

## Biological nitrogen removal at low water temperatures — long term experience

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### ABSTRACT

Many earlier publications presented the lowest temperature of 10°C as feasible for nitrification process. The article evaluates long-term experience with biological nitrogen removal at low temperatures (between 2 and 10°C), studied at four wastewater treatment plants operated with SBR-technology: Holbaek (Denmark), Nowy Targ (Poland), Nynäshamn and Skaulo (Sweden). Influence of nitrogen loads and COD/N ratio on nitrification rate was studied. Despite of operation at low temperatures during 3–4 months of the year good relation between the nitrogen load and the specific nitrification rate has been obtained. Long-term studies regarding nitrification, temperature and SRT demonstrated that the actually needed (aerated) SRT were lower than the normally recommended values. In some cases the nitrification was maintained at a lower efficiency even during non-aerated phases due to remaining free oxygen in the reactor that is used for nitrification.

*Keywords:* Nitrogen removal; SBR; Low water temperature; Solids retention time

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