

ULTRAWAVES ULTRASOUND SYSTEM FOR IMPROVEMENT OF ANAEROBIC DIGESTION ON WASTE WATER TREATMENT PLANTS

Bamberg WWTP



I. Specification of the plant

| | |
|-------------------------------------|---|
| Design capacity | 230,000 PE |
| Actual loading | 280,000 PE |
| Sludge treatment | <ul style="list-style-type: none"> Primary sludge (PS) and thickened waste activated sludge (TWAS) |
| Separate WAS thickening | <ul style="list-style-type: none"> Centrifuge |
| Anaerobic sludge stabilization | <ul style="list-style-type: none"> 3 digesters (2 x 2,000 m³, 1 x 1,000 m³) |
| Hydraulic retention time | <ul style="list-style-type: none"> 18 days (2003) |
| Degradation of volatile solids (VS) | <ul style="list-style-type: none"> 34% (2003) |
| Sludge disposal | <ul style="list-style-type: none"> Incineration after dewatering |

II. Objective of the ultrasound application

- Intensification of anaerobic digestion process
- Reduction of volatile solids concentration
- Increase of biogas production

III. Installation of the Ultrawaves ultrasound system

- Installation of 2 Ultrawaves ultrasound systems (2 x 5 kW) for test in May 2002
- 30% of total TWAS flow treated with ultrasound

IV. Results of ultrasound treatment

- Construction of a new digester (est. investment costs: 2.5 million euros) was avoided
- Intensification of sludge digestion: degradation of VS increased from 34% to 58% (see figure 2)
- Quality of digested sludge: reduction of the VS (as per cent of DS) from 60% to 54%
- Biogas production: increase of 29%

V. Full-scale installation

Two Ultrawaves ultrasound systems (2 x 5 kW) are in operation since August 2004. In the beginning the recommended stream (30% of the total TWAS flow) was treated during 8 hours a day. The thickening process was automated to operate 24 hours a day. Today the treated stream amounts to 80% of the total TWAS flow.

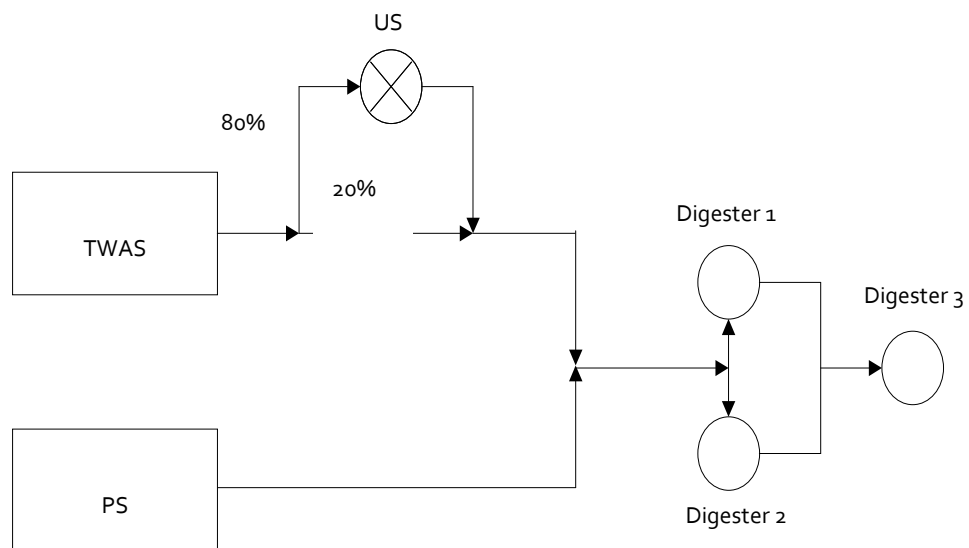


Figure 1: Sludge flow sheet of Bamberg WWTP and integration of ultrasound system (US)

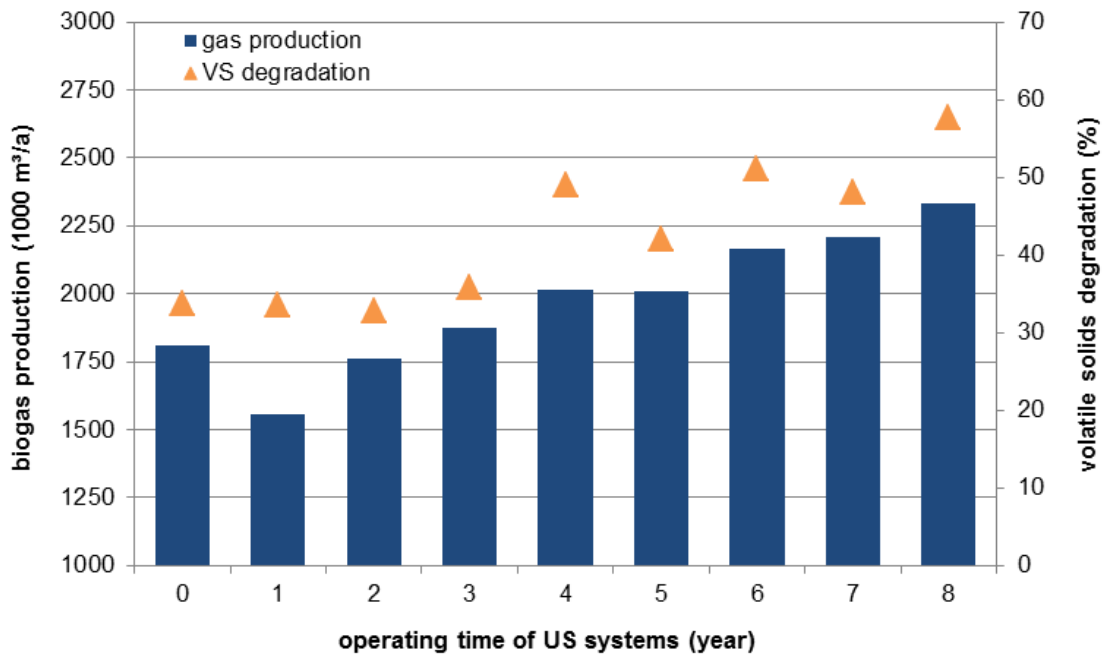


Figure 2: Biogas production and degradation of volatile solids

on Bamberg WWTP

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