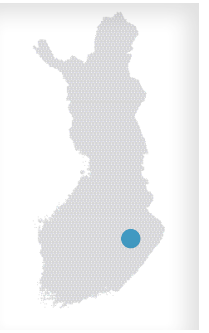
Automotive

Engine Cradles for Passenger Cars



Fabrication process	Hydroforming
Grade/surface	Forta H500, H800 and H1000, 2B
Material supplier	Outokumpu
Source of information	Outokumpu

Materials for structural parts of passenger cars must fulfil requirements which may seem contradictory: on the one hand, they must provide high-strength properties that can be used to design stiff structures; while on the other hand, dedicated parts of the car body must be able to deform in order to absorb crash energy. In addition, fabricated parts must be as light as possible to save fuel. A range of proprietary low-nickel austenitic stainless steels has been optimized for work-hardening which has two effects. Firstly, the cold-rolling process is controlled to achieve defined levels of strength from the outset. Secondly, in the event of a crash, the crumpling of the material locally increases strength in the deformed areas and makes the component absorb energy. The stronger and faster the deformation, the higher the strength increase. This intrinsic property of the material adds to passive safety. But the material retains excellent forming properties, for which the elongation after fracture is an indicator. Forta H500, for instance, reaches a value of over 50 %, which is to say that a standardized sample can be stretched by more than half its original length before it breaks. Proven forming techniques, such as hydroforming, can be applied to achieve exceptionally complex shapes, as demonstrated in an engine cradle. Protective zinc layers are redundant because of the corrosion resistance of the material, but the usual cataphoresis treatment of car bodies can be applied without restrictions. Dedicated material engineering makes stainless steel suitable for volume applications in safer and lighter passenger cars.