

# ULTRASOUND SLUDGE DISINTEGRATION OF SEWAGE SLUDGE USED AS INTERNAL CARBON SOURCE FOR DENITRIFICATION

**Bünde WWTP, Germany**



## I. Brief snapshot of the plant

<b>Design capacity</b>	40,000 PE
<b>Actual loading</b>	54,000 PE
<b>Biological wastewater treatment</b>	<ul style="list-style-type: none"> <li>• P-elimination</li> <li>• Alternating nitrification and denitrification at a sludge age of about 22 days</li> <li>• Addition of methanol as external carbon source</li> <li>• Secondary clarifier</li> </ul>
<b>Sludge treatment</b>	<ul style="list-style-type: none"> <li>• No primary sludge</li> <li>• Thickened waste activated sludge</li> </ul>
<b>Separate waste activated sludge thickening</b>	<ul style="list-style-type: none"> <li>• Belt press (operating 24 hours)</li> </ul>
<b>Anaerobic sludge stabilization</b>	<ul style="list-style-type: none"> <li>• 2 digester, mesophilic</li> <li>• HRT: 40 days</li> </ul>
<b>Digested sludge dewatering</b>	<ul style="list-style-type: none"> <li>• Centrifuge</li> </ul>
<b>Sludge disposal</b>	<ul style="list-style-type: none"> <li>• Incineration</li> </ul>

## II. Objective of the ultrasound sludge disintegration

- Use of disintegrated TWAS as an internal carbon source for the improvement of the denitrification process.

## III. Preliminary trial of the ultrasound disintegration system

- Test phase of four months (March 2006 – June 2006)
- 50% of the total TWAS flow were treated with 1 ULTRAWAVES US unit 5 kW, operating 24 hours per day and feed in denitrification basin (Fig. 1)

#### IV. Results

- A significant reduction of the nitrogen concentration in the effluent ( $N < 3 \text{ mg/L}$ )
- Avoid of methanol as external carbon source
- Waste activated sludge: Reduction of the sludge mass by 13%
- Reduction of the organic fractions
- Improvements in dewaterability of the sludge by 2%
- No foaming or bulking sludge in the activated sludge tank

#### V. Payback time

Immediately, because of reimbursement in form of reduced public sewage fees as a result of decreased nitrogen concentrations in the effluent of the plant and cost savings of avoided methanol.

#### VI. Full-scale installation

In September 2006 the ULTRAWAVES ultrasound system was implemented on WWTP Bünde. And since is in operation 24 hours per day. WWTP Bünde bought a second ULTRAWAVES ultrasound system for the improvement of anaerobic digestion in 2007.

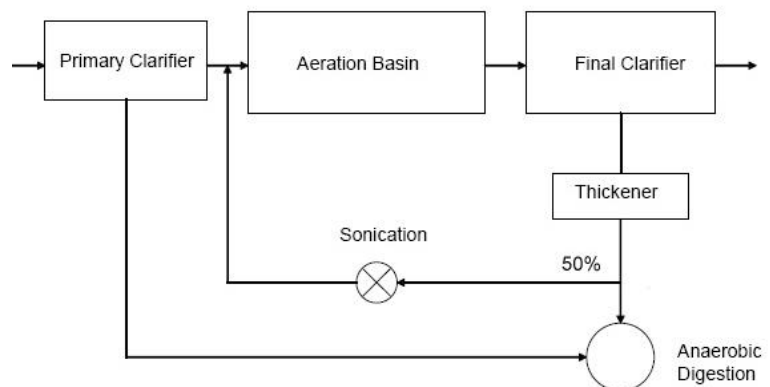


Figure 1: Scheme of sludge treatment on WWTP Bünde and Ultrasound system with thickener

