# 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.

Mr. Rai Singh Dahiya, recipient of the National Grassroots Innovation Award in 2009, was selected as one of the top 10 innovators to spend two weeks with Shri Pranab Mukherjee in 2015.

## TURNING WASTE INTO WATTS
## FROM FIELD TO FUEL

## WHY CHOOSE
## ESB-R BIOMASS GASIFIER

- Smallest, portable, and soundproof gasifier system.
- Utilizes dry filtration, eliminating the need for water and costly purification plants.
- Ideal for villagers with ample agro-waste for electricity generation.
- Low maintenance and easy operation.
- Reliable, rugged, and compact design and costly purification plants.

# 8KW (10KVA) ESB-R BIOMASS GASIFIER

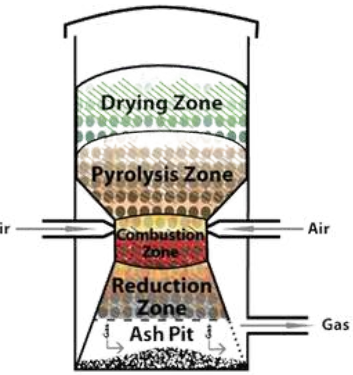
The ESB-R08 8Kw biomass gasifier is ideal for research institutes and catering to small-scale electricity requirements. Featuring patented technology, the ESB-R12 biomass gasifier is designed to be compact, user-friendly, and low maintenance, making it a convenient solution for various applications.

www.enersolbiopower.com

# ESB-R08 BIOMASS GASIFIER DESIGN

The ESB-R08 8kW biomass gasifier is ideal for research institutes and catering to small-scale electricity requirements. Featuring patented technology, the ESB-R08 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.




# KEY FEATURES OF ESB-R08

ESB-R08 8KW biomass gasifier has some unique features which makes it advantageous than other available models in the market. Some of them are listed below:

- Most suitable for villagers due to the abundance of agro-waste available, which can be utilized to generate their own electricity using this gasifier. As it's a portable unit, villagers can employ it for multiple purposes; for instance, during the day for irrigating farms and at night for electrifying their houses.
- Accessible to both urban and rural communities.
- Utilizes dry filtration, eliminating the need for water and costly purification plants.
- Smallest, portable, and soundproof gasifier system.
- Maximum atomization with automatic initial firing.
- Reliable, rugged, and compact design and costly purification plants.
- Low maintenance and easy operation.
- Most suitable for research institutions.

**Most reliable & rugged system**

**Compact system**

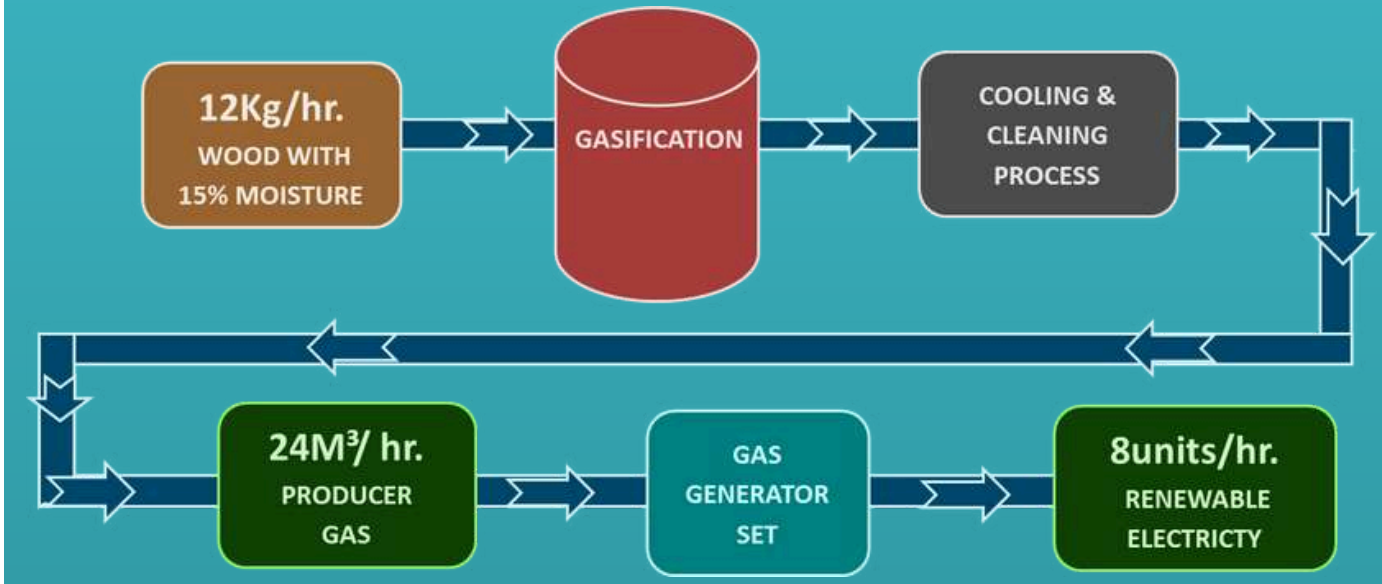
**Accepts all kind of biomass**

**Portable system**

# WORKING PARAMETERS

- 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.
- The gasifier works with producer gas which is basically manufactured 'ON-LINE'.
- Clean all the filters and do the required maintenance on time for better performance of gasifier.
- 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




# TECHNICAL SPECIFICATIONS

**Model Name**
**ESB-R BIO-08**

**Model No.**
**ESB-R08**

**Auxiliary Power**
**2.5HP**

**Weight**
**1.8 - 2Ton**

**Dimension (Gasifier)**
**L10feet**
**W7feet**
**H7feet**

**Dimension (Genset)**
**L6feet**
**W3.5feet**
**H6feet**

# BASIC PARAMETERS

| PARAMETERS | | DETAILS |
|---|---|---|
| ✓ Brand | - | Enersol Biopower® |
| ✓ Type of Gasifier | - | Downdraft |
| ✓ Fuel | - | 100% Biomass |
| ✓ Manpower Required | - | 1no |
| ✓ Auxiliary Power consumption | - | 2.5hp at startup 2hp |
| ✓ Auxiliary Power Details | - | Cooling fan, Vibrator motor Water pump, Distillation Pump Conveyor motor, RS filter pump |

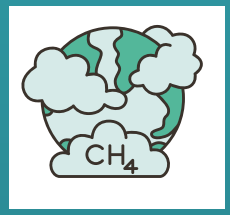
| PARTICULAR | | DETAILS |
|---|---|---|
| ✓ Gas in 1 kg wood with 15% moisture | - | up to 2NM$^3$ |
| ✓ Wood Calorific Value | - | 2100K-2500kcal/kg |
| ✓ Bulk density | - | 200kg/m$^3$ |
| ✓ Biomass consumption kg/kw/hr. | - | 1.4 ± 0.2 kgs/kw-hr. |
| ✓ Char generation | - | 5-7% |

# 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%** |








# BASIC PARAMETERS

| 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 2-3hrs. |
| ✓ Biomass consumption an hr, | - | up to 150kg/hr. |
| ✓ Acceptable biomass size | - | 2 X 2” |
| ✓ Acceptable moisture content | - | less than 20% |
| ✓ Ash content | - | up to 5-10% |

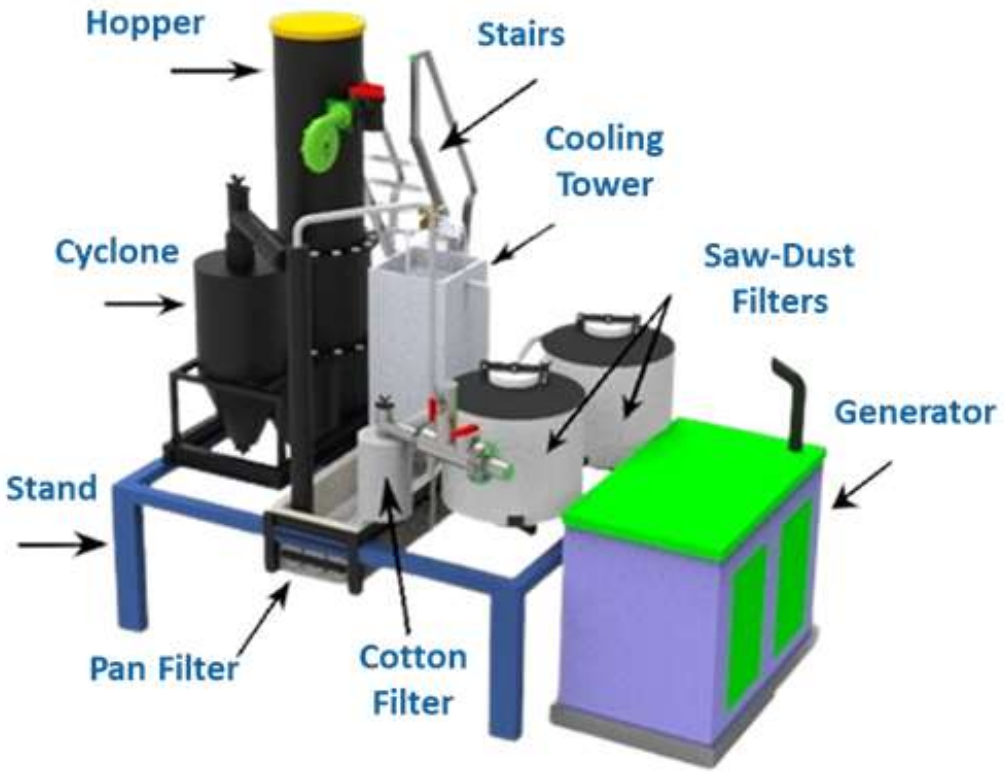
| PARTICULAR | | DETAILS |
|---|---|---|
| ✓ Biomass consumption | - | up to 12kg/hr. |
| ✓ Gas Flow ($NM^3$/hr.) | - | $24NM^3$ |
| ✓ Peak Rated Thermal Output | - | 25,200Kcal -30,000Kcal/hr. |
| ✓ Thermal Output at 80% | - | 20,160-24,000Kcal/hr. |
| ✓ Average Gas Calorific Value (Kcal/$Nm^3$) | - | ≥1,100 |
| ✓ Gasification Temperature | - | 1050 – 1100°C |
| ✓ Temperature of Gas at Gasifier Outlet | - | 300 to 500°C |
| ✓ Indicative Gasification Efficiency (Hot gas mode) | - | >85% |
| ✓ Indicative Gasification Efficiency (Cold gas mode) | - | >75% |

# ESB-R08
# BIOMASS GASIFIER
# PARTS NAME & MADE OF

| PARTS NAME | - | MADE OF |
|---|---|---|
| ✓ Hopper | - | Mild Steel (MS Sheet) |
| ✓ Reduction chamber | - | Stainless Steel (SS Sheet) & 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) |

# FILTER CLEANING

| 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 | 250-300ltrs. Approx. | |
| ✓ Water level | Need to maintain minimum 75% water level all the time | |



# TECHNICAL SPECIFICATIONS OF ESB-R08 SYN-GAS GENSET

**Model Name**
ESB-R
BIO-GEN10

**Model NO.**
ESB-RBG10

**Capacity**
10kva(8kw)

**Producer Gas Consumption**
10NM3/hr.

**Ignition**
Spark Ignition

**Battery**
Exide


# TECHNICAL SPECIFICATIONS

| PARAMETERS | | DESCRIPTION |
|---|---|---|
| ✓ Make | - | **Enersol Biopower®** |
| ✓ Fuel mode | - | 100% producer gas |
| ✓ Power factor | - | 0.8 P.F. |
| ✓ Starter | - | 12V starter |
| ✓ Frequency (Hz) | - | 50Hz |
| ✓ Voltage (V) | - | 415V |
| ✓ Phase | - | Three |
| ✓ Rated current (amps/phase) | - | 11amps/phase |
| ✓ Governor | - | Mechanical / Electronic |
| ✓ Acoustic enclosure (canopy) | - | Provided |

# CONTROL PANEL

| 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 |

# ENGINE SPECIFICATION

| PARAMETERS | | DESCRIPTION |
|---|---|---|
| ✓ Stroke | - | Four stroke engine |
| ✓ Bore x stroke(mm) | - | 102 x 115 |
| ✓ Rated speed | - | 1500RPM |
| ✓ Cooling system | - | Water cooled radiator |
| ✓ Number of cylinder | - | 2nos. |
| ✓ Lube oil sump capacity | - | 5.5ltrs. |
| ✓ Lube oil change period | - | 1st change:50-80hrs.<br>2nd change: 150-200hrs.<br>Subsequent changes: every 250-300hrs. |

# ESB-R STANDALONE BIOMASS GASIFIER

# ESB-R PORTABLE BIOMASS GASIFIER

## ENERGY CROPS

## PELLETS & BRIQUETTES

## AGRO-INDUSTRIAL WASTES

# FUEL SPECIFICATIONS

Woody biomass, including firewood (branches & twigs), wood chips, bamboo, forestry waste, agricultural waste, crop residues, biomass briquettes, and pellets, can be utilized as fuel in ESB-R gasifiers. The biomass to be used must be sized according to our specifications. To achieve the desired output, the fuel must meet the following standard specifications:

- Net Calorific value of not less than 3,600 Kcal/kg
- Bulk density above 200 kg/m³
- Ash softening temperature greater than 1,200°C
- Ash content on dry basis should be less than 5%
- Moisture Content – should be less than 20%
- Fines below 10 mm should be sieved and removed.
- The feedstock must be free from foreign matters like dust, dirt, fines, fibers, stones, debris, soil, oil, metal, plastic, glass etc.

## AGRICULTURAL WASTES

## FOREST WASTES

# CONNECT US ON YOUTUBE

- https://www.youtube.com/watch?v=OD9ueNYjf1Q
- https://www.youtube.com/watch?v=pbSpC4cl8GI
- https://www.youtube.com/watch?v=_Ee0_gxwpGc&t=31s
- https://www.youtube.com/watch?v=fjUlT8k4Axg
- https://www.youtube.com/watch?v=fjUlT8k4Axg
- https://www.youtube.com/shorts/pSmLx4dQAoQ
- https://www.youtube.com/watch?v=-XmU5L6lytM
- https://www.youtube.com/watch?v=2jYnwcBU1lk
- https://www.youtube.com/watch?v=LKDlbvXdHyM
- https://www.youtube.com/watch?v=7MVHph7NfkY

# AWARDS & EXHIBITIONS

# OUR PRESTIGIOUS PARTNERS

IIT Ropar

IndianOil

UNDP

GIMT GUWAHATI

IIT, ROORKEE

GAYA COLLEGE OF ENGINEERING

NATIONAL INSTITUTE OF TECHNOLOGY ROURKELA

NATIONAL INSTITUTE OF TECHNOLOGY TIRUCHIRAPPALLI

+91-9414535665
+91-7073495200
+91-9610103127

info@enersolbiopower.com
gayatri@enersolbiopower.com
raj@enersolbiopower.com