



MANGLAMTM

GASIFIER COMPANY

Biomass to Energy Solutions !!

An Effective Replacement to Diesel, LPG, PNG, LDO & FO





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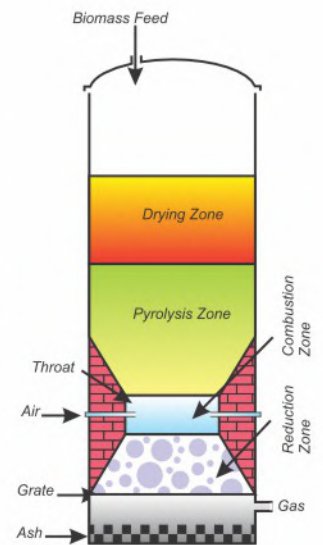
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1.0 BIOMASS GASIFICATION - INTRODUCTION

The biomass gasification process basically converts almost all the forms of biomass or solid fuels, such as, agricultural residues, corn-wastes, rice-husks, woods, wood-wastes etc. into a combustible gas mixture which is normally called producer gas. The producer gas is comprised of carbon monoxide, hydrogen, carbon dioxide, methane and nitrogen. This process of conversion is typically used for various biomass materials, and it partially limits the combustion of such biomass during the process. The partial combustion occurs when the intake of air (oxygen) supply is controlled and is less than adequate quantity.

There are four distinct processes take place in a gasifier:

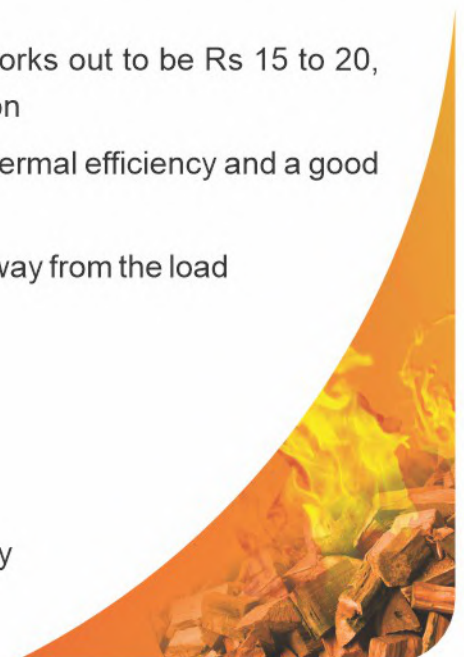
1. Drying of biomass fuel.
2. Pyrolysis.
3. Combustion.
4. Reduction.



MGC Gasifiers

A complete system for Gasifying Biomass:

- It serves as a simple and reliable solution for saving the fuel cost upto 70%.
- It replaces expensive liquid/gaseous fuels like LDO/FO/PNG/LPG/Diesel by low cost solid fuels without any changes in operations, temperature profile, temperature control and cleanliness in the plant area.
- Typically the cost of replacing 1 ltr/kg of liquid/gaseous fuel works out to be Rs 15 to 20, depending on the application and type of fuel used for gasification
- It offers clean combustion; compact burning equipment, high thermal efficiency and a good degree of control just like conventional diesel burner.
- Clean working environment as the Gasifier system is situated away from the load
- Highest overall efficiency
- Payback period 6-8 months
- Reduce oil import
- No emission of smoke from the Gasifier
- Worldwide environment friendly accepted renewable technology



2.0 SAVING ANALYSIS

Depending upon the moisture content available in the biomass, one litre of oil can be saved through the use of 3 to 4 kg of wood/pellet/briquettes. The economical benefits derived in terms of cutback in the fuel costs can be easily evaluated by comparing the likely prices of biomass materials with an outlay of liquid fuels.

Comparing the calorific values of different fuels vis-a-vis producer gas, the Biomass Gasifier System uses wood to produce producer gas which after cleaning process is just like LPG, and can be used for various industrial applications.

By processing 1 kg of wood into a Biomass Gasifier, it transforms the wood into 2.4 nm³ of producer gas, which has a calorific value of 1000–1200 kcal/nm³. In other words, 1 kg of wood yields the calorific value of 2640 kcal after being converted into producer gas.

The calorific values of different fuels are as under:

Fuel Type	kcal/kg or kcal/litre	Producer Gas equivalent (kcal/1100) in kg	Wood Equivalent (kcal/2640) in kg*
HSD (Diesel)	9200	8.36	3.48
LPG	11200	10.18	4.24
PNG	9000	8.18	3.40
FO	9300	8.45	3.52

*Moisture content in biomass under 20%

Savings analysis for using producer gas vis-a-vis other fuels.

The Base values that are taken for calculations are as under :

1 kg of wood : Rs 6.00/kg

Fuel Type	Rs/kg or Rs/litre	Wood Equivalent in kg	Wood Equivalent in Rs	Savings in Rs/litre or Rs/kg
Diesel	₹ 95	3.48 kg	₹ 20.88	₹ 72.12
LPG	₹ 90	4.24 kg	₹ 25.44	₹ 64.56
PNG	₹ 65	3.40 kg	₹ 20.40	₹ 44.60
FO	₹ 60	3.52 kg	₹ 21.12	₹ 38.88

Alternate Fuels : Biomass Briquettes & Pellets

3.0 AREAS OF APPLICATION

- **Power Generation**

The producer gas generated from Manglam Biomass Gasifier can be fed to engine-gensets for producing power and is one of the reliable sources of green energy.

Unit of power	Biomass Consumption (kg)
1 kWh	1.2 - 1.4 kg

- **Thermal Applications**

The versatility of gasification process allows it to be used in a wide range of industrial applications. The industries where the usage of this technology has been successfully adopted are as under:

Bakery & Biscuit :

- ✓ Rotary oven
- ✓ Swing tray
- ✓ Moving tray
- ✓ Biscuit oven

Fried Foods :

- ✓ Potato chips plant
- ✓ Namkeen fryer
- ✓ Automatic Continuous fryer
- ✓ Bhujia bhatti
- ✓ Big Kitchens

Sweet :

- ✓ Desi Bhattis
- ✓ Revolving Bhattis

Furnaces :

- ✓ Rotary Continuous Annealing of Steel, Aluminium, etc
- ✓ Batch Annealing Of Steel, Aluminium, etc
- ✓ Pop Rotary Kiln
- ✓ Lube and Grease Refinery Furnace

Drying & Curing Applications :

- ✓ Tea Dryers
- ✓ Coffee Curing
- ✓ Mosquito Coils
- ✓ Paper Drying
- ✓ Wood Drying
- ✓ Fibre Heating Zone
- ✓ Stenter (Textiles)
- ✓ BOPP Tape Coating Line

Steam Boilers / Thermic Fluid Heaters / Hot Water Generator :

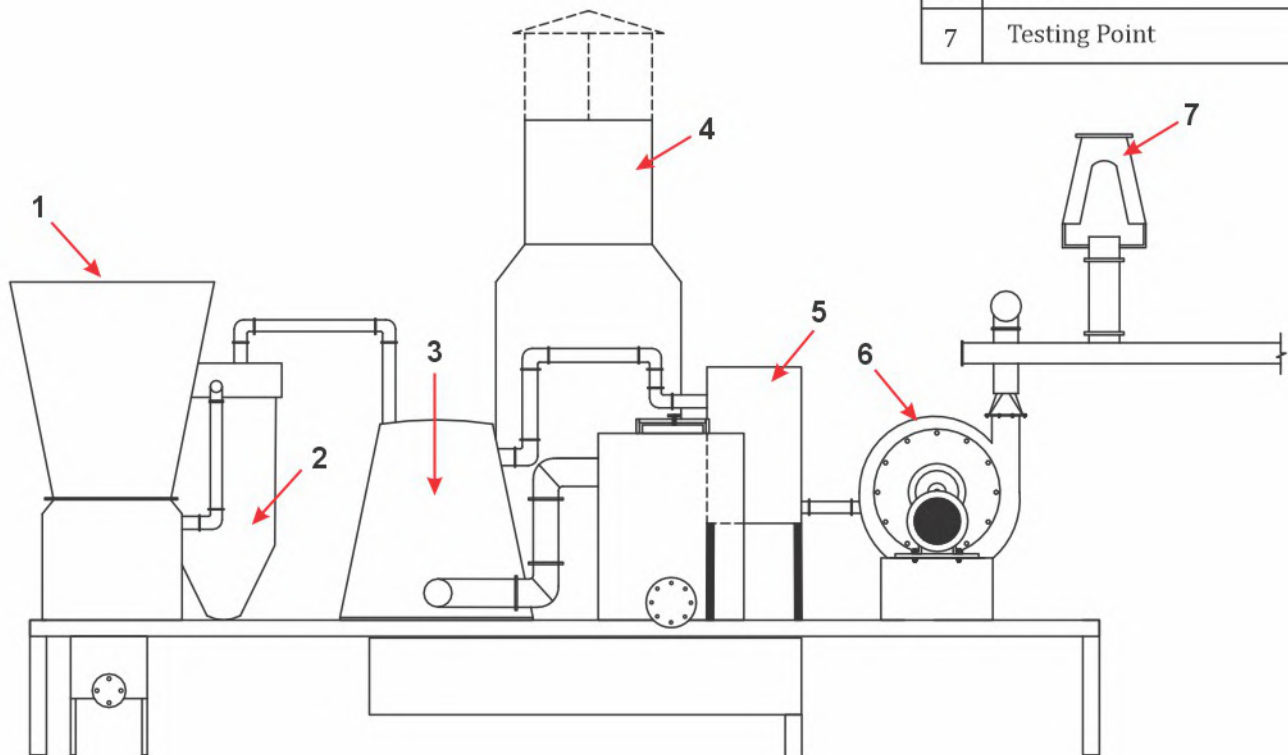
- ✓ Confectionery Industries
- ✓ Pharmaceuticals
- ✓ Textile
- ✓ Chemicals
- ✓ Packaging Industry / Lamination Paper
- ✓ Food Processing Industries



4.0 MGC GASIFIERS (COMPACT) - SPECIFICATION

- **Space-Efficient Design:** The system is compact, requiring minimal space for installation, making it ideal for locations with limited available area.
- **Biomass Fuel Utilization:** It operates using biomass wood chips, providing an eco friendly and renewable energy source.
- **Ideal for Small-Scale Industries:** The system is highly effective for small-scale industrial applications, ensuring energy efficiency and reliability.
- **User-Friendly Operation:** Designed for ease of use, the system can be operated with minimal training, reducing the need for specialized labor.
- **Cost-Effective Investment:** With low capital investment requirements, it offers an affordable energy solution, particularly for smaller businesses.

1	Reactor
2	Cyclone
3	Water Scrubber
4	Ash & Moisture Separator
5	Gas Conditioner
6	Blower
7	Testing Point



4.1 MGC GASIFIERS (COMPACT) - PHOTO GALLERY



4.2 MGC GASIFIERS (COMPACT) - PRODUCT RANGE

PRODUCT RANGE
(SPECTRUM OF PRODUCT)

Sr. No.	Model	Thermal Output kcal / hr	Biomass Consumption kg / hr	Liquid Fuel Replacement ltr / hr	Space Requirement (Feet)	Manpower Requirement	Electricity Consumption hp
1	MGC-10	1,00,000	35-40	10	6' x 12'	1/Shift	4
2	MGC-20	2,00,000	70-80	20	8' x 15'	1/Shift	5
3	MGC-30	3,00,000	105-120	30	8' x 15'	2/Shift	7
4	MGC-40	4,00,000	140-160	40	8' x 16'	2/Shift	8

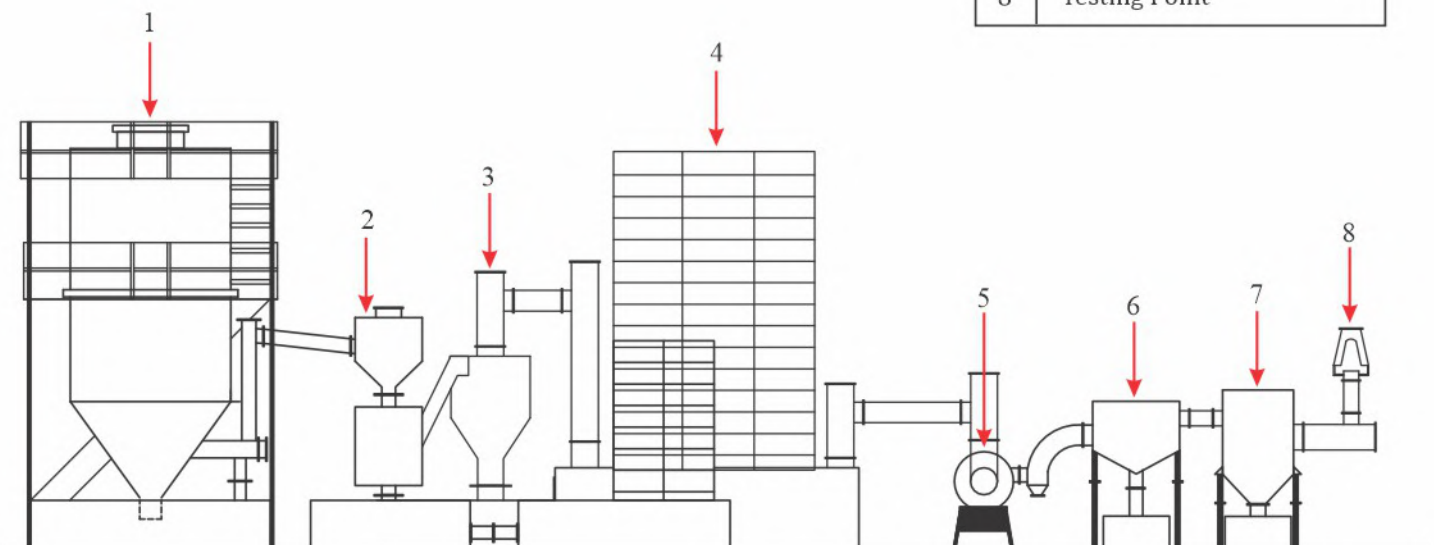
* Fuel: Wood Chips



5.0 MGC GASIFIERS (MEDIUM) - SPECIFICATION

- **Advanced Filtration System:** This gasifier is equipped with advanced filtration technology, ensuring cleaner gas output and improved system efficiency.
- **Biomass Fuel Utilization:** It uses biomass wood chips as fuel, offering a sustainable and renewable energy source.
- **Effective for Medium-Scale Industries:** Designed to meet the energy demands of medium-scale industries, it provides reliable and efficient performance.
- **User-Friendly Operation:** The system is easy to operate, requiring minimal technical expertise, which simplifies its integration into existing industrial processes.
- **Moderate Capital Investment:** With a balanced investment requirement, it provides a cost-effective solution for industries seeking sustainable energy alternatives.

1	Reactor
2	Cyclone
3	Water Scrubber
4	Ash & Moisture Separator
5	Blower
6	Dryer
7	Gas Conditioner
8	Testing Point



5.1 MGC GASIFIERS (MEDIUM) - PHOTO GALLERY



5.2 MGC GASIFIERS (MEDIUM) - PRODUCT RANGE

PRODUCT RANGE
(SPECTRUM OF PRODUCT)

Sr. No.	Model	Thermal Output kcal / hr	Biomass Consumption kg / hr	Liquid Fuel Replacement ltr / hr	Space Requirement (Feet)	Manpower Requirement	Electricity Consumption hp
1	MGC-50	5,00,000	175-200	50	12' x 35'	2/shift	10
2	MGC-60	6,00,000	210-240	60	15' x 40'	3/shift	13
3	MGC-70	7,00,000	245-280	70	15' x 45'	3/shift	18
4	MGC-80	8,00,000	280-320	80	15' x 50'	3/shift	18
5	MGC-90	9,00,000	315-360	90	15' x 50'	3/shift	18
6	MGC-100	10,00,000	350-400	100	15' x 50'	3/shift	23
7	MGC-120	12,00,000	420-480	120	16' x 55'	4/shift	23
8	MGC-150	15,00,000	525-600	150	18' x 55'	4/shift	23
9	MGC-200	20,00,000	700-800	200	20' x 60'	4/shift	28
10	MGC-250	25,00,000	875-1000	250	20' x 60'	4/shift	28

* Fuel: Wood Chips

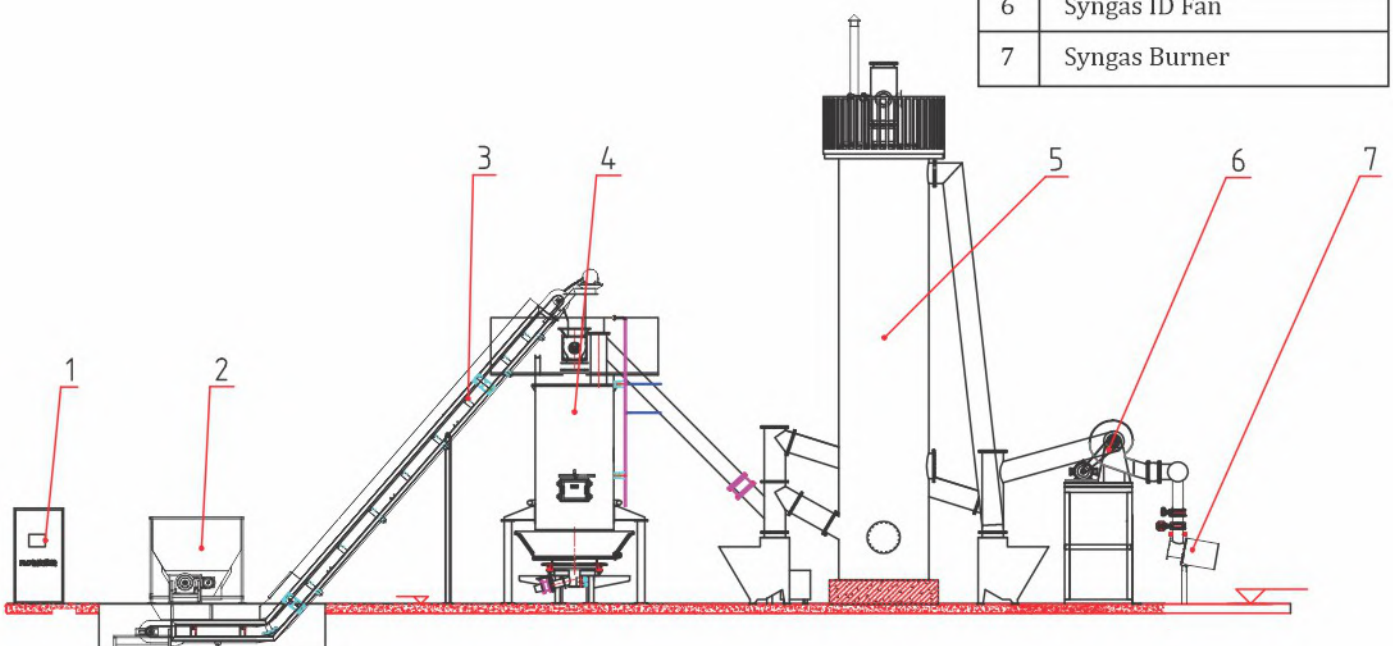


DSH GASIFIERS®

6.0 DSH GASIFIERS - SPECIFICATION

- **Versatile Fuel Compatibility:** This gasifier is designed to operate with various biomass fuels, including wood chips, pellets and briquettes, offering flexibility and efficiency.
- **Ultra-Clean Output:** Equipped with an Electrostatic Precipitator (ESP) filtration system, it delivers an ultra-clean blue flame, ensuring superior combustion and minimal emissions.
- **Automated Operation:** The system features automatic feeding and ash discharge, reducing manual intervention and enhancing operational efficiency.
- **Advanced PLC Control:** Integrated with a Programmable Logic Controller (PLC) system, it allows for precise control and monitoring, optimizing performance and ease of use.
- **Ideal for Medium to Large Scale Industries:** This gasifier is highly effective for both medium and large-scale industrial applications, providing a reliable and sustainable energy solution.

1	PLC Control
2	Feeder
3	Belt Conveyor
4	Biomass Gasifier
5	ESP
6	Syngas ID Fan
7	Syngas Burner



DSH GASIFIERS[®]

6.1 DSH GASIFIERS - PHOTO GALLERY



DSH GASIFIERS®

6.2 DSH GASIFIERS - PRODUCT RANGE

PRODUCT RANGE

(SPECTRUM OF PRODUCT)

Sr. No.	Model	Thermal Output kcal / hr	Biomass Consumption kg / hr	Liquid Fuel Replacement ltr / hr	Space Requirement (Feet)	Manpower Requirement	Electricity Consumption hp
1	DSH-60	6,00,000	210-240	60	55' x 25'	1-2/shift	27
2	DSH-120	12,00,000	420-480	120	60' x 28'	1-2/shift	34
3	DSH-240	24,00,000	840-960	240	76' x 28'	1-2/shift	40
4	DSH-360	36,00,000	1260-1440	360	100' x 29'	1-2/shift	47
5	DSH-480	48,00,000	1680-1920	480	110' x 29'	1-2/shift	51
6	DSH-600	60,00,000	2100-2400	600	110' x 30'	1-2/shift	54
7	DSH-900	90,00,000	3150-3600	900	115' x 30'	1-2/shift	87
8	DSH-1200	1,20,00,000	4200-4800	1200	118' x 35'	1-2/shift	108
9	DSH-1500	1,50,00,000	5250-6000	1500	120' x 45'	1-2/shift	134
10	DSH-1800	1,80,00,000	6300-7200	1800	125' x 48'	1-2/shift	160

* Fuel: Wood Chips / Briquettes / Pellets

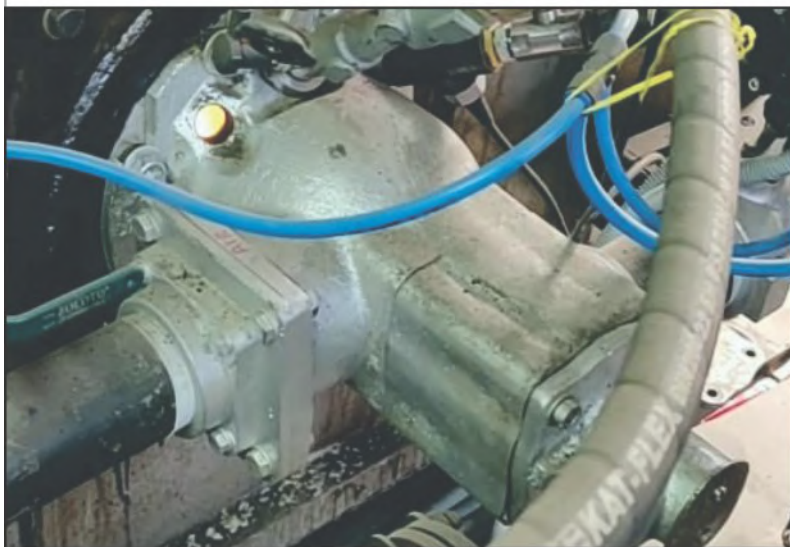


7.0 MGC BURNERS - PRODUCER GAS

- **Dual-Fuel Capability:** This burner is designed to operate using either producer gas (gasifier gas) or LPG/PNG.
- **Wide Capacity Range:** It offers a capacity range of 50,000 to 150,000 kcal/hr, making it suitable for various heating applications across different industries.
- **Automated Operation:** Fully automatic functionality ensures efficient and consistent performance with minimal manual intervention, enhancing reliability and ease of use.



Monobloc Type Burner



North American Type Burner

- **Versatile Fuel Options:** This burner can operate on producer gas (gasifier gas) as well as Diesel, LPG or PNG.
- **Customizable Capacity:** It can be designed to meet any capacity requirements, making it adaptable to various industrial heating needs, regardless of scale.
- **Automated Functionality:** The burner features fully automatic operation, ensuring consistent performance, ease of use, and reduced need for manual intervention.





DSH BURNERS[®]

8.0 DSH BURNERS - INTRODUCTION

Manglam Gasifier company has developed an innovative burner system designed for industries currently using direct biomass (such as sawdust, rice husk, wood) or coal in their boilers and furnaces.

Key Features:

- **Easy Integration:** The burner can be directly attached to the mouth of the boiler or furnace, requiring minimal modifications.
- **Versatile Fuel Compatibility:** Supports a wide range of fuels, including sawdust, rice husk, coal, wood, and other biomass materials.
- **Advanced Semi-Gasification Technology:** Converts solid fuel into gas, ensuring cleaner, more efficient combustion.
- **Enhanced Efficiency & Cost Savings:** Optimized fuel utilization leads to reduced consumption and lower operational expenses.
- **Eco-Friendly Solution:** Generates less pollution, minimal smoke, and no need for a chimney, contributing to a cleaner environment.

Advantages of DSH Burners :

- **Zero Smoke Emissions & No Air Pollution:** Ensures clean combustion, eliminating smoke emissions from boilers, furnaces, and chimneys. A truly ecofriendly solution.
- **Significant Cost Savings:** Achieves 10-20% fuel savings compared to direct biomass or coal usage, reducing operational expenses.
- **Universal Compatibility:** Ideal for all types of boilers, furnaces, and thermic fluid heaters that rely on direct fuel burning, offering seamless integration and enhanced efficiency

Types of Burners :

- A. Saw Dust Burner
- B. Coal Burner
- C. Biomass Wood Chip Burner
- D. Biomass Pellet Burner
- E. Multifuel Burner



DSH BURNERS[®]

8.1 DSH BURNERS - AREAS OF APPLICATION



Steam boiler



Thermal oil furnace



Rotary dryer



Spray drying line



Coal-fired boiler



Aluminum melting furnace



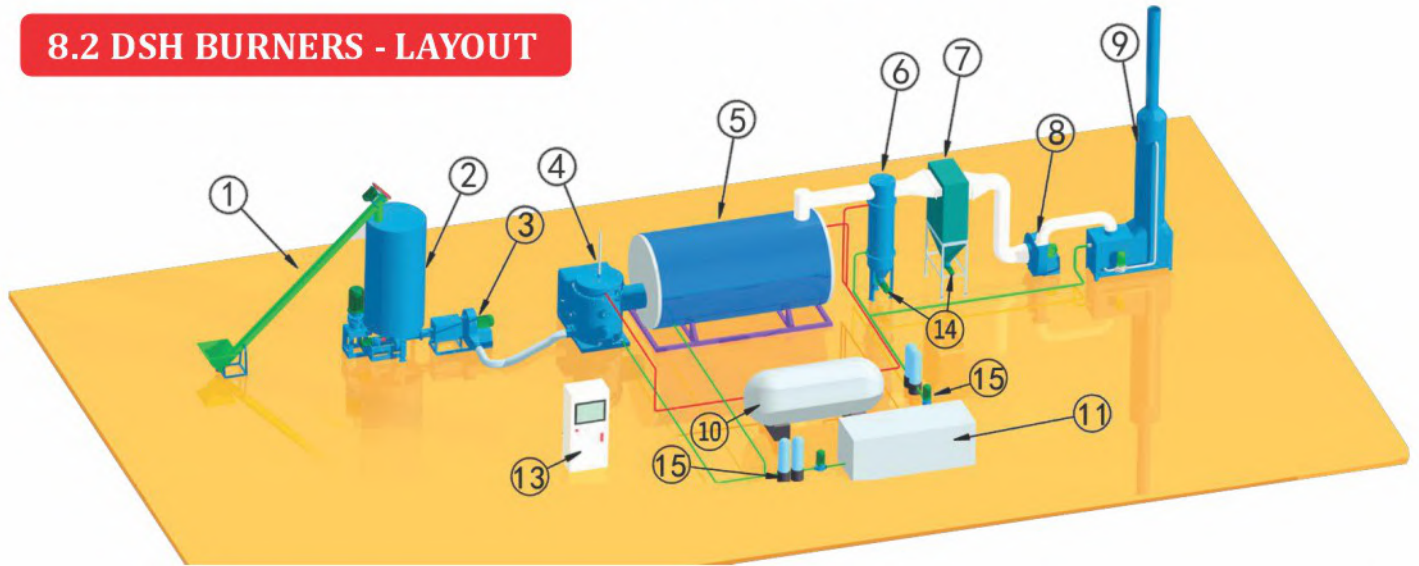
Incinerator



Forging heating

DSH BURNERS®

8.2 DSH BURNERS - LAYOUT



1	Screw conveyor
2	Fuel bin
3	Fan
4	Sawdust / Rice Husk burner
5	Fuel gas boiler/furnace
6	Waste heat recovery
7	Multibarrel ceramic dust collector
8	ID fan

9	Chimney
10	Hot water tank
11	Cold water tank
12	Water pump
13	Control pannel
14	Air lock
15	Soft water device



DSH BURNERS®

8.3 DSH BURNERS - PRODUCT RANGE

PRODUCT RANGE

(SPECTRUM OF PRODUCT)

Sr. No.	Model	Thermal Output kcal / hr	Matched Boiler Capacity (T)	Liquid Fuel Replacement ltr / hr
1	DSH-30	3,00,000	0.5	30
2	DSH-60	6,00,000	1.0	60
3	DSH-120	12,00,000	2.0	120
4	DSH-180	18,00,000	3.0	180
5	DSH-240	24,00,000	4.0	240
6	DSH-300	30,00,000	5.0	300
7	DSH-360	36,00,000	6.0	360
8	DSH-420	42,00,000	7.0	420
9	DSH-480	48,00,000	8.0	480
10	DSH-540	54,00,000	9.0	540
11	DSH-600	60,00,000	10.0	600
12	DSH-720	72,00,000	12.0	720
13	DSH-840	84,00,000	14.0	840
14	DSH-900	90,00,000	15.0	900
15	DSH-960	96,00,000	16.0	960
16	DSH-1080	1,08,00,000	18.0	1080
17	DSH-1200	1,20,00,000	20.0	1200





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