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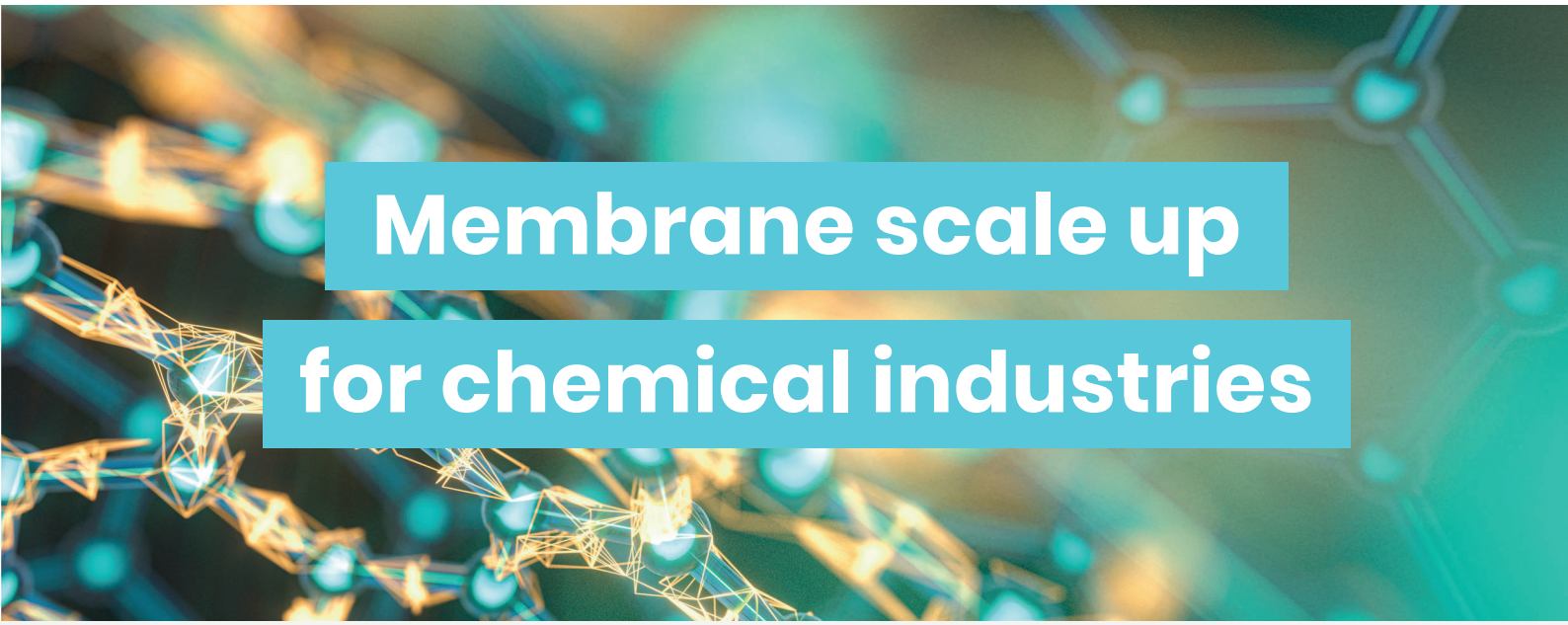

Membrane scale up for chemical industries

STATUS OF PROTYPES

Innovation never stands still – and neither does MEASURED.

In the 6th issue of the MEASURED newsletter, we take you behind the scenes of new pilot installations, rapidly advancing membrane technologies, and the teams turning scientific ideas into real industrial solutions. From waste reduction to high-performance separations, the project is gaining momentum-and we're excited to share the latest steps forward.

MEMBRANE DISTILLATION PILOT: REDUCING WASTE AND INCREASING SUSTAINABILITY

The Membrane Distillation (MD) line aims to treat and purify the wastewater generated during membrane manufacturing. By concentrating toxic high-boiling solvents and volatile alcohols into a much smaller waste stream, the process significantly reduces disposal volumes. This solution was chosen because it offers flexibility, aligns with GVS's plans to expand renewable energy use in future factories, and helps optimize both space and budget.

PREPARING AND ASSEMBLING THE MD MEMBRANES

For the MD process, membranes were produced using a phase-inversion method and given a surface treatment to make them more hydrophobic, an essential feature for efficient distillation. Delivery of the pilot system is expected soon, after which reception tests will begin. Each membrane module holds 40 plates, each carrying one membrane of 200 × 200 mm. The complete module measures 230 × 300 × 240 mm (W × H × D). It includes dedicated ports for feed, cooling, and purified water flows. The plates for the MD units are already manufactured and are now entering the assembly phase.

BUILDING AND DEPLOYING THE MD PILOT

The MD pilot has now been fully constructed at EPC's facility and has already been picked up for shipment to Sweden. From there, it will be forwarded to the GVS facility in Italy for installation and operational testing.

SCALING UP CARBON MOLECULAR SIEVE MEMBRANES FOR GAS SEPARATION

The production of carbon molecular sieve membranes (CMSMs) has been scaled up from small laboratory-scale tubes (10–15 cm long) to larger, more industrially relevant ones exceeding 40 cm in length and 1.4 cm in diameter. These membranes are now produced with higher numbers per batch. Early 2026, up to 70 of these larger membranes will be delivered by TECNALIA to TU/e for the assembly of a prototype gas-separation unit and then tested by ZEFIRA for hydrogen separation.

PERVAPORATION SYSTEM SUCCESSFULLY LAUNCHED

The membrane skid for the pervaporation (PV) unit has now been successfully started. Since early November, ARKEMA's esterification reactor and Orelis's membrane unit have been operating together continuously from Monday to Friday. This follows positive performance checks conducted in October using standard mixtures such as butanol and water. Thanks to the strong collaboration across the PV team (Orelis, TNO, Arkema), the system is running well. Membrane selectivity is very good, and the flux—while slightly below the optimal target—remains stable. The most encouraging result is membrane durability: no decrease in performance has been observed so far. Testing will continue to assess lifetime and further optimize the combined reaction and pervaporation process.

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