

ばっ気時間自動制御装置を用いた膜分離 間欠ばっ気活性汚泥方式の窒素除去特性

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概 要

膜分離活性汚泥法では，安定した窒素除去能力を確保するうえで，十分な還元雰囲気
を確保することが必要である。本報では，過ばっ気やばっ気不足による機能の低下を防
ぎ，窒素の硝化と脱窒を効率的に行うことが可能な，ばっ気時間自動制御装置（ATC）
の膜分離間欠ばっ気活性汚泥法への適用について検討した。

通常負荷では，硝化時間を必要最小限とすることで，1サイクル（2時間）当たり約
40分の余裕時間（脱窒完了後から次回のばっ気までの時間）が得られた。また，設計水
量の50％に流入を抑えた低負荷試験や，設計水量の3倍量を流入させた水量負荷試験に
おいても，基質濃度に対応してばっ気時間を自動制御可能なことを確認した。従来の間
欠ばっ気処理では，経験に基づいたタイマーやDOの設定が必要で，負荷変動への対応が
困難であったが，ATCを組み込むことにより，維持管理が容易で，安定した窒素除去能
力を確保することができた。

同時に，中空糸膜の導入により，再利用水として利用可能な高度な水質を得ることが
できた。

The Characteristics of Nitrogen Removal in Membrane Separation Activated Sludge Process with Intermittent Aeration by Applying an Aeration Time Controller

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Abstract

In the membrane separation activated sludge process, it is necessary to assure a sufficient reduction conditions in order to have a stabilized nitrogen removal efficiency. This study conducts by applying an aeration time controller (ATC), which can prevent a drop in treating performance due to excessive aeration or insufficient aeration, and achieve efficient nitrification and denitrification with intermittent aeration in the membrane separation activated sludge process.

With a normal load, by setting the minimum necessary nitrification time, approximately 40 minutes spare time (from the completion of denitrification to the next aeration) was obtained in a 2 hours cycle. It was also confirmed in the low load test that the influent was reduced to 50% of the design volume, and in the volume load test that the influent was increased to 3 times the design volume, that it was possible to control the aeration time automatically corresponding to the substrate concentration. In conventional intermittent aeration treatment, aeration time or DO concentration was usually set based on experience, that was difficult to respond to load fluctuations, but through the incorporation of the ATC, maintenance and operation could be carried out easily and stable nitrogen removal efficiency could be achieved.

At the same time, combined with the hollow fiber membrane, high level quality water could be obtained that made it possible to reuse.