



**Turning Waste into Watts**  
**From Field to Fuel** 

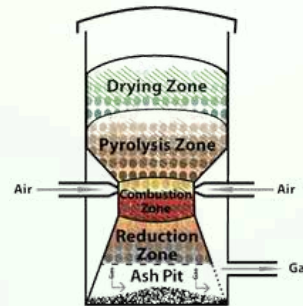
# **ESB-R04** **4KW (5KVA)** **BIOMASS** **GASIFIER** **SET**



## **ESB-R04 BIOMASS GASIFIER DESIGN**

The ESB-R04 4KW (5kVA) biomass gasifier is ideal for research institutes and catering to small-scale electricity requirements. Featuring patented technology, the ESB-R04 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.



**TRANSFORM YOUR ENERGY**  
**TRANSFORM YOUR WORLD**



## **ENERSOL BIOPOWER PVT LTD**

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.



# KEY FEATURES OF ESB-R04

The ESB-R04 4kW Biomass Gasifier is an innovative and sustainable energy solution, empowering communities to achieve self-sufficiency in electricity generation while promoting environmental conservation.

## 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.

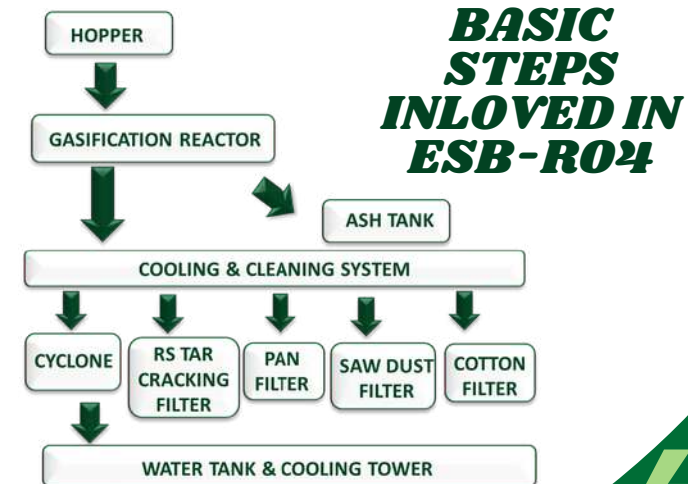
## 7 Automatic Initial Firing

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



# 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.



# TECHNICAL SPECIFICATIONS

## BIOMASS GASIFIER

Model Name  
ESB-R BIO-04

Model No.  
ESB-R 04

Auxiliary Power  
2.5HP

Weight  
1.5-1.8Ton

Dimensions (in feet)

Gasifier -L10 x W7 x H7  
Genset-L6 x W3.5 x H6



## BASIC PARAMETERS

PARAMETERS	DETAILS
✓ Brand	- Enersol Biopower®
✓ Type of Gasifier	- Downdraft
✓ Fuel	- 100% Biomass
✓ Manpower Required	- 1no
✓ Auxiliary power consumption	- 2.5hp at start up; 2hp during continuous operation
✓ Auxiliary Power Details	- Cooling fan Vibrator motor Water pump Distillation Pump Conveyor motor RS filter pump

PARAMETERS	DETAILS
✓ Gas in 1 kg wood with 15% moisture	- up to 2NM <sup>3</sup>
✓ Wood Calorific Value	- 2100K-2500 kcal/kg
✓ Bulk density	- 200kg/m <sup>3</sup>
✓ Biomass consumption kg/kw-hr.	- 1.4 ± 0.2
✓ Char generation	- 5-7%

## BIOMASS GASIFIER OUTPUT

PARTICULAR	DETAILS
✓ Biomass consumption	- up to 6kg/hr.
✓ Gas Flow (NM <sup>3</sup> /hr.)	- 12NM <sup>3</sup>
✓ Peak Rated Thermal Output	- 12,600Kcal - 15,000Kcal/hr.
✓ Continuous Duty Rated Thermal Output (80%)	- 10,080- 12,000Kcal/hr.
✓ Average Gas Calorific Value (Kcal/Nm <sup>3</sup> )	- ≥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



# TECHNICAL SPECIFICATIONS

## BIOMASS FEEDING SYSTEM

PARTICULAR	-	DESCRIPTION
✓ Start-up	-	Automatic ignition
✓ Biomass feeding system	-	Manual feeding
✓ Feeding Frequency	-	Every 1.5-2 hrs.
✓ Ash removal system	-	Manual
✓ Frequency of removing ash	-	Every 1.5-2 hrs.
✓ Biomass consumption an hour	-	up to 6kg/hr.
✓ Acceptable biomass size	-	2 X 2"
✓ Acceptable moisture content	-	less than 20%
✓ Ash content	-	up to 5-10%

## BIOMASS GASIFIER COMPONENTS & BUILD MATERIALS

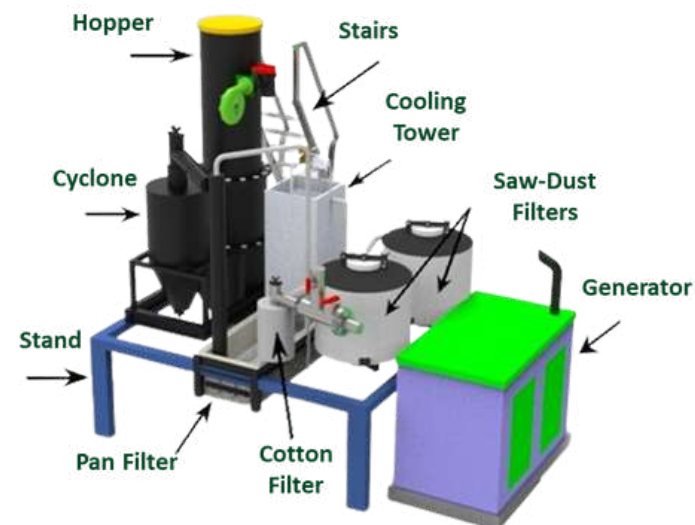
FILTER NAME	CLEANING TIME	REMARK
✓ Cyclone	Every 40-50 hrs.	Ash to be removed
✓ Scrubber filter	Every 25-30 hrs.	To be checked
✓ Saw-dust filter	Every 80-100 hrs.	Replace sawdust /coconut husk etc.
✓ Distillation tank	Every 2-3hrs.	Extra water need to be removed
✓ Pan filter	Every 80-100 hrs.	To be cleaned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

## BIOMASS GASIFIER COMPONENTS & BUILD MATERIALS

PARTS NAME	-	MADE OF
✓ Hopper	-	Mild Steel (MS Sheet)
✓ Reduction chamber	-	Stainless Steel & Ceramic bricks
✓ Ash storage tank	-	Mild Steel (MS Sheet)
✓ Ash removal tank	-	Mild Steel (MS Sheet)
✓ Cyclone	-	Mild Steel (MS Sheet)
✓ Scrubber	-	Stainless Steel (SS Sheet)
✓ RS Filter to remove tar	-	Mild Steel (MS Sheet) & Stainless Steel (SS Sheet)
✓ Distillation tank	-	Stainless Steel (SS Sheet)
✓ Saw-dust filter	-	Stainless Steel (SS Sheet)
✓ Pan filter	-	Stainless Steel (SS Sheet)
✓ Water tank	-	Mild Steel (MS Sheet)
✓ Cooling tower	-	Aluminum sheet with PVC fills
✓ Cotton filter	-	Stainless Steel (SS Sheet)

## PRODUCER GAS COMPOSITION

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



# TECHNICAL SPECIFICATIONS

## SYNGAS GENSET

Model Name  
ESB-R  
BIO-GEN05

Model NO.  
ESB-RBG05

Capacity  
5KVA  
(4KW)

Producer Gas  
Consumption  
12NM3/hr.

Ignition  
Spark Ignition

Battery  
Exide

## BASIC PARAMETERS

PARTICULAR	DETAILS
✓ Make	- Enersol Biopower®
✓ Fuel Mode	- 100% on Producer gas
✓ Power factor	- 0.8P.F.
✓ Starter	- 12V starter
✓ Frequency (Hz)	- 50Hz
✓ Voltage	- 220V
✓ No. of Phase	- Single phase
✓ Rated current (amps/phase)	- 20amps (single phase)
✓ Governor	- Mechanical
✓ Acoustic enclosure	- Provided

### CONTROL PANEL

✓ Oil pressure gauge	- Yes
✓ Water temperature gauge	- yes
✓ Starting switch	- yes
✓ Hour meter	- yes
✓ Multi meter (Energy, Voltage, Amps & Frequency Indicators)	- 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

## ENGINE SPECIFICATIONS

PARTICULAR	DETAILS
✓ Stroke	- Four stroke engine
✓ Ignition system	- Electronic coil
✓ Battery charge	- 12V battery charging alternator
✓ Rated speed	- 1500RPM
✓ Cooling system	- Water cooled radiator
✓ Coolant capacity	- 5ltrs.
✓ Number of cylinder	- Single cylinder
✓ Lube oil sump capacity	- 3.5ltrs.
✓ Lube oil change period	- 1 <sup>st</sup> change: 50-80hrs. 2 <sup>nd</sup> change: 150-200hrs. Subsequent changes: Every 250-300hrs.
✓ Air & fuel controller & mixing system	- Yes
✓ Starting switch	- Yes
✓ Aspiration	- Natural
✓ Alternator	- Enersol Biopower / Kirloskar / Mahindra



## CONNECT US ON YOUTUBE



- <https://www.youtube.com/watch?v=FYPajsGRrrw>
- <https://www.youtube.com/watch?v=LKDLbvXdHyM&t=9s>
- <https://www.youtube.com/watch?v=Rp17MmDRiIQ>
- [https://www.youtube.com/watch?v=GTmOj\\_JRLVw](https://www.youtube.com/watch?v=GTmOj_JRLVw)
- <https://www.youtube.com/watch?v=pcQN3qzNfh0>
- <https://www.youtube.com/watch?v=IAGaO9LRVOY>
- <https://www.youtube.com/watch?v=6cYUyY250XE>
- [https://www.youtube.com/watch?v=iyiz\\_OBGFGw](https://www.youtube.com/watch?v=iyiz_OBGFGw)
- <https://www.youtube.com/watch?v=W9HXk2M-Mgw>

## AWARDS & EXHIBITIONS



## OUR PRESTIGIOUS PARTNERS



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