

MODELING OF CONTRACTED  
AND FREE-BURNING ELECTRIC  
ARCS BETWEEN CONSUMABLE  
ELECTRODES. 1. ASSUMPTION  
OF EQUILIBRIUM STATE OF PLASMA

*V.A. Zhovtyansky, Yu.I. Lelyukh, V.M. Patriyuk*

The Gas Institute, Nat. Acad. of Sci. of Ukraine  
(39, Degtyarivs'ka Str., Kyiv 03113;  
*e-mail: zhovt@ukr.net*)

S u m m a r y

The role of transfer processes in the formation of a self-organized structure of the plasma of electric arcs is analyzed. The models of contracted and free-burning electric arcs between consumable electrodes are characterized on the whole, by depending on the accepted state of plasma in the discharge channel: equilibrium or nonequilibrium one. In particular, we consider the common channel model and its modifications, including the ellipsoidal one, which use the assumption of equilibrium plasma and allow one to calculate the properties of electric arc plasma. The reasonability of involving the mechanisms of self-organization for the study of the electric arc properties is demonstrated. A method based on the introduction of an effective stabilizing wall (a quasiwall) in the analysis of the plasma processes running in free-burning electric arcs is substantiated.