

## WWTP Emden

### New established RMU Plug Flow Technology, exchange of the MESSNER Aeration Panels, energy savings and improved effluent values!

*Exchange of the MESSNER Aeration Panels after more than 22 years operation.*

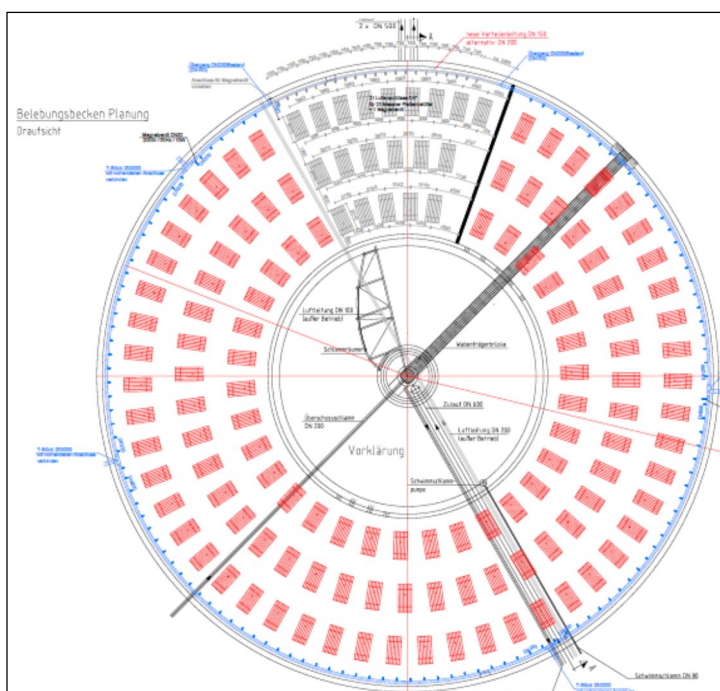
The Bau- und Entsorgungsbetrieb Emden operates its main wastewater treatment plant Emden-Larrelt, which has an expansion size of 90,000 inhabitants. The load of the anaerobic stabilising wastewater plant, which is equal to 75,000 PE, is treated in two parallel aeration tanks. These two circulation basins have a total volume of 9,260 m<sup>3</sup>.

#### Initial situation:

In 1992 and 1993 the MESSNER Aeration Panels were installed in the two aeration tanks of the WWTP Emden. Each tank was separated in five compartments, which were flowed through one after the other, at this time. Only the second and the fourth compartment of each aeration tank were aerated with the MESSNER Aeration Panels. The third non-aerated compartments were fed with fresh wastewater from the settling tank in the inner circle. Mixers were installed in every single compartment.

#### RMU Plug Flow Technology:

In 2015 the MESSNER Aeration Panels got exchanged for substitute aerators from the RUDOLF MESSNER UMWELTECHNIK AG after continuous operation over 22 and 23 years respectively. Besides, four of the five existing separation walls and all of the mixers



were removed in every circulation tank. Thus two circular plug flow reactors were generated, which were equipped with 136 MESSNER Aeration Panels each. Thereby the exchanged MESSNER Aeration Panels were installed evenly distributed, while the fresh wastewater feeding in the middle of the reactor has been maintained. Both plug flow reactors have been operated independently and aerated intermittently since their renewal. The activated sludge is kept in suspension through RMU Air Pulsing during the non-aerated denitrification phases. Therefore the total mixing of the activated sludge is ensured by short aeration impulses.

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## Results and Benefits:

The MESSNER Aeration Panels got exchanged for substitute aerators from the RUDOLF



MESSNER UMWELTTECHNIK AG in 2015. The substitute aerators are refurbished MESSNER Aeration Panels with equal efficiency and service life features as new MESSNER Aeration Panels. The main difference to a new MESSNER Aeration Panel is the drastic price reduction. The removal of the mixers results in the loss of maintenance, operating and renewal costs. In comparison to the used process the energy

costs for the biological wastewater treatment could be reduced by 47%, due to higher membrane surface, mixer removal and the RMU Plug Flow Technology. This means an energy saving of 654,000 kWh, extrapolated to one year. Therefore the specific energy consumption of the biological wastewater treatment is actual under 10 kWh per inhabitant and year. Furthermore the average effluent value of ammoniacal nitrogen could be decreased by 40% in the reference period.

