

SL 15.20

Optimization of an Established Joining Method: Vibration Welding

Y. Kuriykov, R. Kuenkel, G.W. Ehrenstein

*Institute of Polymer Technology, University of Erlangen-Nürnberg,
D-91058 Erlangen, Germany*

Vibration welding of thermoplastic polymers is a widely-used and established joining technology in many areas of industrial series production. Especially joining of middle- and large-sized plastic components is dominated by this technology. Its main advantage is a considerable reduction in joining time compared to adhesive bonding and to heated tool welding.

For this reason, thermoplastic air-intake manifolds, oil and brake fluid reservoirs, bumpers, components of the interior decoration and equipment, radiator grilles and lights are welded by this way in automotive industry and its sub-suppliers. Vibration welding is established in the electronics (casings) as well as the household appliances industry (thermostats, water tanks for steam electric irons).

The relationships between the process, the parameter depending resulting structure, and the resulting weld bead properties were widely studied for common material systems. The potential of improvement consists in the optimization of the time to break the vibration, which strongly influences the weld bead properties. Properties of oscillation can be controlled through targeted breaking (active breaking) during the final oscillation phase and cooling phase. As a result, the mechanical properties of the weld can be improved.