THREE-PHASE ALTERNATING CURRENT WATER-STEAM PLASMA GENERATOR WITH POWER UP TO 100 kW*

Philip G. Rutberg, Sergey A. Kuschev, Kirill A. Kuzmin, Ghennady V. Nakonechny, Alexey V. Nikonov, Sergey D. Popov, Alexey A. Safronov, Evgeny O. Serba, Valentin A. Spodobin, Olga B. Vasilieva
Institute for Electrophysics and Electric Power Russian Academy of Sciences, 18 Dvortsovaya emb., St.-Petersburg, 191186 Russia

Water-steam plasma consists of hydrogen and oxygen acting as active reagents in many chemical reactions. It has no ballast, which is nitrogen in air plasma. Nitrogen is inert for many processes and, moreover, it is harmful, as it is a source of toxic NO_x oxide.

According to forecasts, the future of power engineering during XXI century will be connected with the use of organic fuel and mainly coal which stocks are great enough. However, significant emissions of CO_2, sulfur and nitrogen oxides at the enterprises using coal, enormous mass of slag and a lot of polluted lands demand basic revision of methods of further use of coal as a fuel. Recently, the concept of complex processing of coal with production of high-calorific synthesis-gas (mixture of CO and H_2) and associated saleable goods from slag (aluminum, ferric carbide, etc) is examined in the world. The process of coal gasification is the basis of this strategy.

Electric arc plasma generators are the basic element of systems of plasma gasification of coal and various organic containing wastes.

The paper is dedicated to research of parameters of the three-phase electric arc alternating current plasma generator with power up to 100 kW working on steam with air protection of electrodes. Researches were carried out over a range of arc current from 25 to 50 A and range of steam consumption of 3-5 g/s. Current-voltage and volt consumable characteristics, operation oscillograms and power characteristics are presented.

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