

## Biogas Plant Technical Specifications

Two Fixed-dome Deenbandhu model digester systems of 18m<sup>3</sup> each that produces 2 to 6 cubic meter biogas per day

The design of the plant is a fixed dome on the lines of Deenbandhu model specifically designed by SKGS suitable for South African conditions. As the mean temperature of South Africa is about 21 degrees Celsius the plant has been designed with 50 days hydraulic retention time (HRT).

*Table 1: Required Physio – Chemical conditions for optimum production of biogas*

Sl. No.	Character	Range	comments
1	pH	6.8 – 7.2	
2	C/N ratio	1: 25-30	
3	Temperature	32-35	Can be compensated with HRT
4	Solids concentration	8-10	
5	Toxic substances	0 – 25ppm	

*Table 2: Construction measurements of biogas plant in centimeters*

Sl. No.	Description	Up to 6 M <sup>3</sup> of gas
1	A – Height of the Mixing Tank	60
2	B – Thickness of Digester at GI Nipple level	13
3	C – Width of the Displacement Tank	120
4	D – Displacement tank height above the hole bottom	53
5	E – Width of the mixing tank concrete base	120
6	F – Width of mixing tank	80
7	G – Thickness of digester masonry work	10
8	H – Thickness of base concrete at digester base	15

<b>9</b>	J – Height of the taper portion or height of the centre pillar	80
<b>10</b>	K – Height of the inlet pipe inner edge from the base concrete	60
<b>11</b>	L – Height of the arch from the bottom inner tip of the inlet pipe	25
<b>12</b>	M – Initial slurry level height from the arch	110
<b>13</b>	N – Radius of the Digester	190
<b>14</b>	P – Arch height from arch tank concrete base	75
<b>15</b>	Q – Length of the arch tank	90
<b>16</b>	R – Thickness of arch tank wall under the displacement tank wall	22
<b>17</b>	S – Arch tank height until the bottom of the concrete base of the displacement tank	90
<b>18</b>	T – Diameter of the digester	380
<b>19</b>	U – Height of the slurry exit hole from the bottom of the displacement tank	55
<b>20</b>	V- Width of the concrete under the digester base	25
<b>21</b>	W – Length of the Displacement tank	300

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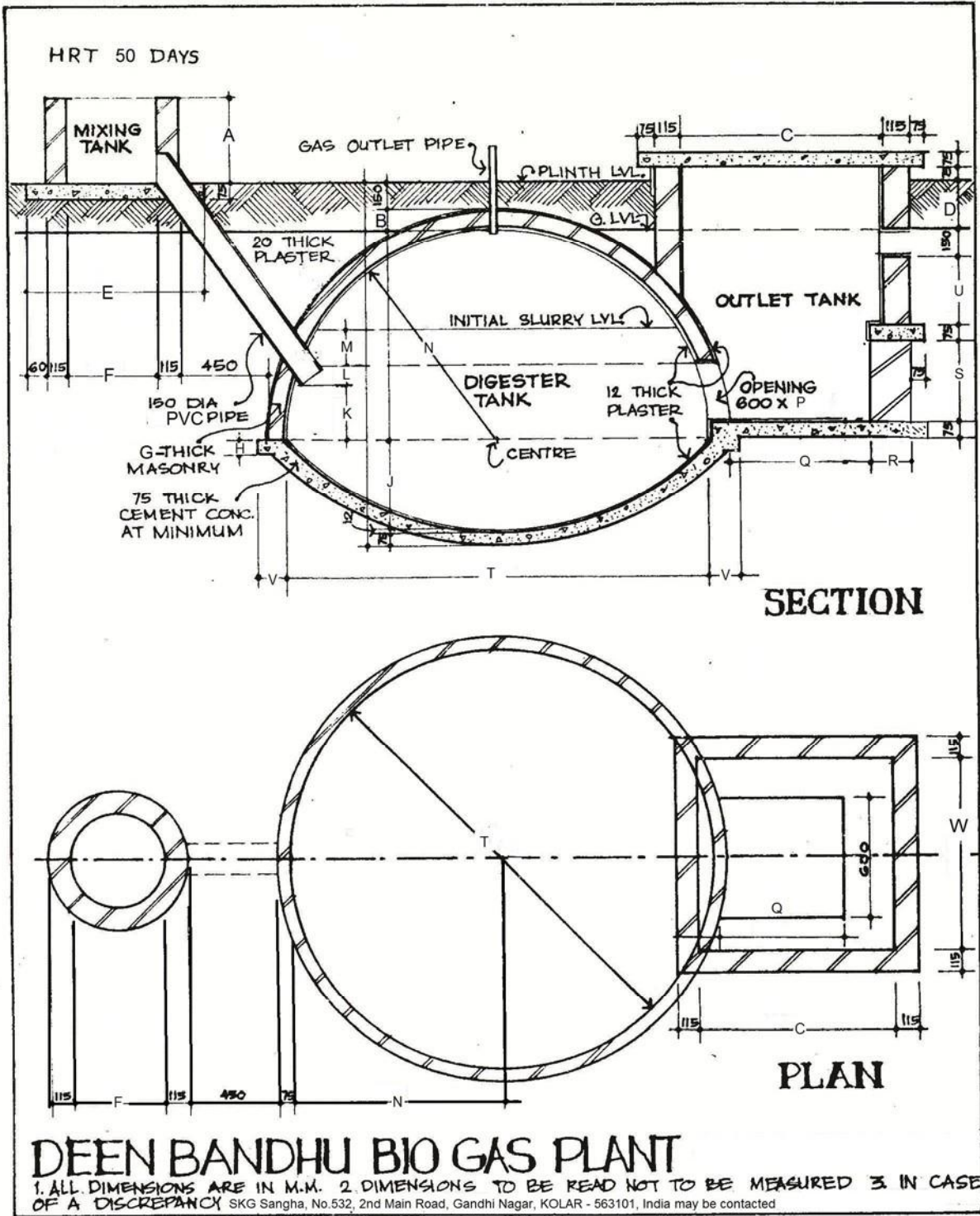


Figure 1: Plan and sectional diagram of the biogas plant

*Table 3: Material requirement for the biogas plant. (Note that the material does not include compost pits)*

<b>Sl. No.</b>	<b>Description</b>	<b>6 M<sup>3</sup></b>
<b>1</b>	Well burnt solid mud bricks of 22 x 10 x 7 mm	2650
<b>2</b>	Cement bags of 50 kg each, 42.5 grade OPC	34
<b>3</b>	Sand - coarse in cubic meters	4
<b>4</b>	Sand – fine in cubic meters	4
<b>5</b>	Stone aggregates – made from granite stone in Cubic meters	3.5
<b>6</b>	6 mm iron wire in kilograms	25
<b>7</b>	Binding iron wire in kilograms	0.25
<b>8</b>	150 mm diameter 6 mm thick PVC pipe in meters	2.2
<b>9</b>	Brackets welded 1.2” diameter GI nipple of 30 centimeter long	1
<b>10</b>	PVC gate valve of 20 mm diameter nos.	1
<b>11</b>	Stainless steel body double burner biogas stove	1
<b>12</b>	100 mm long Galvanized iron 20 mm diameter nipples	2
<b>13</b>	Female threaded brass metal pipe nipple	1
<b>14</b>	Rubber hose in meters	1
<b>15</b>	High Density Poly Ethylene (HDPE) pipe of 20 mm diameter in meters	50
<b>16</b>	Plumber in man days	½
<b>17</b>	Fresh animal dung for initial feeding in tons	7.5