# OPTIMIZED MATERIALS AND PROCESSES FOR THE SEPARATION OF MICROPLASTIC FROM THE WATER CYCLE – OEMP

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The increasing application of plastic products during the last 60 years, entailed an undesirable plastic input to the environment. Small plastic particles (microplastic) are able to reach the water cycle by households and urban areas. Microplastics are defined as particles with smaller than 5 mm and could be subdivided into two groups. Primary microplastics are engineered materials used as product additives for cosmetics, peelings and cleaning agents. Secondary microplastics are produced from the embrittlement of common plastic products, due to physical, chemical or biological degradation processes. The project "Optimized materials and processes for the separation of microplastic from the water cycle" – OEMP founded by the German Bmbf intends the development of new restraining materials and separation processes of various microplastic particles (different in size, shape, type of plastic). Different entry pathways of the urban water cycle in city areas (effluent from wastewater treatment plants, combined sewer overflows, street drainage) are investigated for the purposes of optimized technical approaches, to ensure a sustainable water economy with high class standards in protection of the surface waters. Therefore, a proper assurance is needed, that examines the different technical and natural systems with regard to their retention qualities. An integrant is an evaluable methodology for sampling and analytics of microplastic, as well as a first benchmark of the purification processes, which are developed during the project OEMP. For the effluent of the wastewater treatment plant high performance filtration materials were developed. The first field tests are evaluated and show relevant reduction of suspended solids. The cloth filtration media and for sieve filtration show a removal efficiency of more than 70 % for the Materials down to 20 microns. Further test with pore size materials down to 6 microns will follow. The following figures explain the principle of the cloth filtration media and the sieve filtration. For the fine materials fare higher reduction rates are expected. To analyze the samples a thermal extraction method was developed as well as a sampling technique for high sampling volumes up to 2 m3 to measure the amount of microplastics in the frictions of 500, 100, 50, and 6 microns. Plastics and microplastics will be preserved in the environment for many years, therefore systematic studies in the field of urban water management are reasonable. To implement promising technics for separating microplastics from the effluent of wastewater treatment plant and mixes sewage water at existing infrastructure the municipality, the industry, the research and the citizen/consumer are requested to collaborate.

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