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## UNISOL – solar combistore evaluation and optimization.

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### Abstract

In the frame of UNISOL project, a test bench was installed to perform tests of a combistore which includes a two-way heat exchanger already submitted to a national patent application. The present work describes the main characteristics of the test bench installed and the tests performed with the objective of optimization of the configuration of the inner storage tank of the combistore (two way heat exchanger), used for DHW pre-heating or as back-up of the space heating. Tests according to EN 12977-3:2012 were performed in order to evaluate distinct configurations of the inner storage tank. Tests according to EN 12977-4:2012 were also performed for characterization of the complete combistore. Long-term performances of solar thermal systems using these combistore are presented. Long-term performance prediction based on testing results according to EN 12977-3:2012, showed how an increased active volume of the heat exchanger enhances the energy available for space heating, although it may decrease solar collector thermal performance and increase the energy losses of the combistore. Long-term performance prediction based on testing results according to EN 12977-4:2012, considering a lower heat loss coefficient since a better insulation of the combistore is expected in future prototypes, showed fsav values for Davos and Wurzburg of 39.3% and 25.3%, respectively.

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### 1. Introduction

UNISOL is a national project aiming at the development of an innovative, autonomous and intelligent universal system for management and accumulation of solar heat that can practically use any solar collector in the market [1]. The system will simultaneously pre-heat domestic water (DHW) and space heating (SH). The main component is a

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