

**PROCEEDINGS OF THE EXECUTIVE DIRECTOR, SUCHITWA MISSION,
THIRUVANANTHAPURAM**

PRESENT : K.T. Balabhaskaran

Sub:- L.S.G.D - Suchitwa Mission- Approval of New devices – Standards, Specifications, O&M protocol and unit Cost for household level/small scale solid waste management devices - orders issued - Reg.

No: 2869/C2/2016/SM

Dated: 29.04.2022

Read:- 1. Proceedings No. 1547/C2/2021/SM dated 30.10.2021 of the Executive Director, Suchitwa Mission.
2. Minutes of the Technical Committee Meeting held on 06.11.2021 at Suchitwa Mission.
3. Performance analysis report (Email dated 09.03.2022 from Government Engineering College Thrissur.
4. 1341/21 number Laboratory report dated 31.01.2022 issued from College of Engineering and Technology Trivandrum.
5. Proceedings No. 2869/C2/2016/SM dated 09-08-2021 of the Executive Director, Suchitwa Mission.
6. Minutes of the Technical Committee Meeting held on 17-03-2022 at Suchitwa Mission.

ORDER

Applications were received from various agencies for approving new devices/ technologies in the solid waste management sector. The technical committee constituted vide paper read 1st above for scrutinizing and approving the new technologies and devices in Solid Waste Management sector verified the applications and new devices, in the technical committee held on 16.11.2021 vide paper read 2nd above. The committee recommended various devices for approval subject to condition that, 'approval for the SWM devices viz. Kapigro Kitchen waste digester, Organic Composting Bin may be considered only after analyzing the performance of the device in a laboratory condition' and approval for all the devices recommended by the technical committee shall be for a period of one year. Further extension of the approval shall be based on the in situ evaluation of the performance of these approved devices.

Based on the recommendation of the committee, new devices developed by M/s Kapigro Technologies Pvt. Ltd. (Kitchen Waste Digester) and M/s Agro Flame (Organic Composting Bin) have been submitted at Government Engineering College Thrissur & College of Engineering and Technology Trivandrum respectively for third party evaluation. Vide reference 3, 4 third party evaluation reports have been received from both the institutions. Therefore the devices were placed before the rate fixation committee constituted vide paper read as 5th above for fixing the unit rate.

The rate fixation committee meeting held on 17.03.2022 verified & scrutinized the rate split up submitted by the agencies. As per paper read 6th above the Rate Fixation

Committee approved the unit rates of the newly approved waste management devices, viz. Vermion Kitchen Waste Treatment, Kapigro Kitchen waste digester, Organic Composting Bin & Geebin -2 Bin System.

The unit cost approved against the devices are inclusive of cost of materials, tools and equipment as per standards & specification, labour, conveyance including installation at the household/user location and commissioning the facility and exclusive of taxes. All incidental expenditure including inoculum and other expendable items required for completing the unit has to be provided by the supplier and it is inclusive of the unit cost. The agency undertaking the supply shall also train the beneficiary in operation and capacity building of the unit. The agency should also provide one year free warranty period from the date of installation of the unit during which they shall repair/replace all defective items at free of cost. **While implementing projects for supply of SWM devices approved by this order, the implementing officers of LSGIs shall ensure the provision for GST as per prevailing norms is included in addition to the approved unit cost. Technical sanction for such projects shall also be accorded including necessary GST provision.**

The manufacturer shall design/fabricate/supply/install the entire facility using appropriate technology/ standards & specifications approved by the technical committee vide reference 2 for the safe use by the beneficiary.

The specifications, Standards, Unit cost and O&M protocols for newly approved solid waste management devices are hereby approved and are attached as annexure.

- Copy to:-
1. Principal Director LSGD
 2. Director LSGD (Urban)
 3. Director LSGD (Rural)
 4. All District Coordinators, Suchitwa Mission
 5. Secretaries of all Grama Panchayats & ULBs through District Co-ordinators, Suchitwa Mission.
 6. OC/SF/ Website issue

Sd/-

K T Balabhaskaran *
Executive Director

* This is a computer system (Digital File) generated letter. Hence there is no need for a physical signature.

I. Vermion Kitchen Waste Treatment Unit (4 Kg/day capacity)

No	Detailed Specification	Unit Cost (in Rs.)
Vermion Kitchen Waste Treatment Unit with the following Specification and size		
	<ul style="list-style-type: none"> - Vermion Waste treatment unit is capable of composting/digesting 4-5 Kgs of Biodegradable waste per day. - Vermion waste treatment unit contains 2 nos of double chambered Barrel (70 Ltr outer main chamber & 50 Ltr inner net chamber) made of HDPE Plastic, supported by an input chamber with 15cm dia HDPE lid and a ball valve system inside the input chamber, which can be lifted upwards while waste addition and 2 Nos of leachate collection can - The main chamber is fitted with an aeration pipe(PVC) - The approx. total weight of a Vermion unit with all the above mentioned parts is about 10Kgs - A cow dung based dry inoculum powder is used to accelerate waste degradation (As starter). 	4,400/-
Infrastructure Requirement		
	<ul style="list-style-type: none"> - Outer Main Chamber : 2 Nos - Inner Net Chamber : 2 Nos - Input Chamber with lid & Ball valve system : 1 No. - Aeration pipe system (1metre Length) : 2 Nos - Drain Tap : 2 Nos - Leachate Collection Can (PVC) : 2 Nos - Inoculum(dry cow dung powder) : 10 Kgs 	
O & M Protocol		
	<ul style="list-style-type: none"> - Put all the biodegradable kitchen waste 4 – 5 Kg/ day into the input chamber - On lifting the ball valve the waste will be deposited into the inner net chamber from where it will start to digest/compost with the help of “<i>Black Soldier</i>” Larvae 	

	<ul style="list-style-type: none"> - The leachate will drain from the inner chamber to the main chamber and finally be collected at the leachate collection can. - The digestion process is continuous until or up to 2-3 months while the inner chamber is almost filled. - Then, use the additional chamber for waste feeding, by shifting the input chamber from the first chamber to the additional chamber supplied. - After completion of further two months/ after filling the second bin the compost in the first bin can be collected and used for agriculture purposes. - The vermin leachate can be collected frequently from the can and used as fertilizer by diluting it with water in a ratio 1:5. - The cow dung based inoculum is sprinkled/added into the chamber to speed up the digestion process or to promote proper functioning of the entire system as and when needed. 	
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II. Kapigro Kitchen Waste Digester (2kg/day capacity)

No	Detailed Specification	Unit Cost (in Rs.)
Kapigro Kitchen Waste Digester with the following Specification and size		
	<ul style="list-style-type: none"> - Two octagon shaped Ultraviolet stabilized LLDPE bins of 20 liter capacity. - Two airtight lids are provided in each bin, one at the top for putting the waste & other at bottom most portion for collecting the manure/compost. - A ventilation hole fitted with a stainless steel screen is provided at the top to avoid entrance of flies. Behind the ventilation hole, there is an activated carbon impregnated foam to avoid bad odour at the initial stages of digestion process. - At the center of each bin there is a thin hollow pipe half the way, vertically, this pipe by-pass the leachate to the soil/ ground from the middle portion of the bin. - At the bottom of each bin there are 5 drain holes of 2 inch diameter to drain leachate into soil beneath. - Microbes enriched inoculums of 2kg are provided as a starter kit. 	5,600/-

Infrastructure Requirement

- Two numbers of 5 mm thick LLDPE bins of 120 liter capacity octagon shaped bins with lids
- The octagonal shaped bins are narrowing with top vertically, bottom diameter of 55 cm and upper diameter of 30 cm overall height of each bin is 83 cm.
- 2 Lids with diameter of 15cms at top and bottom of each bin for putting the waste & for collecting the manure.
- Hollow leachate drain pipes of 5cms diameter & 40 cm height at the center of each bin.
- 3 ventilation holes of diameter 2cm, are provided the top rear side.
- Activated carbon impregnated foam of 5cms x 5cms x 2.5cms are fixed at the top behind the ventilation holes.
- 3cms x 8cms size stainless steel mesh at the ventilation hole for preventing entrance of flies.

O & M Protocol

- Select a suitable space of 60cm width & 120cm length to install 2 digester bins.
- Install the bins in the soil trench having 5 cm depth (for easy drain of leachate).
- Use one digester bin at a time, waste input must not exceed 2kg per day.
- Open the top lid and put any kind of organic solid food waste into the bin. Add 30gms of provided microbial inoculums into the bin once in a day.
- One bin of 120 liter will become filled within 6 months since 80% of solid waste is converted into paste/liquid form and then drained into soil beneath.
- Leave the first bin idle without inputting waste for another 6 months when it gets filled, by this time the second bin will become filled.
- Now open the side lid of the first bin to collect organic manure or compost.
- After collecting all the compost now the first bin is ready to use again.
- The collected compost is ready to use for garden or agriculture purposes.

III. Organic Composting Bin

No	Detailed Specification	Unit Cost (in Rs.)
Organic Composting Bin with the following Specification and size		
	<ul style="list-style-type: none"> - 3 nos 23 Liter capacity PPC Bins (air-vent holes are provided around the bins) with 34 cm upper (inner) dia, 28 cm Bottom dia, 32 cm height with bottom nozzle duly fitted with 3 PPC perforated pipes for air ventilation and leachate drain. One end of the upper most perforated pipe is closed using an end cap. - 1 Lid of size 31.5 cm (placed over the uppermost brace ring) with 2 mm ventilation holes. - Brace ring of size 40.5 cm outer dia. and 22.5 cm inner dia for holding the bins. - 8 legs of 6.3 cm ht are provided for stable seating at the ground. - 5 kg Kerala Agriculture University approved inoculums as starter kit. - 700ml capacity leachate collection tray of size 21cm dia. 	2,125/-
Infrastructure Requirement		
	<ul style="list-style-type: none"> - 3 nos of 23.5 L capacity PPC Bins with bottom nozzle and 1 No. 31.5 cm PPC Lid. - 4 nos of 40.5 cm outer dia and 22.5 cm inner dia PPC Braces (Rings) - 3 nos of PPC perforated pipes with 1 end cap. - 8 nos of 6.3 cm ht PPC legs - 5kg Kerala Agriculture University approved inoculums as starter kit 	
O & M Protocol		
	<ul style="list-style-type: none"> - On an average of 2 kg waste per day can be treated in this device. - Arrange the bins one over another by placing each bin on the brace ring and interconnecting the central shaft with the bottom nozzle of the upper bin. The bottom most bin is placed above the brace which is fitted with 8 legs to facilitate adequate height from floor for easy movement of leachate collection tray. - The top most brace is covered with a lid. 	

	<ul style="list-style-type: none"> - Free end of the central shaft is closed using the end cap. - Place the leachate collection tray below the bottom most bin - Initial composting is started by spreading the food waste in the first bin as small pieces and thin layers. 3 spoons of inoculum are sprinkled over the waste. - This process is continued until the first bin gets filled. One bin will get filled within 20-25 days (1.5-2 kg/day waste). - The waste shall be turned each time before adding the food waste again over it. - Replace the first bin with the second one, once it gets filled. Keep the filled bin at the bottom most level. - The same procedure is repeated for the second and third bins. By the time of filling the third bin, waste in the first bin will get converted into compost and is ready for taking out as manure or as starter for the next cycle of composting. - Leachate collected in the tray shall be removed periodically, which can be used as manure after diluting with water in 1:20 ratio. - Food waste with high water content/ liquid waste shall be avoided. Antimicrobial/ detergents shall be avoided. 	
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IV. Gee Bin – 2 Bin System(1.5 Kg/day capacity)

No	Detailed Specification	Unit Cost (in Rs.)
Gee Bin with the following specification and size		
	<ul style="list-style-type: none"> - PolyPropylene Co-Polymer (PPCP) made 29 liter capacity bins (2 Nos), each bin have an inner digester bin and an outer covering bin in cylindrical shape, each with a base ring having the facility to collect leachate and filter plate. The bin has a top lid having aeration facility and an upper ring to hold the top lid for treating 1.5kg waste per day. - One lid for covering the top most bins is provided. - Each bin has two parts. Inner digester and outer covering bin as protective system which helps to prevent entering of flies and insects into the digester. 	3,660/-

	<ul style="list-style-type: none"> - Filter plates are fixed at the bottom of the digester for easy drain of leachate. - Base rings are provided for holding the upper bin and helps to hold the leachate tray and one top ring for fixing the lid. - Microbes enriched coco peat (inoculum) for speedy composting, water absorption and aeration. (Starter) 	
Infrastructure Requirement		
	<ul style="list-style-type: none"> - 2 Nos. of inner digester bin set, diameter area, 331 mm dia, 335 mm height, 2.4 mm gauge. It is 29 liter in capacity and has 2 mm dia holes all around for ventilation. - 2 Nos. of outer bin set, dimensions are 383 mm dia, 335 mm height, 2.4 mm gauge, 1.5 mm dia holes provided all around for ventilation. - Top ring (1 no.) has 384 mm dia, 51 mm height and 2.75 mm thickness for fixing the top lid. - 2 numbers of base rings are 2.75 mm gauge and 378.17 mm dia. This base has got the facility to hold approximately 2 to 3 liters of leachate in it and also this ring helps to hold the upper inn. - The leachate trays are having 204 mm dia, 23 mm height and 1.35mm thickness fixed in the base ring. - The bins contain a lid 418 mm dia, 112 mm height, 2.6mm thickness and 2 mm dia holes are provided all round for ventilation of hot air. - Each inner & outer bins are vertically divided into halves. Inner bin is assembled with 6 plug buttons, and the outer bin is assembled with 10 plug buttons. - Filter plates 320 mm Dia, 2.4 mm thickness and the central portion 15mm dia with 3mm dia holes for easy drain of leachate. - Microbes enriched coco peat (inoculum) for speedy composting, water absorption and aeration. (Starter) 	
O & M Protocol		
	<ul style="list-style-type: none"> - The inner digester bin is assembled with plug buttons - Fix the filter plate at the bottom of the inner bin by pressing it at the bottom of the inner bin. - Place the base ring and fix the inner bin into it. 	

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| <ul style="list-style-type: none">- Assemble the outer cover with nuts & bolts and place it in the base ring.- Place the bins over the base rings and arrange them as one over another. It is optional to put some dry coco-peat into the base ring for absorbing the excess leachate.- Spread a little soaked inoculum at the bottom of the upper digester bin as a thin layer. Then start loading the bio waste into the upper bin. Again put the inoculum over the bio waste, after every use, cover the upper bin with a top lid. Occasionally mix the fresh waste with the old waste.- One bin will be filled within 30 to 35 day time in a family of 3 members.- Replace the filled bin with the empty one and place the lid on it.- By the time of filling the other two bins the first one will be fully composted/matured. Empty the first one and start composting again.- Dry the removed compost under shade, then it can be used as a starter for the next cycle of composting- Periodically clean the leachate tray. The collected leachate may be used as inoculum for composting or can be used as manure in the garden. | |
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