

Friction Press Joining of dissimilar materials: A concept for improving the joining strength

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Abstract. The recent scandals about combustion engines in the mobility sector have accelerated the debate on the electrification of automobiles. However, the acceptance of electric cars depends significantly on their range. In order to increase the maximum range of electrified engines, lightweight construction using multi-material design is an essential factor. As a new joining technology, friction-press joining in particular offers great potential for joining metals with thermoplastics. The objective of this work is to enable this novel technology to combine metals and plastics in a reproducible way. At first, the influence of process and tool parameters on the joining zone temperature and bond strength will be investigated. Based on this results, a joining zone temperature model will be developed and implemented in a temperature control system. Next, the effect of the joining pressure on the joining strength will be analyzed. In the last part, the joining strength of these bonds, produced by a temperature and pressure controlled friction press joining process, will be compared with reference methods.