

## Resonator made of DuPont™ Zytel® PLUS helps revolutionary hybrid sports car sound good

SHANGHAI, Apr. 24, 2016 – The stunning BMW i8 plug-in hybrid sports car features a resonator made of glass-fibre reinforced DuPont™ Zytel® PLUS 95G35 which is tuned to reduce the typical high-frequency air intake sound to a lower level, thus improving the driving experience. Zytel® PLUS is a high-performance polyamide, produced with DuPont's proprietary SHIELD technology which provides superior long-term resistance to high temperatures and aggressive fluids typical of under-the-hood applications. Due to its function, the resonator has a relatively large volume; however due to the newly optimized design, it weighs just 1.5 kg because the high stiffness and high strength grade of Zytel® PLUS reduced the thinness of the resonator walls. Installed between the air filter and turbo charger in the rear of the i8, the resonator is part of the air management system of the sports car's compact 1.5 litre 3-cylinder petrol engine.

The resonator was developed by close collaboration between BMW Group, DuPont Performance Materials and MANN+HUMMEL. This Tier-1 supplier makes use of its experience in hot-gas welding to assemble two injection moulded parts – the perforated interior tube as well as an outer tube measuring about 40 cm in length with integrated fittings for fuel tank ventilation and blow-by inlet – to create the broad-band resonator. An additional air duct including an elastic bellows segment, made of an unreinforced soft nylon grade, is then mounted to connect the resonator to the air intake filter, while the system's opposite end fits to the intake side of the turbo charger.

DuPont™ Zytel® PLUS enables the resonator to have long-term resistance to temperatures from -40°C to 190°C as well as hot engine gases and fluids. As Florian Janiak, Polymer Specialist / Global Production Strategy, MANN+HUMMEL, comments: "In the light of the high temperature environment due to close proximity to the exhaust gas system and direct contact with chemicals such as road salt, we quickly ruled out standard polyamide materials for this demanding application due to their insufficient long-term heat and chemical resistance. DuPont™ Zytel® PLUS 95G35 performs well in such a hot and confined operating environment and what's more, it retains most of its weld strength even after extended exposure to very high temperatures, where traditional materials would drop significantly. We also found it very easy to mold and weld in our hot gas process."

DuPont's proprietary SHIELD technology combines several innovations including a new polymer backbone, polymer modifications and a special set of additives which can double or triple the service life of standard nylon on exposure to hot environments and aggressive chemicals such as hot oil, automotive coolants and road salt. DuPont™ Zytel® PLUS 95G35, the core product of the Zytel® PLUS family, shows no significant drop in its ability to withstand load – even over 4,000 hours of testing at 180°C – whereas a traditional PA 66 GF35's ability to withstand load is cut to less than half.