

## **What is the Minimum Weight of a Safe Subcompact Car?**

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### **Summary**

Comprehensive vehicle safety requires a high level of both driving and crash safety. When it comes to subcompact cars fundamental difficulties have to be overcome regarding occupant protection in particular. Apart from high pressure on costs, it is the short deformation zones and the high loading of the lighter car in vehicle-vehicle collisions which turn out to be critical.

Not only the safety requirements, but also economical considerations set limits to the efforts towards lightweight design in this market sector. Moreover, customer expectations regarding comfort, styling, quality appearance, spaciousness and variability of the passenger compartment conflict with the aim of effective lightweight design.

The empty weights of subcompact cars have actually been rising substantially with every model renewal for years. Constructional measures for turning back this trend should include the fundamental optimisation of vehicle concepts, for example concerning the position of the engine-transmission unit. In particular, such measures should be designed to improve the compatibility in vehicle-vehicle collisions. When it comes to the application of lightweight materials, it is especially high performance fibre-reinforced plastics which facilitate weight reduction, if the corresponding structures are designed appropriate to the material involved.

Considering also the application of new driver assistance systems for the prevention of accidents, a safe, two-seated subcompact car with an empty weight of less than 500 kg seems technically feasible in the near future. The realisability in series production, however, depends on conditions like the fuel price and the compatibility of heavier vehicles.