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MEASUREMENT CHAIN FOR THE BIFACIAL AND THE CONVENTIONAL FLAT-PLATE WATER SOLAR COLLECTORS

Abstract: *The term bifacial flat-plate water solar collector means a solar collector that can absorb solar irradiation by its upper as well as its lower absorber surface. Absorption of solar radiation by its lower absorber surface is achieved by using reflective surface (reflector) placed below the collector. Compared to a conventional flat-plate water solar collector, the analyzed collector insulation, placed in the bottom of the box, is replaced by glass cover (glazing). In this paper a measurement chain for testing the mentioned specific solar collector and the conventional collector is presented. The measurement chain would provide data about instantaneous useful energy gain and efficiency for both collectors.*

Keywords: *bifacial flat - plate water solar collector, experiment, measurement*

1. INTRODUCTION

A bifacial flat-plate solar collector (BFPC) is a solar collector which can absorb solar irradiation simultaneously from both its upper and lower absorber surfaces (LAS). Absorption of irradiation from the LAS is accomplished using a flat-plate reflecting surface (reflector) placed below the collector. To enable absorption from the LAS it is necessary beside the reflector that insulation in lower part of the collector box be replaced with glazing. In this paper the measurement chain with measuring equipment for the experimental testing of the BFPC and the conventional collector (FPC) is presented. The measurement chain would provide data about instantaneous useful energy gain and efficiency for both analyzed collectors.

2. EXPERIMENTAL SETUP OF THE BFPC AND FPC COLLECTORS

The main objectives of the experimental study are to investigate the feasibility of the proposed concept, the comparison of the experimental and theoretical results as well as the verification of the theoretical models. In this chapter the experimental setup of the BFPC and FPC collectors is presented.

The experimental setup of the tested collectors is installed in the open area of the Thermodynamics and Thermotechnics Laboratory of the Faculty of Engineering Kragujevac. The setup includes: the collector - reflector system (CRS), the FPC and the hydraulic installation.

The CRS consists of the supporting construction (Figure 1, position 1), the BFPC (Figure 1, position 2), the reflector (Figure 1, position 3) and the construction

