Wet-pressing Technology are up to 70% lighter than traditional parts made in steel or even aluminum and offer functional integration advantages like acoustic isolation or design freedom at vehicles front side. Further advantages are integration of passive pedestrian protection for head impact as well as protection of upper and lower leg.

The Class-A surface is demonstrated in perfection with the bonnet part. With its 7,2 kg, it weighs 1/3 of the steel solution, and has fewer parts. The technology is furthermore appropriate for external body panels or other semi-structural parts like tailgates, hang-on parts, floor panels or doors or even other industrial applications.

The cost effective process allows mass production of 100,000 or even 500,000 units per year. The bonnet meets the new Global Technical Regulation (GTR) no. 9 on pedestrian protection and offers lower HIC values in critical areas (head impact).

Finally the business cases compared to the steel version and aluminium version shows that the composite bonnet is significantly cheaper than the aluminum incumbent and equal to the steel version, but being 15 kg lighter which is a huge benefit not only for the lower CO2 emission.