

# 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**  
Simultaneous denitrification and nitrification  
Bio-P-Elimination
- **Sludge Treatment**  
No primary sludge  
Thickened waste activated sludge (TWAS)
- **Separate waste activated sludge thickening**  
Drum thickener (operating 14h/d)
- **Sludge stabilization**  
Two digesters, 2 x 1,680 m<sup>3</sup>, mesophilic
- **Biogas production**  
Production: 438.000 m<sup>3</sup>/a  
66% capacity of the CHP used
- **Digested sludge dewatering**  
Band filter press

## 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 trial 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- was treated with 2 units 5kW-ULTRAWAVES US, operating 14 hours per day

## IV. Results

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

## V. Payback time

Based on these results, the payback time for the ultrasound installation is calculated with 2 years. No need for the construction of a new digester.

## VI. Full-scale installation

In July 2009 the ULTRAWAVES ultrasonic reactor was implemented on Centrum WWTP. And since is in operation 14 hours per day.

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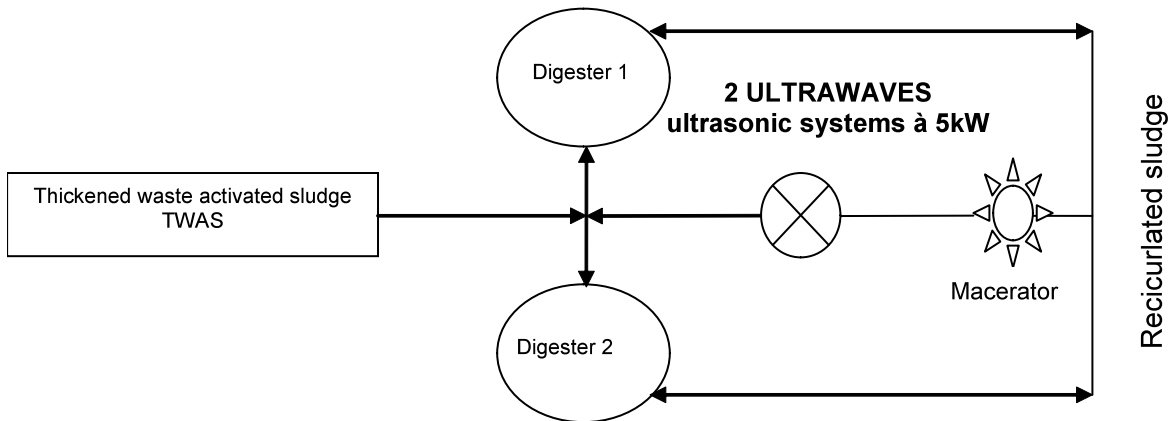


Fig. 1: Centrum WWTP sludge flow sheet

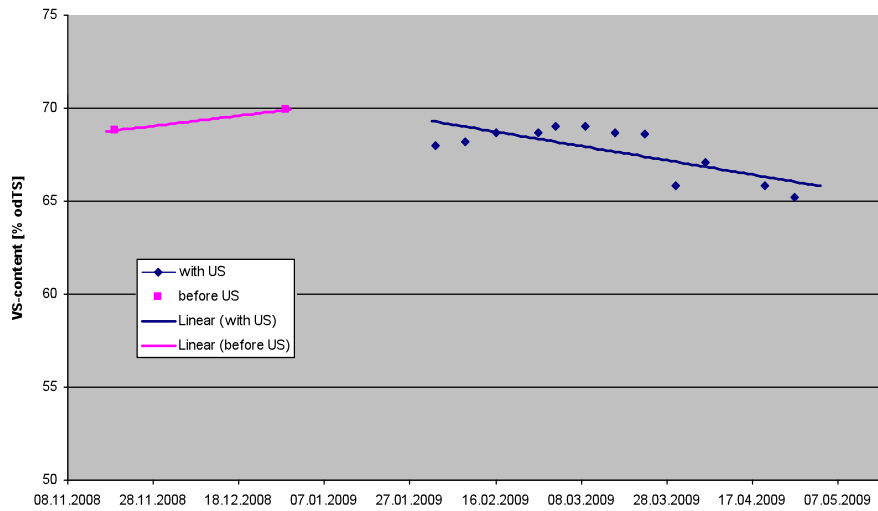


Fig. 2: Volatile solids concentrations in digested sludge during trial

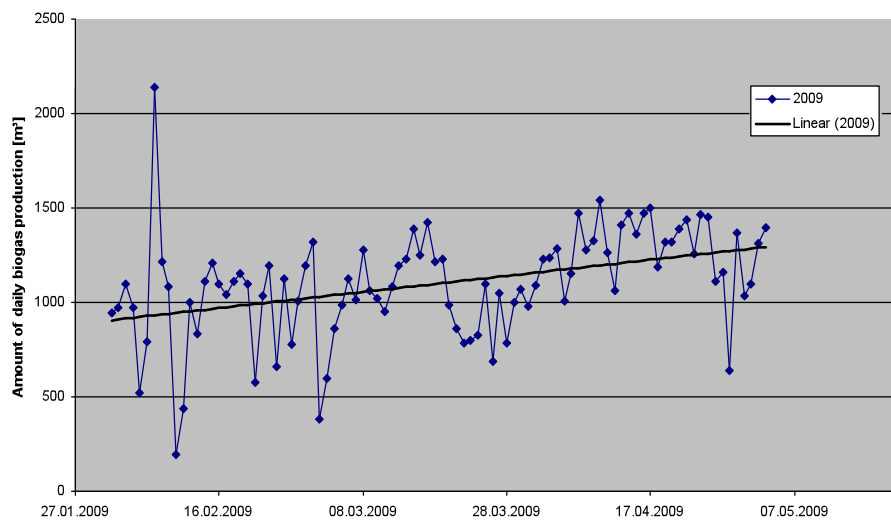


Fig. 3: Biogasproduction of Anaerobic Digester Jan – May '09