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"Gheorghe Asachi" Technical University of Iasi, Romania

EXPERIMENTAL STUDY ON SHOWER WATER HEAT RECOVERY SYSTEM FOR LOW WATER FLOW RATES

Dragos Marian Purghel, Cătălin Ioan Teodosiu[1*]

Faculty of Building Services and Equipment, CAMBI Research Center,
Technical University of Civil Engineering 122 – 124 Lacul Tei Bvd, Bucharest 020396, Romania

Abstract

Nearly 15% of the energy consumption in residential buildings in European Union (EU) is due to domestic hot water (DHW) nowadays. Consequently, there is a growing interest in exploiting the heat recovery potential related to DHW systems in buildings. There are several technical solutions for this, among them horizontal drain water heat recovery (DWHR) systems being more and more studied and enhanced as these systems do not require a large space for installation and they can be used for a wide range of applications. In this context, the objective of this study is to experimentally investigate the performance of a DWHR prototype for shower drains with reduced dimensions under low water flow rates conditions (equivalent to actual DHW consumptions in buildings equipped with modern fittings). The experimental studies were carried out both for unbalanced and balanced configurations in terms of waste water flow rate and cold water flow rate. The performance of the horizontal DWHR prototype is assessed by determining the effectiveness and the Number of Transfer Units (NTU). The results show that the proposed DWHR system leads to acceptable results considering the constraints related to its design and manufacture (reduced dimensions, low-cost construction and simple maintenance). Furthermore, the designed DWHR system could be an appropriate solution for heat recovery from drain shower water considering the estimated annual energy saving for DHW by its implementation in dwellings.

Key words: drain water heat recovery, energy saving, experimental set-up

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[*] Author to whom all correspondence should be addressed: e-mail: catalin.teodosiu@utcb.ro; Phone: +40 212524620; Fax: +40 212526880