Mobile Septage Treatment Unit (MTU)

Designed and Developed by
WASH Institute

What is MTU?

- Treatment system mounted on a small/ medium truck
- Designed to treat contents of septic tank at the household/site itself.
- Separates solids and liquids, liquid gets treated on the spot, thickened sludge carried for secondary treatment.
- Operational capacity is 6000 liters/hour.

PROCESS

Solid and Liquid Separation → Sludge (Solid) Thickening through Centrifuge → Liquid treatment – Membrane Filtration → The thickened solid is taken for secondary treatment → The treated effluent is safe for disposal on sight itself/can be used for secondary purposes such as gardening etc.

Major Advantages

Addresses several barriers to achieving safely managed septic waste

- Highly Mobile as treatment system is mounted on wheels
- Low Operational Cost
- Treated effluents meets the national and international norms. Can be used for secondary purposes such as gardening etc.
- Helps to keep environment clean by elimination of indiscriminate disposal and dumping of septage
- Reduces costs by avoiding transport of the liquid portion (which usually comprises of 95-99% of septage)
- Higher flow rate of MTU helps to empty & treat more number of septic tanks in a day
- As most of the small towns do not have treatment facilities such as FSTPs/STPs, MTU can be a very apt option for emptying & treating of septage

MTU has been tested and validated by National & International Institutions

Validated by Duke University, US in 2017: This validation was used to improve and finalize the MTU design. The MTU has been functional since this validation was completed.

Validated by RTI International, US in 2019: This validation was part of a larger set of field tests on all BMGF supported technologies. This was a rigorous 200 hour test which validated the technical performance and operating costs of the MTU.

Validated by BITS Pilani, Goa in 2020: Field testing of MTU for more than 180 hours took place as part of this validation prior to commercialization of MTU. The test methodology and results were independently reviewed by eminent academics from **IIT Madras and NIT Suratkal**. The MTU was driven to Goa in order to test its treatment efficiency at different geographical locations (60 septic tanks, Treated 4,53,701 lts).

Total No. of Septic Tanks Treated Thus Far

As a part of performance evaluation validation,till date, MTU has emptied 724 septic tanks and treated over 38.7 lakh litres of septage in different geographies of India.

MTU in Action During Emergency

In 2018, during Kerala floods, WASH Institute in close partnership with UNICEF deployed four MTUs in four severely flood affected districts (Alappuzha, Pathanamthitta, Thrissur and Ernakulam).

The MTUs treated a total of 9,18,222 litre of septage from the septic tanks in 156 locations across 60 camps. MTU services during Kerala floods were highly appreciated by the Govt. of Kerala, Hon'ble Finance Minister, Kerala Govt & District Collector, Thrissur district who visited the MTU operations.

Accreditations Received

Contents lists available at ScienceDirect

Journal of Environmental Management

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Research article

Technical evaluation and optimization of a mobile septage treatment unit

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ARTICLE INFO

Keywords:
Onsite wastewater treatment
Septage
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Microfiltration
Mobile
Full-scale

ABSTRACT

A mobile septage treatment unit was built in India using readily available filters and membranes (mesh fabric, sand, granular activated carbon (GAC), microfilter, ultrafilter) and installed on the bed of a small truck. The target application was emptying of septic or sewage holding tanks and concentration of suspended solids while generating a liquid that could be discharged. The system was evaluated for operational and treatment performance while processing septage in the field at 108 sites in Tamil Nadu, India. After one phase of evaluation (Phase I), the system was improved and three replicate systems with slight modifications were fabricated for a second round of evaluation (Phase II) alongside the original, but modified unit. In Phase I, 105 m^3 of septage was processed at an average flow of 623 L h^{-1} and with high removal efficiencies: 83% chemical oxygen demand (COD), 75% total suspended solids (TSS), and >96.4% total coliform (TC). In Phase II, the original and three new systems combined treated 168 m^3 of septage. One of the new systems doubled in capacity and processed septage at an average flow of 2700 L h^{-1} while the other three averaged 1290 L h^{-1}. The removal efficiencies in Phase II were: 80% COD, 81% TSS, and 99% TC averaged between the four systems. Pass through of soluble contaminants (e.g. soluble COD, NH_3-N) remain the primary challenge for treatment performance. Success may be limited with some septage due to seasonality, location, or septage age, and further validation and optimization may be necessary. However, the septage in this study was treated to local standards, and the system offers a method of onsite treatment while reducing the need of costly and often inefficient septage emptying services. Further, the system can be produced at a cost competitive to traditional septage hauling trucks.

In 2021, Journal of Environmental Management - Elsevier published a technical paper - "Technical Evaluation and Optimization of a Mobile Septage Treatment Unit".

SPECIAL INNOVATIONS

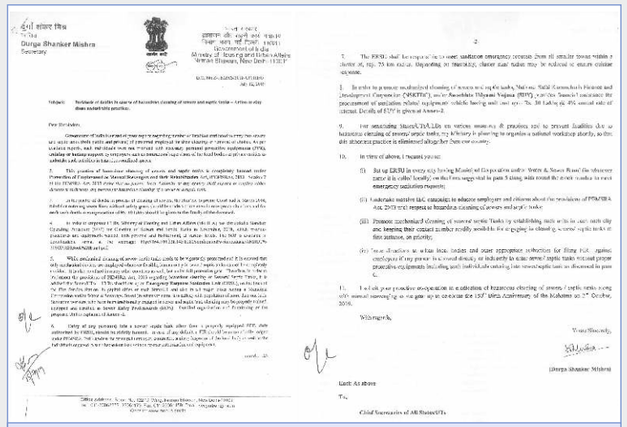
Product Name : ANNAM–MOBILE SEPTAGE TREATMENT UNIT (MTU)

Description :
- The on-site mobile treatment unit works with the concept of solid-liquid separation, sludge thickening and effluent treatment process. While the liquid is separated from the solid, the effluent passes through the treatment process and disposes the treated effluent.
- The sludge thickening process helps further in reducing the moisture content in the sludge. The solid sludge is collected in centrifuge and it later goes for secondary treatment

Specifications :
- The Mobile Treatment Unit (MTU) is an onsite faecal sludge treatment technology.
- It is a treatment system installed on the bed of a small truck, which is able to treat the contents of septic tanks.
- 3000 to 6000 lits/hr.

Manufacturer :
WASH INSTITUTE

In 2019, MoHUA also included MTU as one of the options to empty and treat septage through an Advisory (Titled as 'Sewer, Faecal Septage & Drain Cleaning Equipment, Manufactured In India')



दुर्गा शंकर मिश्र
Durga Shanker Mishra
Secretary

Government of India
Ministry of Housing and Urban Affairs
Nirman Bhawan, New Delhi-110011

Subject: Reminder of deadline in case of hazardous cleaning of sewers and septic tanks – Curbs to stop deaths caused by asphyxia.

Dear Sir/Madam,

Chief Secretaries of All States/UTs

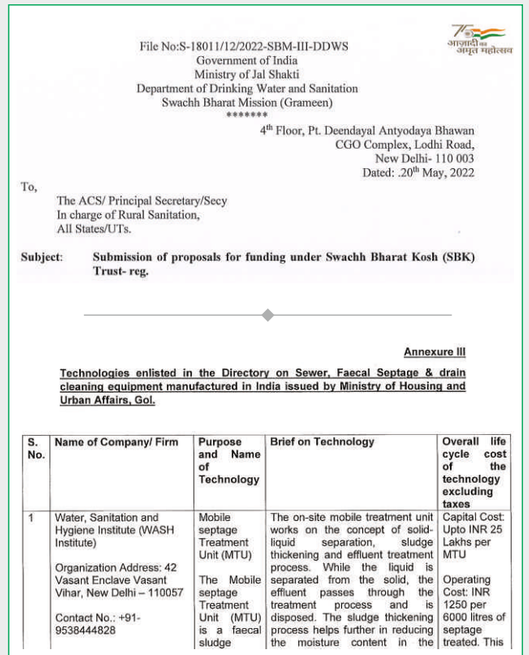
Letter issued by Secretary, MoHUA New Delhi on July 12, 2019 to Chief Secretaries of all states regarding steps that needs to be taken on urgent basis to stop manual desludging of septic tanks.

MTU by WASH Institute, Dindigul, Tamil Nadu

It is a septage treatment system mounted on the bed of a small truck and treats the effluent of septic tanks onsite.

- The operational capacity of the on-site Mobile septage Treatment Unit (MTU) varies from 3000 to 6000 lits/hr.
- The unit works on the concepts of solid-liquid separation, sludge thickening and effluent treatment processes.
- While liquid is separated from the solid, the effluent passes through the treatment process and disposes the treated effluent. Sludge thickening process helps to further reduce the moisture content in the sludge.
- The MTU treated septage effluent meets India's disposal standards.
- The total cost of each mobile treatment unit is considerably lower than septage emptying trucks.

In the Annexure to the above letter, MTU has been mentioned in Page No. 7 as one of the eligible products/ processes examined through the technology challenge available through Emergency Response Sanitation Unit (ERSU) with MoHUA



File No:S-18011/12/2022-SBM-III-DDWS
Government of India
Ministry of Jal Shakti
Department of Drinking Water and Sanitation
Swachh Bharat Mission (Grameen)

4th Floor, Pt. Deendayal Antyodaya Bhawan
CGO Complex, Lodhi Road,
New Delhi- 110 003
Dated: 20th May, 2022

To,
The ACS/ Principal Secretary/Secy
In charge of Rural Sanitation,
All States/UTs.

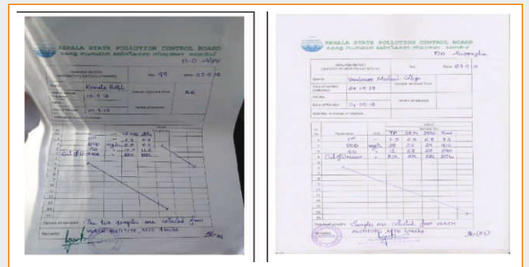
Subject: Submission of proposals for funding under Swachh Bharat Kosh (SBK) Trust- reg.

Annexure III

Technologies enlisted in the Directory on Sewer, Faecal Septage & drain cleaning equipment manufactured in India issued by Ministry of Housing and Urban Affairs, GoI.

S. No.	Name of Company/ Firm	Purpose and Name of Technology	Brief on Technology	Overall life cycle cost of the technology excluding taxes
1	Water, Sanitation and Hygiene Institute (WASH Institute) Organization Address: 42 Vasant Enclave Vasant Vihar, New Delhi – 110057 Contact No.: +91-9538444828	Mobile septage Treatment Unit (MTU) The Mobile septage Treatment Unit (MTU) is a faecal sludge	The on-site mobile treatment unit works on the concept of solid-liquid separation, sludge thickening and effluent treatment process. While the liquid is separated from the solid, the effluent passes through the treatment process and is disposed. The sludge thickening process helps further in reducing the moisture content in the	Capital Cost: Upto INR 25 Lakhs per MTU Operating Cost: INR 1250 per 6000 litres of septage treated. This

MTU Identified under SBM Kosh as one of the Technologies for septic tank cleaning equipment by Department of Drinking Water and Sanitation, Ministry of Jal Shakti.



Kerala Pollution Control Board Certificates Issued to MTU

Awards and Recognitions

In November 2018, MTU was accorded a National Level Award by Ministry of Housing and Urban Affairs (MoHUA), Government of India on "Technology Challenge for identifying and promoting solutions for cleaning and maintenance of septic tanks which eliminated the need for human entry" category.

In January 2020, WASH Institute received the 5th Edition of India Industry Water Conclave and 7th Edition of FICCI Water Awards under the category "Water Initiative by NGO". The award was presented by the Hon'ble Minister of Jal Shakti, Shri Gajendra Singh Shekhawat for WASH Institute's innovative onsite septage treatment technology, MTU.

MTU at Various Events and Platforms

The MTU has been displayed and demonstrated on various platforms and has received awards and appreciation

Shri Arumugam Kalimuthu, Executive Director of WASH Institute demonstrating MTU to Shri Durga Shankar Mishra, Secretary, MoHUA & Shri Shiv Das Meena, Additional Secretay, MoHUA at National Level Workshop on FSSM in Odisha on 27th Oct, 2018.

MTU demonstration to Shri Hardeep Singh Puri, , Hon'ble Minister, MoHUA during a National Workshop on Sustainable Sanitation at Vigyan Bhawan, Delhi on August 2019.

MTU being demonstrated before Shri K.T. Rama Rao, Hon'ble Minister for Municipal Administration & Urban Development, Govt. of Telangana at INK WASH event organized by ASCI in Hyderabad in January 2020.

MTU being displayed & demonstrated before Shri Rattanlal Kataria, Hon'ble Minister of State, MoJS and Shri Arun Baroka, Additional Secretary, DDWS at a National Planning Workshop on ODF Plus & Water Conservation hosted in October, 2019, organized by DDWS, MoJS at ICAR Campus, Delhi.

MTU being demonstrated to Joint Secretary, SBM and CPHEEO team at MoHUA, Nirman Bhawan, New Delhi in October, 2019.

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