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Flexible Integration of Airbag Weakening Lines in Interior Components: Airbag Weakening with Jenoptik Laser Technology

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Abstract : Vehicle interiors are not only changing in terms of design and functionality but also due to new driving situations in which, for example, autonomous operating modes are possible. Flexible seating positions are changing the requirements for passive safety system behavior and location in the interior of a vehicle. With fully autonomous driving, the driver can, for example, leave the position behind the steering wheel and take a seated position facing backward. Since autonomous and non-autonomous vehicles will share the same road network for the foreseeable future, accidents cannot be avoided, which makes the use of passive safety systems indispensable. With JENOPTIK-VOTAN® A technology, the trend towards flexible predetermined airbag weakening lines is enabled. With the help of laser beams, the predetermined weakening lines are introduced from the backside of the components so that they are absolutely invisible. This machining process is sensor-controlled and guarantees that a small residual wall thickness remains for the best quality and reliability for airbag weakening lines. Due to the wide processing range of the laser, the processing of almost all materials is possible. A CO_2 laser is used for many plastics, natural fiber materials, foams, foils and material composites. A femtosecond laser is used for natural materials and textiles that are very heat-sensitive. This laser type has extremely short laser pulses with very high energy densities. Supported by a high-precision and fast movement of the laser beam by a laser scanner system, the so-called cold ablation is enabled to predetermine weakening lines layer by layer until the desired residual wall thickness remains. In that way, for example, genuine leather can be processed in a material-friendly and process-reliable manner without design implications to the components A-Side. Passive safety in the vehicle is increased through the interaction of modern airbag technology and high-precision laser airbag weakening. The JENOPTIK-VOTAN® A product family has been representing this for more than 25 years and is pointing the way to the future with new and innovative technologies.

Keywords : design freedom, interior material processing, laser technology, passive safety
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