

MEASURING OF HEAT FLUX IN THE RANGE FROM 5 UP TO 2500 KILOWATT PER METER SQUARED

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Measuring of density of high intensity radiation heat flux is great importance for experimental studies, technological processes and materials testing [1-3]. A significant problem for the development of standards that ensure the unity of measurements of high-intensity fluxes is the creation of a source of high-power heat flux in the laboratory. The source must ensure the stability of the radiation in time and uniformity of the heat flux density on the area, which one exceeds the size of the receiving area of the sensors. A xenon high-pressure gas-discharge lamp with a power of 7 kW and an elliptical reflector with a diameter of 380 mm focusing the heat rays from the arc of the gas-discharge lamp and forming a heat flux of high intensity were chosen as a source of heat flux. To obtain a uniform heat flux in the apparatus, a quartz lightguide is used. The geometry of lightguide was calculated to redistribute the flux density uniformly across the section. The achieved uniformity of the heat flux density is 2 % on area 100 mm². Radiometer-calorimeter is used for absolute measuring of the heat flux on the exit of the lightguide. Radiometer-calorimeter measures the heat flux density by substitution the electric power. On the base of this apparatus "The state standard of unit of radiation heat flux density in the range from 5 up to 2500 kW/m²" was developed and certified in VNIIFTRI. Systematic error is less, than 2.9 % , RMS error is less, than 0.3 % [3].

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