

# Electrically Assisted Forming Simulation Solutions with FORGE®

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## ABSTRACT

Electrically coupled processes have proved themselves very effective in the search for optimizing manufacturing processes of metallic components in various industries ranging from automotive or aerospace down to medical applications. The present work reviews the fundamental blocks introduced into the finite elements simulation software FORGE® to deal with electrically assisted forming processes such as electric upsetting and joining, spot welding and capacitor discharge welding. This work has been carried out using intrinsic coupling between the physical blocks defining the charge conservation equation, the energy conservation, the linear momentum equilibrium, sophisticated metallurgical databases, high-performance parallel computing and advanced remeshing algorithms to cover large deformations. We also present experimental and numerical studies that have been carried out to validate the present model for its two main applications in electric upsetting and resistance welding.

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