WASSER 3.0

FACTSHEET

# WASSER 3.0 PE-X®

## Simultaneous Microplastic & TSS Removal at a Municipal WWTP – Mykonos, Greece

**86%**
MP Removal (mass)

**95%**
TSS Removal

**70%**
COD Reduction

**93%**
Turbidity Reduction

REMEDIES
MEDITERRANEAN SEA BASIN LIGHTHOUSE

Co-funded by the European Union

## OVERVIEW

This factsheet summarizes the results of pilot trials conducted at the municipal wastewater treatment plant (WWTP) of Mykonos, Greece, within the EU Horizon Europe REMEDIES project (GA 101093964). The Wasser 3.0 PE-X® pilot unit was installed downstream of the two-stage conventional activated sludge (CAS) line and operated in semi-continuous mode over five experimental loops.

## DEMO SITE – MYKONOS WWTP

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| **Location** | Mykonos Island, Cyclades, Greece |
| **Design capacity** | 48,000 population equivalents (PE) |
| **Off-season population** | < 10,000 PE |
| **Treatment lines** | Conventional activated sludge (8,400 $m^3/d$) + MBR (10,800 $m^3/d$; shut down during trials) |
| **Wastewater sources** | Municipal sewage (sewer network) + septic tank deliveries by truck |
| **Discharge** | Mediterranean Sea (Aegean) |

| TECHNOLOGY | |
|---|---|
| **Process** | Wasser 3.0 PE-X® Agglomeration-Fixation Technology (Clump & Skim) |
| **Reactor capacity** | 200 L (reactor) + 800 L (separation unit), stainless steel |
| **Flow rate** | 5 $m^3$/h (semi-continuous mode) |
| **MP reagent** | abcr eco Wasser 3.0 PE-X®, wastewater (AB930003),<br>5 mL per loop |
| **MP detection** | Fluorescence staining (Wasser 3.0 detect mix MP-1)<br>+ Zeiss Axiozoom.V16 microscopy, 10 µm detection limit |
| **TRL** | 8+ (municipal WWTP application) |
| **TRL** | 9 (industrial wastewater treatment) |

## KEY RESULTS

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|---|---|
| **MP influent** | 633–5,843 MP/L (mean 2,032 ± 2,176 MP/L) |
| **MP effluent** | 96–263 MP/L (mean 178 ± 76 MP/L) |
| **MP removal** | 86 ± 8% (range 77–96%) |
| **TSS influent** | 43–515 mg/L (mean 194 ± 173 mg/L) |
| **TSS effluent** | 2–14 mg/L (mean 7 ± 5 mg/L) |
| **TSS removal** | 95 ± 3% (range 91–99%) |
| **COD influent** | 95–786 mg/L (mean 323 ± 254 mg/L) |
| **COD effluent** | 51–56 mg/L (mean 53 ± 2 mg/L) |
| **COD removal** | 70 ± 20% (range 46–93%) |
| **Turbidity removal** | 93 ± 7% (82–99%), effluent 2–3 NTU |
| **pH / Conductivity** | Stable; pH 6.9 → 7.2, conductivity unchanged (15.6 mS/cm) |
| **MP size distribution** | 70% of influent MP < 50 µm; larger particles removed more efficiently |

## REGULATORY COMPLIANCE

After treatment, all effluent values comply with Greek/EU discharge limits (COD ≤ 125 mg/L, TSS ≤ 35 mg/L) as required by JMD oik. 5673/400/1997 transposing Directive 91/271/EEC. Untreated WWTP effluent exceeded these limits in multiple loops. The revised EU Directive (EU) 2024/3019 mandates MP monitoring from 2025 (Article 17), with transposition by July 2027. All reagents are EU-REACH compliant.

## KEY ADVANTAGES

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| **Filter-free** | No fouling, no clogging – agglomerates > 1 mm separated via coarse-pored units |
| **Robust** | Stable performance despite irregular truck-delivered wastewater with high variability |
| **Circular economy** | Agglomerates are recyclable (construction materials, energy recovery) |
| **Cost-effective** | -20% lower CapEx, up to 75% lower OpEx vs. membrane filtration |
| **Dual removal** | Simultaneous MP + TSS removal in a single process step |
| **Scalable** | Modular containerised systems (250 L–1,000 L) for rental & service model |

## FUNDING & REFERENCE

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