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IMPROVING THE ENERGY EFFICIENCY OF RESIDENTIAL BUILDINGS BY USING A DRAIN WATER HEAT RECOVERY SYSTEM

Timea Gabor*, Viorel Dan, Iulian-Nicolae Badila, Ancuta-Elena Tiuc, Ioana Monica Sur

Technical University of Cluj-Napoca, Faculty of Materials and Environmental Engineering, Department of Environmental Engineering and Sustainable Development Entrepreneurship, 103-105 Muncii Ave, Cluj-Napoca, 400641, Romania

Abstract

Continuously increasing energy prices, as well as the increasing number of legal stipulations, bring to the attention of scientists the necessity of finding solutions for energy saving by using different heat sources. According to the EU Action Plan, the highest potential of energy savings (27-30% until 2020) will be applied to the existing buildings. Under the circumstances of environmental issues, research on the use of secondary energy resources is of great interest, being a concern in the context of sustainable development. The aim of the present paper is to accumulate knowledge on how a drain water heat recovery unit using a heat pipe heat exchanger performs under different drain water flow profile scenarios. Researching how the intermittent behaviour of the drain water influences the performance for this type of system is important because it gives insight on how the system will perform in a real life situation. In this paper the authors investigated the performance of a heat recovery unit, from drain water heat recovery. Investigation of the heat recovery unit performance shows that the heat pipe has the capability to recover more than 30% of the available heat in the drain water, at the flow rates investigated ($0.3 \div 0.5 \text{ m}^3/\text{hour}$). The application of the presented solution shows that a heat recovery system of this type has the possibility to recover a large portion of the available heat if it has been achieved in those buildings where the hot water consumption is higher (housing complexes, university campus, hotels, swimming pool, sport and leisure, hospital/healthcare, restaurants, laundry, pharmaceutical manufacturing).

Key words: domestic hot water, drain water, heat exchanger, heat pipe, heat recovery, storage tank

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* Author to whom all correspondence should be addressed: e-mail: timea.gabor@imadd.utcluj.ro; Phone: +40/264-401624