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## Other materials

Fiber-reinforced polymers (FRP) offer many advantageous possibilities for the “ultra” lightweight design of the future. Development engineers at Audi are by no means fixated on CFRP alone. They are instead exploring all avenues.

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In the A8, the lower cross-member of the front end was made of so-called organic sheets – a matrix of glass-fiber-reinforced polymer (GFRP) reinforced with embedded aluminum sheets. Audi also offers bucket seats with a GFRP frame as an option for the R8 GT. These are 31.5 kilograms (69.45 lb) lighter than the standard seats.

The affordable GFRP becomes particularly attractive when it replaces one or more carbon fiber layers in a CFRP matrix. Alternately, aramid layers could be used here, as Audi does with its high-security vehicles. The toughness of the aramid layers prevents the CFRP components from splintering in a crash. Natural fibers such as hemp are also suitable for use in the matrix. They are particularly good at damping noise.

In mid-2010, Audi established a special ideas foundry, the FRP Technical Center, at the Audi Lightweight Design Center in Neckarsulm, where approximately 180 specialists are employed. Some 50 experts are focusing their efforts on fiber-reinforced polymers at the facility. The FRP Technical Center recreates the entire production process chain under one roof.

The experts at Audi are materials and process specialists with broad-based competence. All materials, whether fiber-reinforced polymer, steel or aluminum, are repeatedly reviewed with respect to their suitability for the intended purpose, and the Audi experts are intimately familiar with their potential and weaknesses. The materials are in technological competition with one another, and Audi can use any and all advancements to its direct advantage. Aluminum and steel promise even greater strengths in the near future and will thus enable lower weights.

Audi also sees intriguing potential in magnesium. This lightweight material is already used today in many areas. Examples include the center tunnel and the gearbox cross-member in the A8, the engine frame of the R8 and add-on engine parts, such as induction manifolds. Magnesium is also an option for the strut brace in the engine compartment or for parts of the engine itself, such as the cover of the camshaft case.



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