



# **THERMACT-BIO<sup>TM</sup><sub>SP</sub>**

**Multifunctional Combustion Catalyst**



**ABHITECH ENERGYCON LIMITED**

## Introduction

Worldover, usage of biomass fuels is gaining importance for electricity generation, due to its local availability and competitive cost advantage. Biomass-fired plants are environment friendly & helps in reducing global warming as they use renewable resources & reduce the dependance on fossil fuel based electricity generation.

When biomass is fired in boilers, large amount of heat is lost due to its high moisture content, leading to incomplete combustion. The presence of alkaline metals in these fuels gives rise to formation of slag & clinkers which reduces the Boiler Efficiency.

## What is THERMACT-BIO<sub>SP</sub> ?

THERMACT-BIO<sub>SP</sub>, is a multifunctional Combustion Improver for biomass fuels, developed in association with IIT, Bombay. It contains proprietary combustion catalyst, which helps in complete combustion and enhances the Boiler Efficiency. It is totally non-hazardous, environment friendly and safe to use in any type of Biomass-fired boilers.

THERMACT-BIO<sub>SP</sub>, is being successfully used by many biomass-fired boilers in different parts of the world helping them in reducing biomass consumption as well as improving the Boiler Efficiency.



## Technology of THERMACT-BIO<sub>SP</sub>

When THERMACT-BIO<sub>SP</sub> is added in a combustion chamber, it moves through the grid of biomass. The catalyst in THERMACT-BIO<sub>SP</sub> lowers the activation energy needed for dissociation of moisture in biomass. Hence, the moisture breaks into Hydrogen and unpaired Oxygen at elevated temperature. The Hydrogen combines with carbon in biomass forming (CH)<sub>n</sub> gases. These gases on burning gives more heat due to which, biomass feed rate can be reduced.

The unpaired oxygen formed by dissociation of moisture aids the combustion due to which, the operating air level is reduced. The unpaired oxygen further helps in complete combustion of biomass leading to reduction in Unburnts, Clinker, Slag and soot from Super Heater Zone. The improved steam quality leads to enhanced generation.

In nut shell, THERMACT-BIO<sub>SP</sub> reduces the heat losses by moisture in biomass and converts it into useful combustion products. This leads to improvement in Boiler Efficiency.

**Effect of THERMACT-BIO<sub>SP</sub> on Inherent Moisture in biomass for improving Boiler Efficiency.**



Theory	Observation	Advantage
Liberation of Unpaired Oxygen from Moisture	Reduction of Excess Air Reduction in Unburnt in Ash	Reduction in VFD, ID power Reduction in Dry Flue gas losses Increase in Boiler Efficiency
Formation of Combustible gases	Increase in Furnace Temperature	Saving in Biomass



## Evaluation Procedure

A Pre-trial (without THERMACT-BIO<sub>SP</sub>) is conducted for a period of 5-7 days in which, performance evaluation parameters are noted. A Post-trial (with THERMACT-BIO<sub>SP</sub>) is conducted for a period of 15 - 21 days in which, the same parameters are noted and compared.

The improvement in Boiler Efficiency is calculated as

$$\% \text{ Improvement} = \frac{\text{Boiler Efficiency}_{(Post)} - \text{Boiler Efficiency}_{(Pre)}}{\text{Boiler Efficiency}_{(Pre)}} \times 100$$

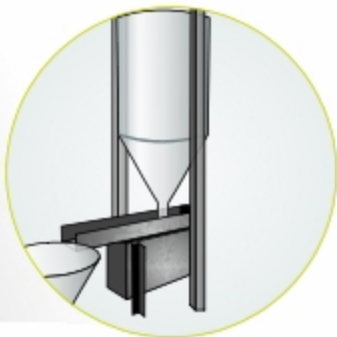
1% improvement in the Boiler Efficiency is equal to about 1.25% reduction in Biomass consumption.

## Benefits of THERMACT-BIO<sub>SP</sub>

- Increase in Boiler Efficiency.
- Reduction in biomass consumption by 2 - 4 %.
- Reduction in Fireside scale deposits.
- Reduces Fluctuation in Steam Parameters.
- Extended Plant Operating cycles.
- Reduction in Excess Air requirement.
- Reduction in Stack emissions.
- Reduction in Unburnts in Fly & Bottom Ash.
- Reduction in operational problems.

## Method of Dosing

THERMACT-BIO<sub>SP</sub> is added directly into the Biomass Feeder



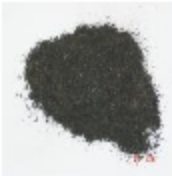
### Dosage:

1 kg of THERMACT-BIO<sub>SP</sub> for 10 Tons of Biomass

### Without THERMACT-BIO<sub>SP</sub>

### With THERMACT-BIO<sub>SP</sub>

Fly Ash is blackish in color indicating presence of unburnt Carbon



Fly ash is grayish in color indicating reduction in unburnt Carbon

### UNBURNTS IN FLY ASH

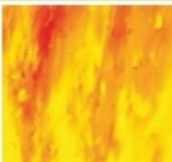
Heavy & hard Clinker



Soft & reduced amount of Clinker

### CLINKER DEPOSITS IN BOILER

Flame color is blackish indicating lower flame temperature & incomplete combustion.

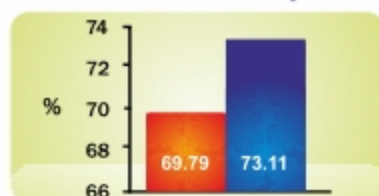


Color of flame is bright and orange/yellow indicating higher flame temperature and more complete combustion.

### FLAME PROPAGATION

## Effects of THERMACT-BIO<sub>SP</sub>

**Boiler Efficiency**

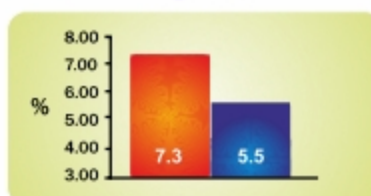


THERMACT-BIO<sub>SP</sub> improves Boiler Combustion Efficiency.



Without THERMACT-BIO<sub>SP</sub>

**O<sub>2</sub> Level**

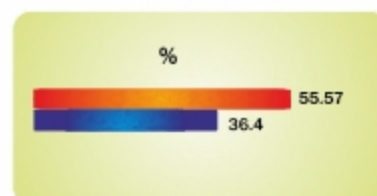


Reduced O<sub>2</sub> and increased CO<sub>2</sub> confirm improved Combustion.



With THERMACT-BIO<sub>SP</sub>

**Excess Air**



Reduction in Excess Air leads to reduced ID, FD & SA Fan Power consumption. Considerable reduction in Excess Air reduces Heat Loss and Stack Temperature.

THERMACT-BIO<sub>SP</sub> is currently being used by number of prestigious Biomass Power Plants, both in India & abroad. In today's era of competition and continued escalation in input cost, THERMACT-BIO<sub>SP</sub>, a multifunctional combustion improver additive is the best tool for Biomass based power plants to improve the Boiler Efficiency and to enhance Profitability.

## Abhitech's Global Presence



### ABHITECH ENERGYCON LIMITED

A/1020, Oberoi Garden Estates, Chandivali, Mumbai - 400 072. INDIA

Tel.: + 91-22 2847 9999 ● Fax: + 91-22 2847 9988

E-mail: abhitech@abhitechenergycon.com

www.abhitechenergycon.com



### ABHITECH ENERGYCON GHANA LIMITED

A2/2, Coastal Estates D.T.D., Spintex Road,

Baatsona / Accra, Greater Accra Region, Ghana

Tel.: + 233 2671 59120 / 2626 10228

E-mail: abhitech.wa@abhitechmail.com



### ABHITECH ENERGYCON s.r.o.

Gen. Píky 2901/22, 1B/3036, Moravská 70100,

Ostrava, CZECH REPUBLIC

Tel.: + 420 606 241 274

E-mail: europe@abhitechenergycon.com

