

The importance of light-weight construction

Georg Fischer aluminium castings in the Audi A8

Cars are becoming lighter and lighter thanks to aluminium bodywork, allowing the upward spiral in car weight to be reversed. This also has a key impact on fuel consumption since a ten percent reduction in weight results in a six percent drop in fuel consumption. Over the past twenty years the empty weight of a large saloon car has increased by a staggering 20 kilos a year, and even a mid-range car by as much as 10 kilos. The reasons behind this trend are safety factors (30%), legal regulations (25%), increasing standards of comfort (22%), the interior (15%) and quality-enhancing measures (8%).

Since the body shell makes up a third of the total vehicle weight and more than half of the average weight increase is accounted for by the car body, Audi decided to develop a light-weight body shell which is used in the new Audi A8. The (215 kilogram) aluminium structure of the new top model is 40% lighter than a comparable steel body. Georg Fischer also supplies a number of bodywork and floor pan components for this top-of-the-range sedan.

The Audi Space Frame (ASF) also featured in previous models of the A8. As a result of further development of this concept, a host of aluminium castings have been added and Audi has also opted for light alloy castings for the floor pan, which further increases the proportion of components supplied by Georg Fischer.

The so-called module crossmember is the most critical part that we supply. This is an aluminium/magnesium hybrid part manufactured by pressure die casting which is screwed to the A columns and carries the instrument panel. In the driver zone it consists of an aluminium tubular section of extremely rigidity and strength since it is used for securing the steering column. The crossmember is continued on the passenger side in the form of an open, ribbed U section made of magnesium. The material which fully meets the strength specifications saves weight owing to its lower density and makes it possible to manufacture a module crossmember weighing only five kilograms, or half the weight of its conventional steel counterpart. This the first time that this particular alloy has been used for components of this type and gives the component relatively high elongation even without heat treatment. In combination with appropriate wall gauges to provide the required strength and rigidity, this results in excellent force absorption properties.

Georg Fischer also supplies other components for the Audi A8, for example the trapezoid link and the inner and outer sections of the A-column. The trapezoid link (a safety component) is fabricated by the sand casting technique, while the inner and outer sections are manufactured by pressure die casting.