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Radiation Power as Function of Current in Wall-stabilized AC Arc of Water-cooled Vortex Type with Small Caliber TORU IWAO, YUTO NAITO, YUTA SHIMIZU, SHINJI YAMAMOTO, Tokyo City University — The problem of an emergency large-scale lighting with the high-intensity discharge (HID) lamp is the lack of radiation intensity because of inappropriate energy balance. Some researchers have researched that the radiation power depended on the arc temperature increases with increasing the current. However, the heat loss and the erosion of the electrode as well as the radiation power increases with increasing the current excessively. AC current replaces alternately the cathode and the anode. Thus, it is possible to avoid the concentration of the heat transfer to the anode. Moreover, the lamp efficiency decreases with increasing the current excessively because of ultra violet rays increment. It is necessary to control the temperature distribution with controlling the current and radius. In this paper, the radiation power as a function of the current in the wall-stabilized AC arc of water-cooled vortex type with small caliber was measured. As a result, the radiation power increased with increasing the current and appropriate wall radius. The radiation of AC arc is smaller than it of DC arc. And, the erosion of electrode decreases.

Toru IWAO
Tokyo City University

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