

TURNING WASTE INTO WATTS

FROM FIELD TO FUEL



ABOUT US

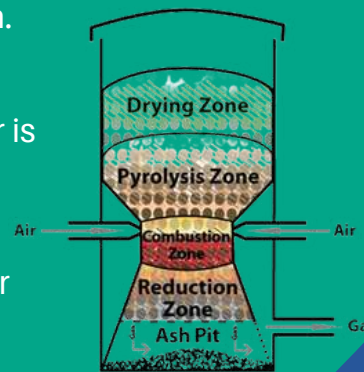
WASTE TO ENERGY

Established in 2013 by Mr. Rai Singh Dahiya, a grassroots innovator in biomass gasifier technology, our company is renowned for its small-size biomass gasifiers, smokeless biomass stoves, and other renewable energy products.

ESB-R05 BIOMASS GASIFIER DESIGN

The ESB-R05 5kW biomass gasifier is ideal for research institutes and catering to small-scale electricity requirements. Featuring patented technology, the ESB-R05 biomass gasifier is designed to be compact, user-friendly, and low maintenance, making it a convenient solution for various applications.

- Simple design.
- Low tar contents as most of the tar is burnt in combustion zone.
- Best option for usage in gas engines.
- At lower loads, fewer particles in the gas.



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Energol Biopower
Pvt. Ltd.

ESB-R05 5KW BIOMASS GASIFIER



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KEY FEATURES OF ESB-R05

ESB-R05 5KW biomass gasifier has some unique features which makes it advantageous than other available models in the market. Some of them are listed below:

1 Portable and Compact Design

Smallest and lightest gasifier system, making it easy to transport and set up in any location.

2 Soundproof Operation

Ensures quiet performance, making it ideal for residential and rural applications.

3 Sustainable Fuel Source

Utilizes abundant agro-waste, providing a cost-effective and eco-friendly energy solution for rural communities.

4 Automatic Initial Firing

Equipped with advanced atomization technology for automated and efficient ignition, reducing manual intervention.

5 Dry Filtration System

Eliminates the need for water-based purification and costly filtration plants, ensuring cleaner and hassle-free operation.

6 User-Friendly Operation

Intuitive controls make it easy for anyone, including villagers, to operate effectively.

7 Automatic Initial Firing

Equipped with advanced atomization technology for automated and efficient ignition, reducing manual intervention.

Most reliable & rugged system



Accepts all kind of biomass



WORKING PARAMETERS

- 1 ESB-R Biomass Gasifier can operate at any type of agricultural or forest waste residues with limited moisture in feedstock. To know more about acceptable feedstock, kindly refer the "ESB-R Biomass Gasifier Catalogue" enclosed with this quotation.
- 2 The gasifier works with producer gas which is basically manufactured 'ON-LINE'.
- 3 Clean all the filters and do the required maintenance on time for better performance of gasifier.
- 4 Since Gasifier being a new technology equipment, we advise clients to get properly acquainted with all operational aspects & optional items of Gasifier like biomass characteristic (recommended moisture level, its bulk density, size etc.) as well as suitability of optional items like wood dryer, wood cutter etc. and any other associated accessories.



BASIC STEPS INVOLVED IN ESB-R05



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TECHNICAL SPECIFICATIONS

BIOMASS GASIFIER

Model Name
ESB-R
BIO-05

Model No.
ESB-R05

Auxiliary Power
2.5HP

Weight
1.8-2Ton

Dimension Gasifier
L10 x W7 x H7
(in feet)

Dimension Genset
L6x W3.5 x H6
(in feet)



BASIC PARAMETERS

PARAMETERS	DETAILS
✓ Brand	- Enersol Biopower®
✓ Type of gasifier	- Downdraft
✓ Accepted fuel	- 100% biomass
✓ Accepted moisture in biomass	- Less than 20%
✓ Manpower required	- 1nos
✓ Auxiliary power consumption	- 2.5hp at startup 2hp during continuous operation
✓ Auxiliary power details	- Vibrator motor, Cooling fan, Water pump, Distillation tank pump, Rs filter pump, Gearbox

PARAMETERS	DETAILS
✓ Gas in 1 kg wood with 15% moisture	- Up to 2NM ³
✓ Wood calorific value	- 2100k-2500kcal/kg
✓ Bulk density	- 200kg/m ³
✓ Biomass consumption kg/kw/hr.	- 1.4 ± 0.2 kgs/kw-hr.
✓ Char generation	- 5-7%



BIOMASS GASIFIER OUTPUT

PARAMETERS	DETAILS
✓ Biomass consumption	- Up to 7.5kg/hr.
✓ Gas flow (NM ³ /hr.)	- 15NM ³
✓ Peak rated thermal output	- 15,750kcal - 18,750kcal/hr.
✓ Continuous duty rated thermal output (80%)	- 12,600- 15,000kcal/hr.
✓ Average gas calorific value (kcal/nm ³)	- ≥1,100
✓ Gasification temperature	- 1050 – 1100°C
✓ Temperature of gas at gasifier outlet (°C)	- 300 to 500°C
✓ Indicative gasification efficiency (hot gas mode)	- >85%
✓ Indicative gasification efficiency (cold gas mode)	- >75%
✓ Turn down ratio	- Not less than 50% of rated capacity



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TECHNICAL SPECIFICATIONS

BIOMASS FEEDING SYSTEM

PARAMETERS	DESCRIPTION
✓ Start-up	- Automatic ignition
✓ Biomass feeding system	- Manual
✓ Feeding frequency	- Every 1.5-2 hrs.
✓ Ash removal system	- Manual
✓ Frequency of removing ash	- Every 1.5-2hrs.
✓ Biomass consumption per hour	- up to 7.5kg/hr.
✓ Acceptable biomass size	- 2 X 2"
✓ Acceptable moisture content	- less than 20%
✓ Ash content	- up to 5-10%



FILTER MAINTENANCE

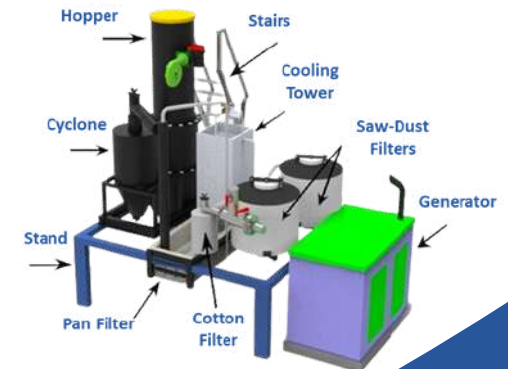
FILTER NAME	CLEANING TIME	REMARK
✓ Cyclone	Every 40-50hrs.	Ash to be removed
✓ Scrubber filter	Every 25-30hrs.	To be checked
✓ Saw-dust filter	Every 80-100hrs.	Replace sawdust/coconut husk etc.
✓ Distillation tank	Every 2-3hrs.	Extra water need to be removed
✓ Pan filter	Every 80-100hrs.	To be cleaned
✓ Cotton filter	Every 80-100hrs.	Replace cotton fabric
✓ Water tank Capacity	250-300ltrs.	
✓ Water level		Need to maintain minimum 75% water level all the time

PRODUCER GAS COMPOSITION

GAS NAME	AVERAGE PERCENTAGE	IN ESB-R05
✓ Carbon dioxide (CO ₂)	10-15%	10.2%
✓ Hydrogen (H ₂)	15-20%	18.9%
✓ Carbon monoxide (CO)	20-25%	21.4%
✓ Methane (CH ₄)	2-5%	3.4%
✓ Nitrogen (N ₂)	40-50%	46%

BIOMASS GASIFIER COMPONENTS & BUILD MATERIALS

PART NAME	MADE OF
✓ Hopper	- Mild steel
✓ Reduction chamber	- Stainless steel & ceramic bricks
✓ Ash storage tank	- Mild steel
✓ Ash removal tank	- Mild steel
✓ Cyclone	- Mild steel
✓ Scrubber	- Stainless steel
✓ RS filter to remove tar	- Mild steel & stainless steel
✓ Distillation tank	- Stainless steel
✓ Saw-dust filter	- Stainless steel
✓ Pan filter	- Stainless steel
✓ Water tank	- Mild steel
✓ Cooling tower	- Aluminum sheet with pvc fills
✓ Cotton filter	- Stainless steel



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TECHNICAL SPECIFICATIONS

BIOGAS GENSET

Model Name
ESB-R
BIO-GEN05

Model No.
ESB-RBG7.5

Capacity
7.5KVA
(5KW)

Producer Gas
Consumption
15M³ /hr.

Ignition
Spark
ignition

Battery
Exide



BASIC DETAILS

PARAMETERS		DESCRIPTION
✓ Make	-	Enersol Biopower®
✓ Fuel mode	-	100% producer gas
✓ Power factor	-	0.8 P.F.
✓ Starter	-	12V starter
✓ Frequency (Hz)	-	50Hz
✓ Voltage (V)	-	220v / 415v
✓ Phase	-	Single / three
✓ Rated current (amps/phase)	-	25amps (single phase) 7amps/phase (three phase)
✓ Governor	-	Mechanical / Electronic
✓ Acoustic enclosure (canopy)	-	Provided
✓ Alternator	-	Enersol Biopower

ENGINE SPECIFICATIONS

PARAMETERS		DESCRIPTION
✓ Stroke	-	Four stroke engine
✓ Rated speed	-	1500RPM
✓ Cooling system	-	Water cooled
✓ Number of cylinder	-	1no./ 2nos.
✓ Lube oil sump capacity	-	3.5ltrs.
✓ Lube oil change period	-	1 st change:50-80hrs. 2 nd change: 150-200hrs. Subsequent changes: every 250-300hrs.



PRODUCER GAS GENSET

PARAMETERS		DETAILS
✓ Control pressure gauge	-	Yes
✓ Water temperature gauge	-	Yes
✓ Starting switch	-	Yes
✓ Hour meter	-	Yes
✓ Multi meter (Energy, Voltage, Amps, & Frequency indicator)	-	Yes
✓ Phase indicator lamp	-	Yes
✓ Overload relay contractor	-	Yes
✓ Voltage low/high cutoff protection	-	Yes
✓ Frequency low/high cutoff protection	-	Yes
✓ Phase loss protection	-	Yes
✓ Battery charging indicator	-	Yes



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AWARDS & EXHIBITIONS



OUR PRESTIGIOUS PARTNERS



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