CWT
CLEAN WATER TECHNOLOGY

# Anaerobic EGSB Reactor

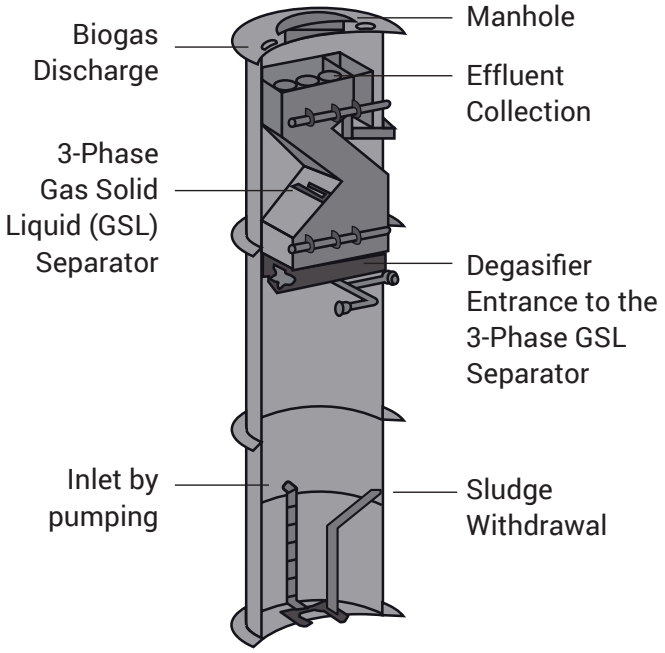
## EXPANDED GRANULAR SLUDGE BED (EGSB) REACTOR

EGSB System

## Achieve Excellent Results With CWT's Secondary Wastewater Treatment

The Expanded Granular Sludge Bed Reactor (EGSB) is a sophisticated improvement of the UASB technology. It operates at high up-flow velocities. The EGSB ensures superior mass transfer and effectively eliminates significantly higher levels of organic material within a more compact volume. Experience unrivaled efficiency and optimal performance with the CWT EGSB Reactor.

These products contain high levels of dissolved chemical and biological oxygen demand (COD/BOD), resulting in high biomass concentrations. The EGSB process efficiently converts contaminants mainly into biogas, enabling organic loading rates of up to 35 kg COD/m3-day, with typical elimination rates exceeding 80%.




### EGSB Advantages

- High organic removal rate
- Extremely small footprint
- Short hydraulic retention time
- Low energy consumption
- Sealed reactor for total emission
- Control and odor prevention
- Agricultural usable sludge
- Methane energy by-product
- Exclusive and highly effective
- Internal novel gas-solid-liquid separator (patent pending)
- Proven reliability and performance

After treatment, the stream can be directed to the aerobic and clarification processes for discharge to the city; or undergo further treatment before being directly discharged or reused.

The EGSB operates through multiple stages in a vertical flow series, effectively breaking down COD/BOD to reduce contaminant concentration, surcharges, odor, and by-product generation.

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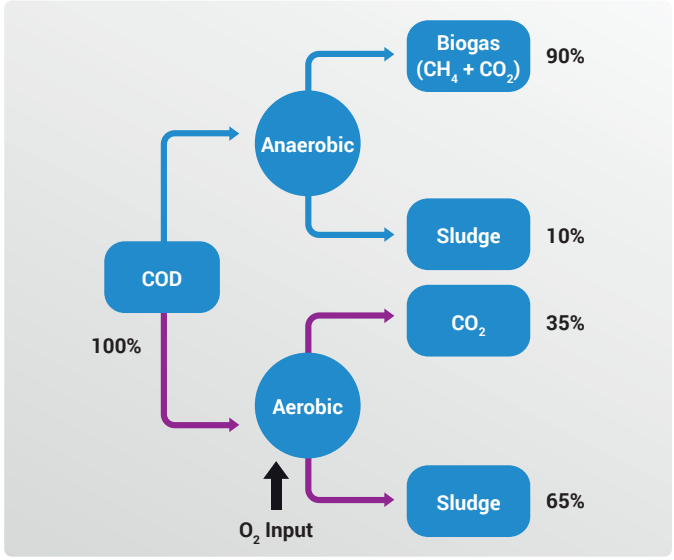
| COMPONENT | FEATURES |
|---|---|
| Tank | Carbon Steel, Fiberglass |
| Height (meters) | 8 to 28 |
| Diameter to height ratio | 3 to 6 |
| Sludge | Granular |
| Three-phase separator | Fiberglass |
| Organic loading (kg COD/$m^3$/d) | 15 to 35 |
| Average reactor volume ($m^3$/ton COD) | 50 |
| Hydraulic Retaining (hours) | 2 to 24 or more |
| Start-up time (days) (depends on volume and quality of inoculum) | 30 to 90 |
| Ascending speed (m/h) | 3 to 10 |
| Removal efficiency (COD%) | 70 to 90 |
| Removal efficiency (BOD%) | 75 to 95 |




## The CWT EGSB Unique Chemical Process

1. Complex organic materials undergo hydrolysis of lipids, cellulose, and proteins, resulting in the hydrolyzation and fermentation into fatty acids. This process can occur in either an aerobic or anaerobic environment.
2. In theacidogenesis stage, large-chain fatty acids such as propionic, acetic, and butyric acid undergo oxidation through β-oxidation, generating hydrogen (H2) and acetate. These processes are known as Acetogenesis and Dehydrogenation, respectively.
3. The final stage is Methanogenesis, in which hydrogen (H2) combines with carbon dioxide (CO2) to produce methane (CH4), while acetic acid is converted into carbon dioxide (CO2) and methane (CH4).

The production of methane gas is the slowest and most delicate stage of the anaerobic digestion process. These bacteria thrive best at a pH level of 6.6-7.6, excessive growth of acid-forming bacteria can lead to an overproduction of acid, resulting in a pH decrease that may cause issues.

Methanogenic bacteria exhibit optimal performance within a limited temperature range, typically in the mesophilic range of 90-105 °F. (equivalent to 32-40 °C in Celsius).

CWT's EGSB Reactor effectively manages these critical steps with a track record of reliability and performance.

Watch video

## Ready to get started?

Contact us today to begin a conversation!

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