# INVESTIGATING THE PERFORMANCE OF THE COMPACT PARTICULATE MATTER COLLECTOR FOR USE IN DOMESTIC WATER SYSTEMS

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Abstract – The concept of the new water treatment system was developed. The system is based on the previously invented technology – Compact Particulate Matter Collector (CPMC). A primary area was defined in which such technology is intended to be used: water treatment in compact flue-gas condensation systems for a low-power wood-fuelled biomass boiler. Such a system is intended for use in domestic conditions. Such a process involves contamination of technical water with a mixture of particulate matter, resulting in suspension. The CPMC aims to divide the suspension into the relevant fractions effectively. A prototype operating based on CPMC technology was built. An experimental plan was developed, and an experimental stand was constructed to determine the prototype's efficiency. The experimental plan envisaged five different prototype operating modes and two research steps, depending on the degree of prototype modification. Based on the research results, it was concluded that the prototype could operate effectively in the laboratory environment: achievable efficiency is equal on average between 57.84 % and 88.09 % depending on the operating mode (see the diagram below). The result is assessed as positive. TRL 3 has been reached. The next phases of the study would be the integration of the prototype into the relevant compact flue-gas condensation system and the exploration of commercialisation capabilities, which will stimulate TRL increase.

Keywords – Biomass energy; domestic water treatment; efficiency study; laboratory testing; particulate matter; prototype development; water filtration; water purification
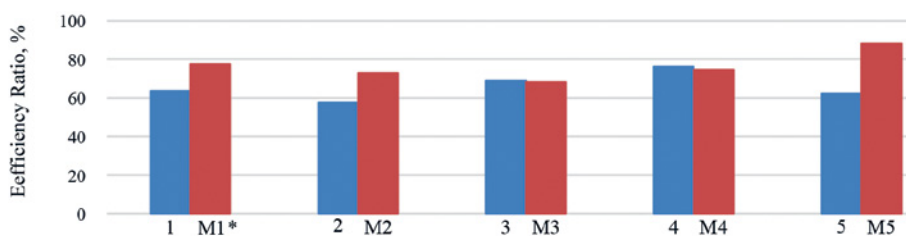
Average efficiency ratio depending on the CPMC operation mode (* M – modified prototype used).

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