Methane Digester

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BIOHOME
COMPACTABLE METHANE DIGESTER

Introduction

Problem Statement

The methane digester is a portable small factory that can convert waste food into
renewable energy without the need of an engineer to operate it.

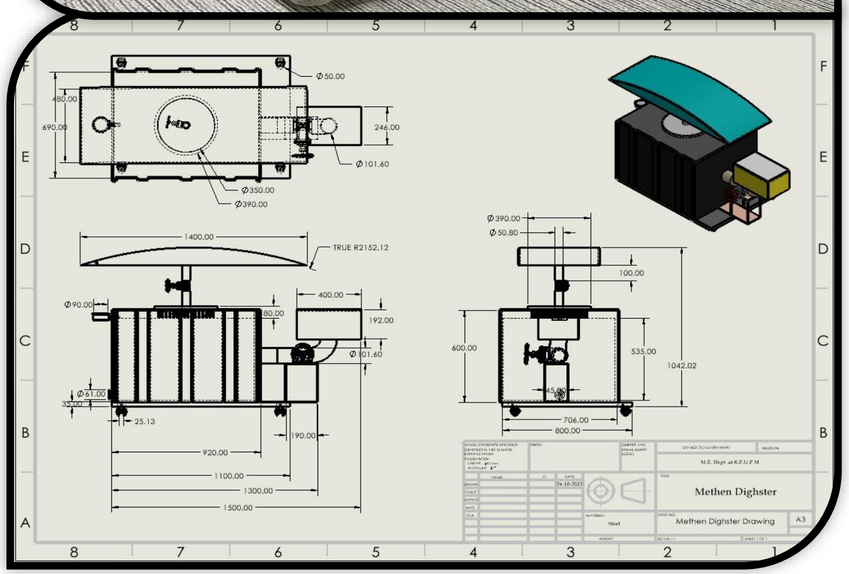
Constrains

- The water amount under 120 liters for each use.
- Each refill has at least 2 kg of waste.
- Material Compatibility
- User-Friendliness
- Portability
- Affordability

Specifications

- Estimated total Capacity: 300 Liters
- Operational temperature range: 35-40 degrees Celsius
- Methane production capacity: 0.15 m3
- Operational Pressure 1 atm
- Volume for Feedstock: 10% of the total capacity
- Volume for Water: 40% of the total capacity
- Volume for Gas Generation: 50% of the total capacity
- System with gauges for temperature, gas production, and safety.

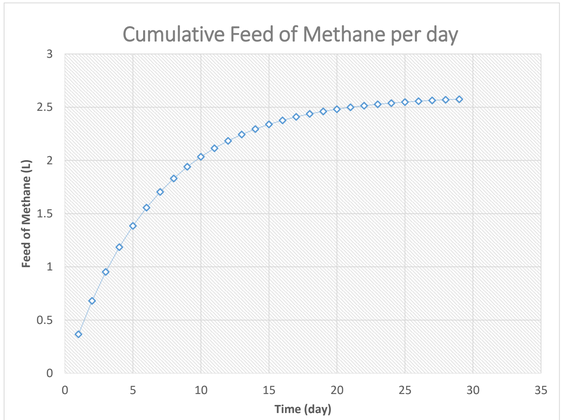
Prototype

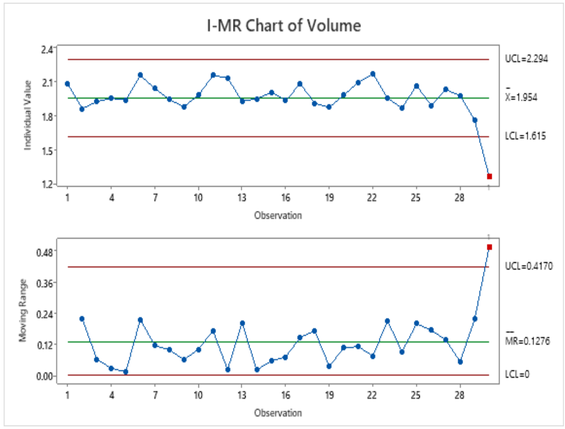


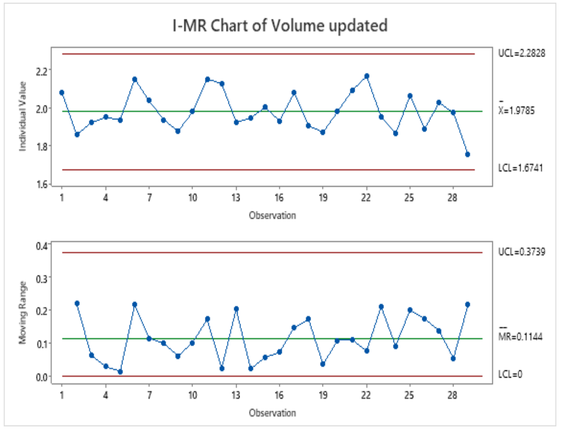
Testing / Validation

Proof that specifications were met

- Sufficient Capacity
- Sustainable Feedstock
- Optimal Temperature Control
- Gas Storage Tank
- Manual Gauges
- Effective Performance Metrics







Conclusions

Result

- 60% Biogas 45% of the Biogas is methane.
- Since the Fin= 10 kg, Fmeth = 2.58 L, and the energy of it = 2.5 MWH.
- The reason of the energy is low due to the feed in is quite low.
- If the was 100 kg, the Fmeth= 258 L.

As a result, the
energy will be 250 MWH

Future Enhancement

- Integrate valve actuators
- Size reduction
- Prototype weight reduction
- Implement machine learning
- Digitize and enhance with smart capabilities