ABSTRACT

Due to the growth, the promotion and the continuous exploitation of the solar energy, photovoltaic system are widely recognized and also being used. Building Integrated Photovoltaic Systems become a new technology, that recently evolved and it is being developed rapidly, as major tool for zero energy consumption buildings.

This study deals with the thermal behavior of Building Integrated Photovoltaic on the Façade and roof of buildings. A solar simulator was used for this study. The experiments took place in the laboratory of the Cyprus University of Technology and several parameters were being tested such as the inclination of the Photovoltaic, the radiation of the simulator and the air gap behind the Photovoltaic. The temperature distribution on the Photovoltaic, the surface of the wall as well as the air temperature in the air gap, were being recorded. These measurements were proportionate to the parameters mentioned above. In some particular experiments, pictures were taken with the use of a thermal camera, which, with a colour deference, could show the thermal distribution on the Photovoltaic and the wall so that the results could be verified. In addition, the coefficient of heat transfer (h) had been evaluated and it was compared between the convective heat transfer coefficient of each experiment.

In conclusion it has been observed that at 90° slope of the Photovoltaic, temperature records were the lowest. Furthermore, a 15 cm air gap seems to be the best possibility to maintain the lowest temperature on the Photovoltaic. At low radiation the air gap of 10 cm is satisfactory. Thus, at low radiation areas, the air gap of 10 cm is capable of maintaining low temperatures on the Photovoltaic. For the calculation of the coefficient of heat transfer, the lowest was observed, at the case between the air gap and wall calculations, which was 1,16 W/m^2°C. On the other hand, the highest coefficient was calculated at the case between the air gap and the Photovoltaic, which was 4,5 W/m^2°C.