

**THREE-DIMENSIONAL SIMULATION OF ELECTRIC ARCS:
POSITION-DEPENDENT COMPARISON OF HEAT TRANSPORT EFFECTS INCLUDING
RADIATION**

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The simulations of moving electric arcs to optimize arc chute geometries for e.g. miniature circuit breakers developed a lot in the last years. It is becoming more custom to include sophisticated radiation models as the multi-band P1 model in the calculations, opposed to previous implementations of the net emission coefficient. However, volumetric radiation re-absorption in the arc column is only one of the multiple heat transfer mechanisms that occur within an electric arc. Others are convection, the common heat conduction, radiation absorption at the runners, and possibly pressure wave effects. In this paper, a quantitative comparison of these effects in a transient three-dimensional simulation is presented. The geometry is chosen similar to miniature circuit breakers. Simulated effects include asymmetric, current-dependent arc root voltage drops, as well as a multi-band P1 radiation model.

Keywords: Arc radiation, Simulation, Arc discharges, Low voltage circuit breakers, P1 model.

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