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Modeling the Arc Splitting Process in Low Voltage Arc Chutes

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Abstract—**Investigations on the arc splitting process in low voltage arc chutes have shown that an ignition voltage has to be exceeded before new arc roots form. When an arc spot has been formed, the electrode fall is nearly constant and rather independent of the current.**

In simulations a thin layer of elements with a nonlinear current density – voltage characteristic surrounding the splitter plate represents the formation of new arc roots. To model this behavior a characteristic with a voltage hump at low current densities and a constant final voltage at higher current densities has been presented in former publications. In this paper, the influence of the magnitude of the voltage hump and the final voltage is evaluated. A low voltage hump yields a smaller arc loop around the lower edge of the splitter plate and an earlier subdivision of the arc. A too high voltage hump makes arc splitting impossible.

In order to verify the simulation model, additional experimental investigations were carried out. The arc root traces on the splitter plate surfaces were investigated to gain information about the location of the arc roots and the arc loop length. This study yields precise results concerning position and size of the arc root traces.