

Multiport diffuser outfall configurations: dispersion and hydraulic optimisation for brine discharges

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ABSTRACT

This study analyses several multiport diffuser types for typical brine discharges from RO plants in both the Arabian Gulf Sea and the Gulf of Oman using the CORMIX2 near-field mixing model software [1] and the CorHyd [2] diffuser hydraulic analysis model for varying discharge flowrates under a range of steady state current flows covering typical current velocities in the region during ebb and flood phases. The diffuser types cover alternating, unidirectional, tee and staged diffusers with different set-ups in order to encompass varying brine effluent flows and characteristics. The results show that one or two independent (in case of a wide range of discharge flowrates) staged diffuser lines will produce the highest mixing among all other configurations, with tapered diffusers to obtain sufficient diffuser velocities to prevent settling and with ports equipped with duckbill valves as to secure the even flow distribution among all ports with high jet velocities and hence achieving the proper mixing.

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