

ELECTRO-EROSION RESISTANCE OF DIFFERENT ELECTRODES MATERIALS FOR PLASMA GENERATORS¹

I.U.V. MURASHOV, N.K. KURAKINA, N.V. OBRAZTSOV, R.I. ZHILIGOTOV

Peter the Great St.Petersburg Polytechnic University, High School of Electrical Engineering, Saint-Petersburg, Russia

Electrodes are the most important components of electrical devices operating at high temperatures (such as arc discharge). Such devices include plasma torches [1-3], different types of circuit breakers, lightning protection devices and many others. Therefore, the study of erosion issues is one of the most important and relevant task at the moment [4-5].

The experimental results of the hollow electrodes erosion resistance taking into account a pilot arc re-ignition during plasma torches operating, are presented in the study. A high voltage alternating current oscillator is used to simulate an initial process instability. The electrical circuit of the experimental setup with a pulsed discharge current up to 2 kA with time parameter 8/250 and a follow current of 800 A at industrial frequency is described. Four electrodes materials of tungsten (W), iron (Fe), copper (Cu), copper with a sprayed nickel+iron powder (Cu-Ni-Fe) are investigated. X-ray patterns of the different electrode surfaces are demonstrated after 4-9 pulses and one pulse with follow current impacts. The electric charge is calculated by integrating the obtained discharge current to assess the erosion coefficient. The following decreasing order of the electrical erosion resistance is determined: W – Fe – Cu-Ni-Fe – Cu.

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