

# IMPROVEMENT OF ANAEROBIC DIGESTION BY ULTRASOUND TECHNOLOGY

Centrum WWTP, Dabrowa-Gornicza, Poland



## I. Brief snapshot of the plant

Design Capacity	150,000 PE
Actual Loading	200,000 PE ➤ Overloading conditions
Biological wastewater treatment	<ul style="list-style-type: none"> <li>• Simultaneous denitrification and nitrification</li> <li>• Bio-P-elimination</li> </ul>
Sludge Treatment	<ul style="list-style-type: none"> <li>• No primary sludge</li> <li>• Thickened waste activated sludge (TWAS)</li> </ul>
Separate waste activated sludge thickening	<ul style="list-style-type: none"> <li>• Drum thickener (operating 14h/d)</li> </ul>
Anaerobic sludge stabilization	<ul style="list-style-type: none"> <li>• Two digesters, 2 x 1,680 m<sup>3</sup>, mesophilic</li> <li>• HRT: 19 days</li> </ul>
Biogas production	<ul style="list-style-type: none"> <li>• 438.000 m<sup>3</sup>/a</li> <li>• 66% capacity of the CHP used</li> </ul>
Digested sludge dewatering	<ul style="list-style-type: none"> <li>• Band filter press</li> </ul>

## II. Objective of the ultrasound sludge disintegration

- Increase biogas production
- Improve volatile solids degradation
- Eliminate the need for the construction of a new digester

## III. Preliminary test of the ultrasound disintegration system

- Test phase of five months (February 2009 – June 2009)
- The recirculated digested sludge concerning 30% of the total daily TWAS flow is treated with 2 units 5kW-ULTRAWAVES US, operating 14 hours a day

#### IV. Results

- Biogas production increased by 28%
- Volatile solids concentration (as % of DS) was reduced from 70% to 65%

#### V. Full-scale installation

In July 2009 the ULTRAWAVES ultrasonic reactor was implemented on Centrum WWTP and is in operation 14 hours a day.

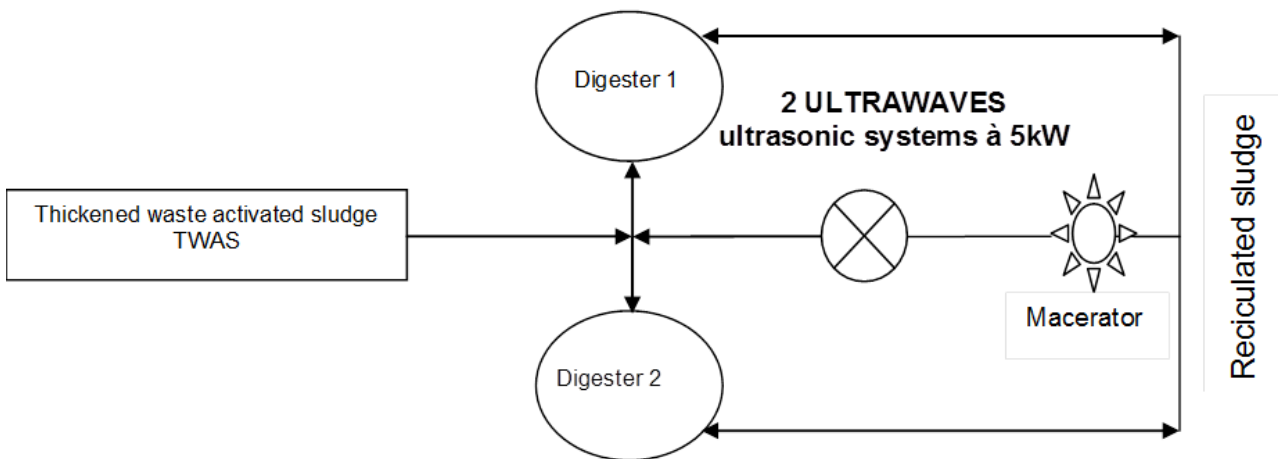


Figure 1: Centrum WWTP sludge flow sheet

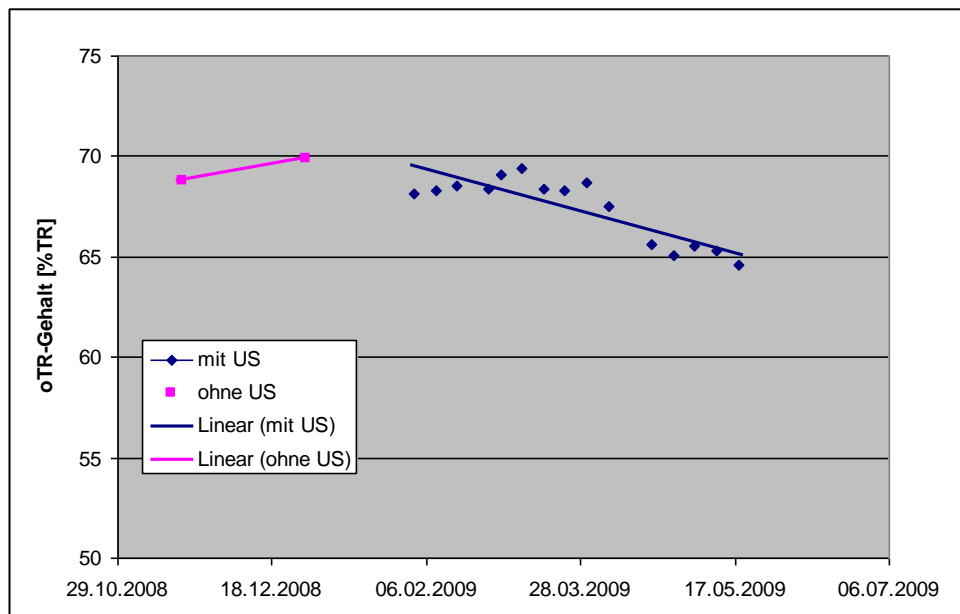


Figure 2: Volatile solids concentrations in digested sludge during trial

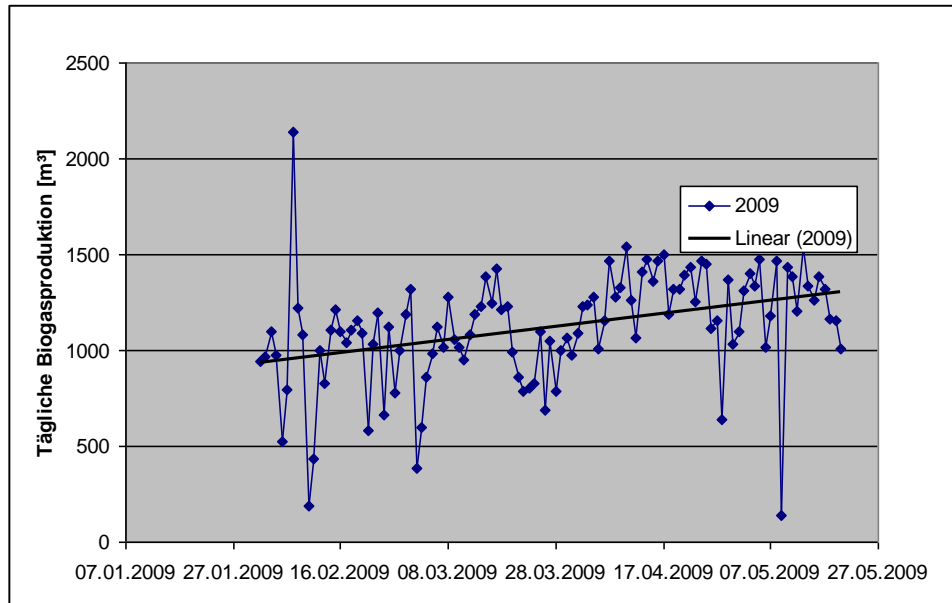


Figure 3: Biogas production of Anaerobic Digester Jan – May 2009

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