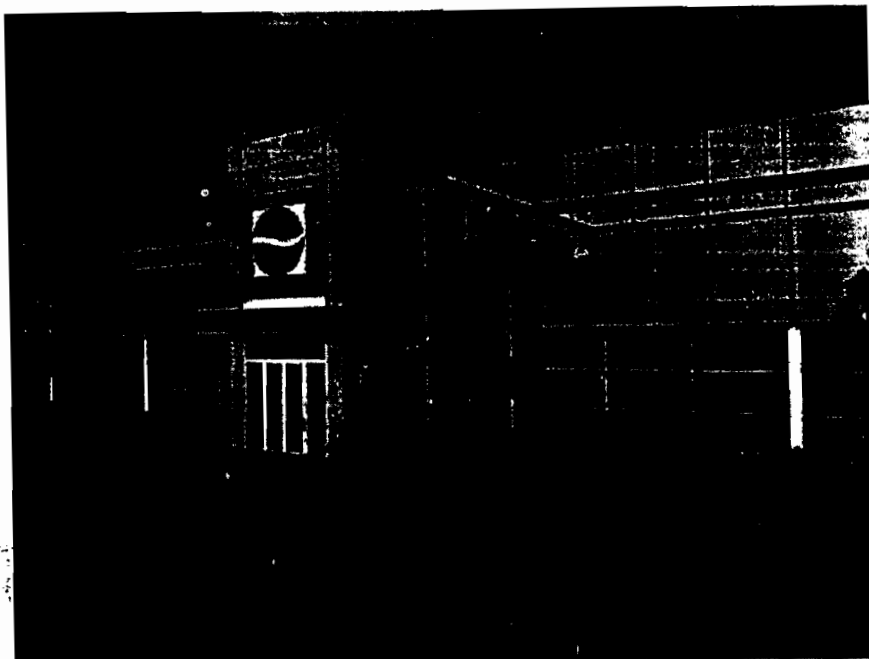


**TRIAL  
CONDUCTED  
AT**



**M/s. PEPSICO INDIA HOLDINGS PVT. LTD.,  
MAMANDUR, TMAILNADU.**



**USING  
TLC FIREPOWER – 4000,  
MULTIFUNCTIONAL FUEL CONDITIONER**

**REPORT PREPERED BY  
M/s. UNITED ONE PVT. LTD.  
(PETROCHEMICAL DIVISION)  
T.NAGAR, CHENNAI – 600 017.**

# UNITED ONE PVT. LTD.

UOPL/PEPSICO-TRIAL/014.  
30<sup>th</sup> January, 2003.

To  
M/s. Pepesico India Holdings Pvt. Ltd.,  
# 6, G.S.T. Road,  
Mamandur Village – 603 111.  
Maduranthagam Taluk.

**Kind Attn: Mr. H.S.Purushotham, Assistant Manager – Maintenance.**

Dear Sirs,  
**Sub: BOILER & D.G.Set TRIAL REPORT with Multifunctional Fuel Conditioner (TLC Firepower – 4000).**

We thank you for the kind co-operation extended to us when we had demonstrated the use and utility of our TLC Firepower – 4000, Multifunctional Fuel Conditioner in your Boiler & D.G.Set Plant at Mamandur.

TLC Firepower – 4000, Multifunctional Fuel Conditioner is an “approved product for pollution control by the Environmental Protection Agency, USA and the products imported from USA, AUSTRALIA and SINGAPORE”.

We are pleased to enclose herewith a detailed trial report for your kind perusal & necessary action.

The overall, observations/benefits as obtained by the use of our TLC Firepower -4000 Multifunctional Fuel Conditioner at the Boiler & D.G.Set plant are as under:

Fuel savings obtained by using our product is 14.02% in 3TPH Shellmax Boiler and 3.20% in 1000 KVA Cummins D.G.Set.

During the trial run the data's were obtained by using the latest German Make Flue Gas Analyzer TESTO-305, a certified DIN ISO-9001 instrument.

**Astonishing benefits of “TLC Firepower 4000” for 3TPH Shellmax Boiler**

- ◆ Reduces the amount of soot and unburnt hydrocarbon & particulate emissions like SO<sub>2</sub>, SO<sub>3</sub> and NO<sub>x</sub> in the flue gas around 85%.
- ◆ Improves complete combustion/heat transfer/higher flame temperature and maximum heat recovery from the fuel.
- ◆ Prevention of clinker formation and lowering corrosion rate in heat transfer surfaces and chimney.
- ◆ Savings in maintenance costs due to less fouling and trouble free operation.
- ◆ Improved working condition for boiler operators due to less thermal and gaseous pollution.

---

**Regional Office South Asia**

10, 3rd Floor, Sindur Palace, Thirumurthy Street, T. Nagar, Chennai - 600 017.  
Ph : (91-44) 834 0125, Fax : (91-44) 834 0743. Website : [www.unitedone.net](http://www.unitedone.net)

## UNITED ONE PVT. LTD.

- ◆ It is an anti-pollutant and energy saving product. As a consequence, reduction in fuel consumption between 5-12%.

### Astonishing benefits of "TLC Firepower 4000" for 1000 KVA Cummins D.G.Set

- ◆ Increase the cetane number.
- ◆ Reduces fuel consumption.
- ◆ Reduces the pollutant emissions like smoke, unburnt hydrocarbons, CO, Nox & Particulates up to 80%.
- ◆ Facilitates engine start-up and running at low speed.
- ◆ Prevents build-up of carbon deposits (Injectors, Exhaust valves, Cross heads) and reducing the need for frequent inspections.
- ◆ Lubricates the injection pump and tops of cylinders.
- ◆ Contain micro biocide, corrosion inhibitors, anti rust agents, de-emulsifiers and deposit modifiers.
- ◆ Reduces filter gum deposits.
- ◆ Reduces noise levels of the engine by about 2 db.

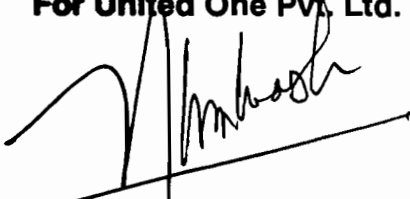
Our TLC Firepower -4000, Multifunctional Fuel Conditioner not only saves your organization money but also solves much of your emission problem acting as pollution control catalyst.

Since the savings & other benefits are substantial we strongly recommend the use of our TLC Firepower 4000 - Multifunctional Fuel Conditioner on a regular basis to reap tangible & Intangible benefits.

We will be servicing you periodically on all technical aspects.

Thanking you and assuring you of our best attention at all times. We remain...

Sincerely Yours,  
For United One Pvt. Ltd.



Jaiprakash Natarajan  
Manager – Technical Sales & Service.  
Fuel & Energy Conservation Cell.

CC: Mr.V.C.Nithiyanandam, Manager – Production, PEPSICO.

# **TRIAL REPORT**

**TLC FIREPOWER – 4000,  
MULTIFUNCTIONAL FUEL CONDITIONER**

**At  
M/s. PEPSICO INDIA HOLDINGS PVT. LTD.,  
MAMANDUR.**

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## **1.0 ACKNOWLEDGEMENT**

**UNITED ONE PVT. LTD.**

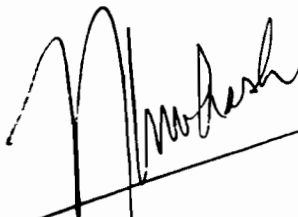
**TLC Firepower 4000 – Multifunctional Fuel Conditioner Trial**  
**Report of M/s. Pepsico India Holdings Pvt. Ltd.**

**ACKNOWLEDGEMENT**

We at UNITED ONE, would like to extend our whole hearted thanks to the management of M/s. Pepsico India Holdings Pvt. Ltd., for providing us an opportunity to demonstrate our product **TLC Firepower 4000 - Multifunctional Fuel Conditioner** at your Boiler and D.G.Set Plant.

We thank **Mr. V.C.Nithiyanandam, Manager – Production** for his initiative in taking up the trial. We would also thank the Boiler Operators and Helpers for their keen attendance while conducting the trial.

We would like to place on record our thanks to all those who directly and indirectly involved in successfully conducting the trial run.



**Jaiprakash Natarajan**  
**Manager – Technical Sales & Service**



**Jitin Patnaik**  
**Manager – Sales & Marketing**

**2.0 UNITED ONE  
(ENERGY CONSERVATION CELL)**

**UNITED ONE PVT. LTD.**

## **UNITED ONE – ENERGY CONSERVATION CELL (PETROCHEMICAL DIVISION)**

The principle aim of our **PETROCHEMICAL DIVISION** is not only to market **TLC Firepower -4000 Multifunctional Fuel Conditioner** but also provide technical backup to all types of D.G.Sets, Boilers, Thermic Fluid Heaters, Furnaces and Marine Vessels so as to increase the efficiency and performance while reducing the harmful emissions which are polluting our environment.

The **State-of-the-art Fuel Conditioning Technology** – Transplanted to Indian fuel conditions to upgrade the various performance enhancement in fuels like Gasoline (Petrol), Diesel, LDO, HSD, Naphtha, SKO, LSHS and Heavy Fuel Oil (FO).

**TLC Firepower 4000. Multifunctional Fuel Conditioner is well proven in world-wide and several industries in Asia.**

- ◆ Reduces the amount of soot and unburnt hydrocarbon & particulate emissions like  $\text{SO}_2$ ,  $\text{SO}_3$  and  $\text{NC}_x$  in the flue gas around 85%.
- ◆ Improves complete combustion/heat transfer/higher flame temperature and maximum heat recovery from the fuel.
- ◆ Prevention of clinker formation and lowering corrosion rate in heat transfer surfaces and chimney.
- ◆ Savings in maintenance costs due to less fouling and trouble free operation.
- ◆ Improved working condition for boiler operators due to less thermal and gaseous pollution.
- ◆ It is an anti-pollutant and energy saving product. As a consequence, reduction in fuel consumption between 5-12%.

**Our PETROCHEMICAL DIVISION** – Conducts various energy conservation trials to improve the efficiency in Boilers, Thermic Fluid Heaters, Furnaces, D.G.Sets and Marine Vessels.

In addition to the above we also offer free monthly Flue Gas Loss Optimization service using the latest German Make Flue Gas Analyzer TESTO-305 and renders energy conservation and emission control tips from a team of well-experienced professionals.



### **3.0 BOILER SPECIFICATION**

## **RECOMMENDED DOSAGE-TLC FIREPOWER 4000**

<b>Product Used</b>	: TLC Firepower 4000-Multifunctional Fuel Conditioner (For Fuel & Energy Conservation)
<b>Dosage</b>	: 1 Ltr of Fuel Conditioner for every 4000 Ltrs of Furnace Oil.
<b>Objective</b>	: Fuel & Energy Conservation and Pollution Control.

---

## **BOILER SPECIFICATION – 3TPH**

<b>Make</b>	: SHELLMAX
<b>Type</b>	: 3-Pass Smoke Tube Boiler.
<b>Year of Make</b>	: 1996
<b>Capacity</b>	: 3 TPH
<b>Fuel</b>	: Furnace Oil
<b>Evaporation</b>	: 3000 Kgs/Hr
<b>Boiler working pressure</b>	: 9 Kg/Cm <sup>2</sup>

## **BOILER SPECIFICATION – 5TPH**

<b>Make</b>	: SHELLMAX
<b>Type</b>	: 3-Pass Smoke Tube Boiler.
<b>Year of Make</b>	: 1995
<b>Capacity</b>	: 5 TPH
<b>Fuel</b>	: Furnace Oil
<b>Evaporation</b>	: 5000 Kgs/Hr
<b>Boiler working pressure</b>	: 9 Kg/Cm <sup>2</sup>
<b>Main Storage Tank Capacity</b>	: 15, 000 Ltrs (3Nos)
<b>Service Oil Tank Capacity</b>	: 5, 000 Ltrs

## **4.0 D.G.SET SPECIFICATION**

## **RECOMMENDED DOSAGE-TLC FIREPOWER 4000**

<b>Product Used</b>	TLC Firepower 4000-Multifunctional Fuel Conditioner (For Fuel & Energy Conservation)
<b>Dosage</b>	: 1 Ltr of Fuel Conditioner for every 4000 Ltrs of Superior Kerosene Oil.
<b>Objective</b>	: Fuel & Energy Conservation and Pollution Control.

---

## **D.G.Set SPECIFICATION – 1000 KVA**

### **ENGINE:**

<b>Make</b>	: Cummins
<b>Model</b>	: KTA – 3067 – G
<b>Aspiration</b>	: Turbo Charger, After cooler.

### **ALTERNATOR:**

<b>Make</b>	: STAMFORD
<b>KVA</b>	: 1000 KVA
<b>Output</b>	: 1390 Amps
<b>KW</b>	: 800
<b>Machine No</b>	: 96036058
<b>RPM</b>	: 1500
<b>Volt</b>	: 415

### **CONTROL PANEL:**

<b>Type</b>	: Manual
<b>Type of Braker</b>	: ACB (L&T)
<b>Main Storage Tank Capacity</b>	: 20, 000 Ltrs (2Nos)
<b>Service Oil Tank Capacity</b>	: 1, 000 Ltrs

## **5.0 BOILER – FUEL CONSERVATION REPORT**

## **FUEL CONSERVATION REPORT – 3TPH BOILER**

**BOILER AVERAGE FUEL SAVINGS = 14.02 %**

### **FUEL ECONOMY ANALYSIS:**

<b>Average monthly FO consumption</b>	<b>= 60 KL</b>
<b>FO savings realized</b>	<b>= 14.02%</b>
<b>FO Saved per month</b>	<b>= 8.41 KL</b>
<b>Cost of FO saved</b>	<b>= Rs. 1, 26, 150/- ----- (A)</b>
<b>Fuel Conditioner used per month</b>	<b>= 15 Ltrs</b>
<b>Cost of TLC Firepower -4000 / Ltr</b>	<b>= Rs. 950/-</b>
<b>Cost of Fuel Conditioner used per month</b>	<b>= Rs. 14, 250/- -----(B)</b>
<b>A – B</b>	<b>= Rs. 1, 26, 150 – Rs. 14, 250</b>
<b>Net Monthly Savings</b>	<b>= Rs. 1, 11, 900/-</b>

**NET ANNUAL SAVINGS = Rs. 13, 42, 800/-**

**As the saving is substantial, it is recommended to use the Fuel Conditioner continuously on a regular basis to achieve the benefits.**

**Apart from the above benefits the usage of Fuel Conditioner will help to reduce the environmental problems by reducing the soot and carbon particulate emission like SO<sub>2</sub>, SO<sub>3</sub> and NO<sub>x</sub> in the flue gas.**

## **6.0 D.G.SET – FUEL CONSERVATION REPORT**

## **FUEL CONSERVATION REPORT – 1000 KVA DGSET**

Pre – Conditioner KWH/SKO	= 3.13 Units/Ltr
Post – Conditioner KWH/SKO	= 3.23 Units/Ltr
Percentage Improvement	= $\frac{\text{Post Conditioner} - \text{Pre Conditioner}}{\text{Pre Conditioner}} \times 100$
	= $3.23 - 3.13 / 3.13 \times 100$

**AVERAGE FUEL SAVINGS = 3.20 %**

### **FUEL ECONOMY ANALYSIS:**

Average monthly SKO consumption	= 50 KL
SKO savings realized	= 3.20 %
SKO Saved per month	= 1.60 KL
Cost of SKO saved	= Rs. 24, 000/- ----- (A)
Fuel Conditioner used per month	= 12.5 Ltrs
Cost of TLC Firepower -4000 / Ltr	= Rs. 950/-
Cost of Fuel Conditioner used per month	= Rs. 11, 875/- -----(B)
A – B	= Rs. 24, 000 – Rs. 11, 875
Net Monthly Savings	= Rs. 12, 125/-

**NET ANNUAL SAVINGS = Rs. 1, 45, 500/-**

*Note: We observed that the load pattern of 1000 KVA D.G.Set was not inconsistent. Hence, we could not able to achieve a marginal fuel savings. We assured you that if our TLC Firepower -4000, Multifunctional Fuel Conditioner is used continuously on a regular basis on constant load to achieve the above benefits.*



## **7.0 BOILER THERMAL EFFICIENCY**

## **BOILER THERMAL EFFICIENCY**

$$\text{Boiler Thermal Efficiency} = 100 - \text{Total Losses}$$

$$\text{Total Losses} = \text{Stack Loss} + \text{Blow Down Loss} + \text{Radiation Loss} + \text{Hydrogen Loss}$$

$$\text{Hydrogen Loss} = 7\%$$

$$\text{Blow Down Loss \& Radiation Loss} = 2\%$$

$$\text{Stack Loss: } (K \times \Delta T) / \% \text{ of CO}_2 \times 100\% \quad (K = 0.576)$$

$$\Delta T = \text{Stack temp.} - \text{Ambient Temp. } (T_{st} - T_{at})$$

### **SHELLMAX BOILER - 3TPH**

#### **PRE-CONDITIONER DATA without TLC Firepower 4000 (Low Fire)**

$$\begin{aligned} \text{O}_2 \% &= 9.7 \\ \text{CO}_2 \% &= 15.5/20.9 \times (20.9 - \% \text{ of O}_2) \\ &= 15.5/20.9 \times (20.9 - 9.7) \\ &= 15.5/20.9 \times 11.2 \\ &= 8.30 \% \\ \text{Stack Loss} &= K \times (T_{st} - T_{at}) / \% \text{ of CO}_2 \\ &= 0.576 \times (236-32) / 8.30 \\ &= 0.576 \times 204 / 8.30 \\ &= 14.15 \\ \text{Total Losses} &= 14.15+2+7= 23.15 \\ \text{Boiler Thermal Efficiency} &= 100 - \text{Total Losses} \\ &= 100 - 23.15 \\ \eta \% &= 76.85 \% \end{aligned}$$

#### **POST-CONDITIONER DATA with TLC Firepower 4000 (Low Fire)**

$$\begin{aligned} \text{O}_2 \% &= 3.0 \\ \text{CO}_2 \% &= 15.5/20.9 \times (20.9 - \% \text{ of O}_2) \\ &= 15.5/20.9 \times (20.9 - 3.0) \\ &= 15.5/20.9 \times 17.90 \\ &= 13.27 \\ \text{Stack Loss} &= K \times (T_{st} - T_{at}) / \% \text{ of CO}_2 \\ &= 0.576 \times (177-32) / 13.27 \end{aligned}$$

## UNITED ONE PVT. LTD.

$$\begin{aligned} &= 0.576 \times 145 / 13.27 \\ &= 6.29 \end{aligned}$$

$$\text{Total Losses} = 6.29 + 2 + 7 = 15.99$$

$$\begin{aligned} \text{Boiler Thermal Efficiency} &= 100 - \text{Total Losses} \\ &= 100 - 15.29 \\ \eta \% &= 84.71\% \end{aligned}$$

$$\begin{aligned} \text{Percentage Improvement} &= \frac{\text{Post Conditioner} - \text{Pre Conditioner}}{\text{Pre Conditioner}} \times 100 \\ &= 84.71 - 76.85 / 76.85 \times 100 \end{aligned}$$

Thermal Efficiency Improved after using TLC Firepower-4000 by 10.22 %

### PRE-CONDITIONER DATA without TLC Firepower4000(Medium Fire)

$$\begin{aligned} \text{O}_2 \% &= 8.0 \\ \text{CO}_2 \% &= 15.5/20.9 \times (20.9 - \% \text{ of O}_2) \\ &= 15.5/20.9 \times (20.9 - 8.0) \\ &= 15.5/20.9 \times 12.90 \\ &= 9.56 \% \\ \text{Stack Loss} &= K \times (T_{st} - T_{at}) / \% \text{ of CO}_2 \\ &= 0.576 \times (227-32) / 9.56 \\ &= 0.576 \times 195 / 9.56 \\ &= 11.74 \\ \text{Total Losses} &= 11.74 + 2 + 7 = 20.74 \\ \text{Boiler Thermal Efficiency} &= 100 - \text{Total Losses} \\ &= 100 - 20.74 \\ \eta \% &= 79.26 \% \end{aligned}$$

### POST-CONDITIONER DATA with TLC Firepower 4000 (Medium Fire)

$$\begin{aligned} \text{O}_2 \% &= 2.2 \\ \text{CO}_2 \% &= 15.5/20.9 \times (20.9 - \% \text{ of O}_2) \\ &= 15.5/20.9 \times (20.9 - 2.2) \end{aligned}$$

$$= 15.5/20.9 \times 18.70$$

$$= 13.86$$

**Stack Loss**

$$= K \times (T_{st} - T_{at}) / \% \text{ of } CO_2$$

$$= 0.576 \times (180-32) / 13.86$$

$$= 0.576 \times 148 / 13.86$$

$$= 6.15$$

**Total Losses**

$$= 6.15+2+7= 15.15$$

**Boiler Thermal Efficiency**

$$= 100 - \text{Total Losses}$$

$$= 100 - 15.15$$

$\eta \% = 84.85 \%$

**Percentage Improvement**

$$= \frac{\text{Post Conditioner} - \text{Pre Conditioner}}{\text{Pre Conditioner}} \times 100$$

$$= 84.85 - 79.26 / 79.26 \times 100$$

**Boiler Thermal Efficiency Improved after using TLC Firepower-4000 by 7.05 %**

### **PRE-CONDITIONER DATA without TLC Firepower 4000 (High Fire)**

**O<sub>2</sub> %**

$$= 6.50$$

**CO<sub>2</sub> %**

$$= 15.5/20.9 \times (20.9 - \% \text{ of } O_2)$$

$$= 15.5/20.9 \times (20.9 - 6.50)$$

$$= 15.5/20.9 \times 14.40$$

$$= 10.67 \%$$

**Stack Loss**

$$= K \times (T_{st} - T_{at}) / \% \text{ of } CO_2$$

$$= 0.576 \times (220-32) / 10.67$$

$$= 0.576 \times 188 / 10.67$$

$$= 10.14$$

**Total Losses**

$$= 10.14+2+7= 19.14$$

**Boiler Thermal Efficiency**

$$= 100 - \text{Total Losses}$$

$$= 100 - 19.14$$

$\eta \% = 80.86 \%$

**POST-CONDITIONER DATA with TLC Firepower 4000 (High Fire)**

$$O_2 \% = 1.40$$

$$\begin{aligned} CO_2 \% &= 15.5/20.9 \times (20.9 - \% \text{ of } O_2) \\ &= 15.5/20.9 \times (20.9 - 1.40) \\ &= 15.5/20.9 \times 19.50 \\ &= 14.46 \end{aligned}$$

$$\begin{aligned} \text{Stack Loss} &= K \times (T_{st} - T_{at}) / \% \text{ of } CO_2 \\ &= 0.576 \times (210 - 32) / 14.46 \\ &= 0.576 \times 178 / 14.46 \\ &= 7.09 \end{aligned}$$

$$\text{Total Losses} = 7.09 + 2 + 7 = 16.09$$

$$\begin{aligned} \text{Boiler Thermal Efficiency} &= 100 - \text{Total Losses} \\ &= 100 - 16.09 \\ \eta \% &= 83.91 \% \end{aligned}$$

$$\begin{aligned} \text{Percentage Improvement} &= \frac{\text{Post Conditioner} - \text{Pre Conditioner}}{\text{Pre Conditioner}} \times 100 \\ &= 83.91 - 80.86 / 80.86 \times 100 \end{aligned}$$

**Boiler Thermal Efficiency Improved after using TLC Firepower-4000 by 3.77 %**

Load	Boiler Thermal Efficiency		Percentage Improvement (Post - Pre / Pre)	Average Percentage Improvement	Fuel Savings (1% Thermal Efficiency = 2% Fuel Savings)
	Pre	Post			
Low Fire	76.85	84.71	10.22		
Medium Fire	79.26	84.85	7.05	7.01	14.02
High Fire	80.86	83.91	3.77		

## **8.0 D.G.SET – PRE & POST CONDITIONER DATA**

**PRE & POST CONDITIONER DATA for 1000 KVA  
Cummins DG Set**

**PRE CONDITIONER DATA without TLC Firepower 4000 (1000KVA)**

Date	Units Generated KWH	SKO Consumed	Hours Generated	KWH/SKO
11/01/2003	1376	446.51	4	3.08
13/01/2003	1440	452.02	4	3.18
			<b>Average</b>	<b>3.13</b>

**POST CONDITIONER DATA with TLC Firepower 4000 (1000KVA)**

Date	Units Generated KWH	SKO Consumed	Hours Generated	KWH/SKO
24/01/2003	1536	474.80	5	3.23
27/01/2003	1184	363.83	3	3.25
28/01/2003	1568	485.10	4	3.23
			<b>Average</b>	<b>3.23</b>

**Overall Observation:**

***As the saving is substantial it is recommended to treat the fuel from the main storage tank of furnace oil and superior kerosene oil.***

***Lets join together to stop pollution,***

***save environment***

***&***

***save fuel oil...***

## **9.0 BOILER – PRE & POST CERTIFIED DATA**



## BOILER FUEL & ENERGY CONSERVATION AUDIT

### PRE CONDITIONER DATA

**Boiler : SHELLMAX - 3 TPH**  
**Dosage: NIL**

Date : 09/01/03

Time	Flue Gas Analysis																
	FO Temp °C	Furnace Oil Pressure Kgs/Cm <sup>2</sup>		Feed Water Temp °C	Steam Generated Kgs	FO Consumed Ltrs.	S/F Ratio	Number of cases produced	FO Consumed / Cases produced								
		Inlet	Outlet							Fire Load	O <sub>2</sub> %	CO <sub>2</sub> %	CO PPM	Stack Temp °C	Ambient Temp °C	Stack Loss %	Comb. Eff. %
10.00	112	20	10	100						L.F	7.00	10.30	5	225	34	10.68	82.50
11.00	106	20	8	97						H.F	5.50	11.42	5	217	32	9.33	83.70
12.00	106	20	10	99						L.F	9.70	8.30	5	236	32	14.15	78.50
13.00	110	20	10	95						H.F	6.50	10.67	5	220	32	10.14	82.80
14.00	110	20	10	80						H.F	5.00	11.79	5	223	32	9.33	84.10
15.00	112	21	6	72						H.F	5.50	11.42	5	209	32	8.92	84.50

Supervised by:  
M/s. Pepsico India Holdings Pvt. Ltd.

**Trial Conducted by:**  
**M/s. United One Pvt. Ltd.**

**BOILER OPERATORS**  
Mr. R. Viswanathan/Mr. M. D. Ganesh/Mr. K. Bhasker/Mr. N. Subbaiah

M/s. Pepsico India Holdings Pvt. Ltd.  
Mamandur Village - 603 111. Maduranthagam Taluk.

BOILER FUEL & ENERGY CONSERVATION AUDIT

PRE CONDITIONER DATA

Boiler : SHELLMAX - 3 TPH  
Dosage : NIL

Date : 11/01/03

Time	FO Temp °C	Furnace Oil Pressure Kgs/Cm <sup>2</sup>		Feed Water Temp °C	Steam Generated Kgs	FO Consumed Ltrs.	S/F Ratio	Number of cases produced	FO Consumed / Cases produced	Flue Gas Analysis							
		Inlet	Outlet							Fire Load	O <sub>2</sub> %	CO <sub>2</sub> %	CO PPM	Stack Temp °C	Ambient Temp °C	Stack Loss %	Comb. Eff. %
11.00	112	20	8	81						M.F	8.00	9.56	5	227	32	11.74	81.50
12.00	106	20	12	82						H.F	5.30	11.56	5	262	32	11.46	81.80
13.00	109	20	8	74						H.F	5.70	11.27	5	217	32	9.45	83.70
14.00	114	20	8	80						M.F	5.50	11.42	5	224	32	9.68	83.50
15.00	114	20	8	67						H.F	5.70	11.27	5	225	32	9.86	83.40
16.00	110	21	11	68						H.F	5.00	11.79	5	234	32	9.86	83.90

Supervised by:  
M/s. Pepsico India Holdings Pvt. Ltd.

Mr.R.Viswanathan/Mr.M.D.Ganesh/Mr.K.Bhasker/Mr.N.Subbalah  
B O I L E R O P E R A T O R S

Trial Conducted by:  
M/s. United One Pvt. Ltd.

Jitin Patnalk / Jaiprakash Natarajan  
Manager - Sales & Marketing

**M/s. Pepsico India Holdings Pvt. Ltd.**  
**Mamandur Village - 603 111. Maduranthagam Taluk.**

**BOILER FUEL & ENERGY CONSERVATION AUDIT**

**PRE CONDITIONER DATA**

Boiler : SHELLMAX - 3 TPH  
 Dosage : NIL

Date : 13/01/11

Time	FO Temp °C	Furnace Oil Pressure Kgs/Cm <sup>2</sup>		Feed Water Temp °C	Steam Generated Kgs	FO Consumed Lt. s.	S/F Ratio	Number of cases produced	FO Consumed / Cases produced	Flue Gas Analysis						Stack Loss %	Comt Eff. %
		Inlet	Outlet							Fire Load	O <sub>2</sub> %	CO <sub>2</sub> %	CO PPM	Stack Temp °C	Ambient Temp °C		
11.00	110	21	8	76						H.F.	6.50	10.67	5	199	32	8.90	83.91
12.00	105	20	8	73						L.F	7.00	10.30	5	200	32	9.39	83.61
13.00	110	20	8	75						M.F	5.80	11.19	5	210	32	9.16	84.51
14.00	109	20	8	79						M.F	5.50	11.42	5	207	32	8.82	84.81
15.00	111	20	8	81						H.F.	5.10	11.71	5	205	32	8.50	85.11
16.00	116	20	8	88						H.F.	5.00	11.79	5	200	32	8.50	85.01

Supervised by:  
 M/s. Pepsico India Holdings Pvt. Ltd.

Trial Conducted by:  
 M/s. United One Pvt. Ltd.

Mr. R. Viswanathan / Mr. M. D. Ganesh / Mr. K. Bhasker / Mr. N. Subbalaah  
 B O I L E R O P E R A T O R S

Jitin Patnaik / Jalpavkash Natarajan  
 Manager - Sales & Marketing

**M/s. Pepsico India Holdings Pvt. Ltd.**  
**Mamandur Village - 603 111. Maduranthagam Taluk.**

**BOILER FUEL & ENERGY CONSERVATION AUDIT**

**POST CONDITIONER DATA**

**Boiler : SHELLMAX - 3 TPH**  
**Dosage : 1:1000**

**Date : 17/01/03**

Time	FO Temp °C	Furnace Oil Pressure Kgs/Cm <sup>2</sup>		Feed Water Temp °C	Steam Generated K <sub>cal</sub> /hr	FO Consumed Ltrs.	S/F Ratio	Number of cases produced	FO Consumed / Cases produced	Flue Gas Analysis						Stack Loss %	Ambient Temp °C	Comb. Eff. %
		Inlet	Outlet							Fire Load	O <sub>2</sub> %	CO <sub>2</sub> %	CO PPM	Stack Temp °C				
11.30	116	20	8	63						M.F	3.30	13.05	5	197		7.28	32	86.00
12.30	109	21	11	60						H.F	2.30	13.05	5	200		7.18	32	86.10
13.30	113	22	12	64						H.F	1.70	13.05	5	200		7.89	32	86.00
14.30	116	21	12	69						H.F	2.00	13.05	5	200		8.26	32	85.50
15.30	115	20	8	76						L.F	3.30	13.05	5	200		7.41	32	86.00
16.30	111	20	11	84						H.F	2.10	13.05	5	200		7.35	32	86.20

**Supervised by:**  
**M/s. Pepsico India Holdings Pvt. Ltd.**

**Trial Conducted by:**  
**M/s. United One Pvt. Ltd.**

**Mr. R. Viswanathan / Mr. M. D. Ganesh / Mr. K. Bhasker / Mr. N. Subbaiah**  
**B O I L E R O P E R A T O R S**

**Jitin Patnaik / Jaiprakash Natarajan**  
**Manager - Sales & Marketing**

M/s. Pepsico India Holdings Pvt. Ltd.  
Mamandur Village - 603 111. Maduranthagam Taluk.

BOILER FUEL & ENERGY CONSERVATION AUDIT

POST CONDITIONER DATA

Boiler : SHELLMAX - 3 TPH  
Dosage : 1:1000

Date : 18/01/11

Time	FO Temp °C	Furnace Oil Pressure Kgs/Cm <sub>2</sub>		Feed Water Temp °C	Steam Generated Kgs	FO Consumed Ltrs.	S/F Ratio	Number of cases produced	FO Consumed / Cases produced	Flue Gas Analysis							Com Eff. %
		Inlet	Outlet							Fire Load	O <sub>2</sub> %	CO <sub>2</sub> %	CO PPM	Stack Temp °C	Ambient Temp °C	Stack Loss %	
10.30	105	21	11	70						H.F	1.80	13.86	5	210	32	7.64	86.8
11.30	116	22	12	70						M.F	2.20	13.86	5	210	32	7.39	86.4
12.30	116	20	9	70						M.F	2.00	14.01	5	205	32	7.11	86.5
13.30	115	20	9	79						M.F	2.50	13.64	5	195	32	6.88	86.5
14.30	106	22	12	85						H.F	1.40	14.23	5	210	32	7.09	86.5
15.30	105	20	10	83						H.F	1.70	14.23	5	207	32	7.08	86.5

Supervised by:  
M/s. Pepsico India Holdings Pvt. Ltd.

Mr.R.Viswanathan/Mr.M.D.Sanesh/Mr.K.Bhasker/Mr.N.Subbalah  
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Trial Conducted by:  
M/s. United One Pvt. Ltd.

Jitin Patnaik / Jaiprakash Natarajan  
Manager - Sales & Marketing

**M/s. Pepsico India Holdings Pvt. Ltd.  
Mamandur Village - 603 111. Maduranthagam Taluk.**

**BOILER FUEL & ENERGY CONSERVATION AUDIT**

**POST CONDITIONER DATA**

**Boiler : SHELLMAX - 3 TPH  
Dosage : 1:1000**

**Date : 22/01/03**

Time	FO Temp °C	Furnace Oil Pressure Kgs/Cm <sub>2</sub>		Feed Water Temp °C	Steam Generated Kgs	FO Consumed Ltrs.	S/F Ratio	Number of cases produced	FO Consumed / Cases produced	Flue Gas Analysis							
		Inlet	Outlet							Fire Load	O <sub>2</sub> %	CO <sub>2</sub> %	CO PPM	Stack Temp °C	Ambient Temp °C	Stack Loss %	Comb. Eff. %
11.00	109	21	11	58						L.F	3.20	13.12	5	216	32	8.07	86.10
12.00	111	20	9	64						L.F	3.30	13.05	5	204	32	7.59	86.00
13.00	113	20	8	76						M.F	2.60	13.57	5	182	32	6.36	87.20
14.00	116	20	8	79						M.F	2.20	13.86	5	180	32	6.15	87.30
15.00	108	19	7	80						L.F	3.00	13.27	5	177	32	6.29	87.00
16.00	116	22	12	81						H.F	2.30	13.79	5	170	32	7.56	86.60

**Supervised by:  
M/s. Pepsico India Holdings Pvt. Ltd.**

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**Trial Conducted by:  
M/s. United One Pvt.Ltd.**

**Jitin Patnaik / Jalprakash Natarajan  
Manager - Sales & Marketing**

## **10.0 D.G.SET – PRE & POST CERTIFIED DATA**

M/s. Pepsico India Holdings Pvt. Ltd.  
Mamandur Village - 603 111. Maduranthagam Taluk.

-- D G SET FUEL & ENERGY CONSERVATION AUDIT

PRE CONDITIONER DATA

D G Set : Cummins (1000 KVA)

Date : 11/01/03

Time	Engine Oil		Cooling Water Temp °C	RPM	Hz	Volt	Phase Current Amps	SKO Level Ltrs	SKO Consumed (1CM = 11.025 Ltrs)	Unit Generated KWH	KWH (Conversion Factor * 320)	KWH / SKO
	Pressure	Temp °C										
12.30	7	90	80	1455	51	420	510	909.56	—	9855.70	—	—
13.30	7	90	80	1455	50	420	580	815.85	93.71	9856.60	288	3.07
14.30	7	90	85	1455	50	420	780	689.06	126.79	9857.80	384	3.02
15.30	6.5	90	80	1455	50	420	675	576.60	112.46	9858.90	352	3.13
16.30	7	90	80	1455	50	420	690	463.05	113.55	9860.00	352	3.09

Supervised by:  
M/s. Pepsico India Holdings Pvt. Ltd.

Trial Conducted by:  
M/s. United One Pvt. Ltd.

Mr.N.Gynasekar/Mr.M.Amarapathi/Mr.D.Elangoan/Mr.J.Kannan/Mr.R.Vijaykumar/Mr.K.Vijaykumar  
E L E C T R I C A L D E P A R T M E N T

Jithn Patnaik / Jai Prakash Natarajan  
Manager - Sales & Marketing



**M/s. Pepsico India Holdings Pvt. Ltd.**  
**Mamandur Village - 603 111. Maduranthagam Taluk.**

**D G SET FUEL & ENERGY CONSERVATION AUDIT**

**PRE CONDITIONER DATA**

**D G Set : Cummins (1000 KVA)**

**Date : 13/01/03**

Time	Engine Oil		Cooling Water Temp °C	RPM	Hz	Volt	Phase Current Amps	SKO Level Ltrs	SKO Consumed (1CM =11.025 Ltrs)	Unit Generated KWH	KWH ( Conversion Factor * 320 )	KWH / SKO
	Pressure	Temp °C										
10.30	7	90	80	1455	50	420	720	804.82	—	9877.80	—	—
11.30	7	90	85	1455	50	420	740	683.55	121.27	9879.00	384	3.16
12.30	7	90	85	1455	50	420	670	578.81	104.74	9880.10	352	3.36
13.30	7	90	85	1455	50	420	710	755.21	—	9881.30	—	—
14.30	7	90	85	1455	50	420	680	633.93	121.28	9882.50	384	3.16
15.30	7	90	80	1455	51	420	670	529.20	104.73	9883.50	320	3.05

**Supervised by:**  
**M/s. Pepsico India Holdings Pvt. Ltd.**

**Trial Conducted by:**  
**M/s. United One Pvt. Ltd.**

**Mr.N.Gynasekar/Mr.M.Amarapathi/Mr.D.Elangoan/Mr.J.J.Kannan/Mr.R.R.Vijaykumar**  
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**Manager - Sales & Marketing**

**M/s. Pepsico India Holdings Pvt. Ltd.**  
**Mamandur Village - 603 111. Maduranthagam Taluk.**

**D G SET FUEL & ENERGY CONSERVATION AUDIT**

**POST CONDITIONER DATA**

**D G Set : Cummins (1000 KVA)**  
**Dosage : 1:2000 (500 PPM)**

**Date : 24/01/03**

Time	Engine Oil		Cooling Water Temp °C	RPM	Hz	Volt	Phase Current Amps	SKO Level Ltrs	SKO Consumed (1CM = 11.025 Ltrs)	Unit Generated KWH	KWH ( Conversion Factor * 320 )	KWH / SKO
	Pressure	Temp °C										
10.30	7	90	85	1455	50	420	700	551.25		26.50		
11.30	7	90	85	1455	50	420	700	474.07	77.18	27.30	256	3.32
12.45	7	90	85	1455	50	420	600	909.56	.	28.70		
13.45	7	90	85	1455	51	420	525	826.87	82.69	29.60	288	3.48
14.45	7	90	85	1455	50	420	740	733.16	93.71	30.50	288	3.07
15.45	7	90	85	1455	50	420	580	628.42	104.74	31.50	320	3.05
16.45	7	90	85	1455	50	420	600	512.66	115.76	32.70	384	3.31

**Supervised by:**  
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**Jitin Patnalk / Jalprekash Natarajan**  
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**M/s. Pepsico India Holdings Pvt. Ltd.**  
**Mamandur Village - 603 111, Maduranthagam Taluk.**

**D G SET FUEL & ENERGY CONSERVATION AUDIT**

**POST CONDITIONER DATA**

**D G Set : Cummins (1000 KVA)**  
**Dosage : 1:2000 (500 PPM)**

**Date : 27/01/03**

Time	Engine Oil		Cooling Water Temp °C	RPM	Hz	Volt	Phase Current Amps	SKO Level Ltrs	SKO Consumed (1CM =11.025 Ltrs)	Unit Generated KWH	KWH ( Conversion Factor * 320 )	KWH / SKO
	Pressure	Temp °C										
12.15	7	90	85	1455	51	420	640	733.16		64.20		
13.15	7	90	85	1455	50	420	870	589.83	143.33	65.60	448	3.13
14.15	7	90	85	1455	50	420	680	474.07	115.76	66.80	384	3.32
15.15	7	95	85	1455	50	420	670	369.33	104.74	67.90	352	3.36

**Supervised by:**  
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**Trial Conducted by:**  
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**Jitin Patnaik / Jalprakash Natarajan**  
**Manager - Sales & Marketing**

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**Mamandur Village - 603 111. Maduranthagam Taluk.**

**D G SET FUEL & ENERGY CONSERVATION AUDIT**

**POST CONDITIONER DATA**

**D G Set : Cummins (1000 KVA)**  
**Dosage : 1:2000 (500 PPM)**

**Date : 28/01/03**

Time	Engine Oil		Cooling Water Temp °C	RPM	Hz	Volt	Phase Current Amps	SKO Level Ltrs	SKO Consumed (1CM =11.025 Ltrs)	Unit Generated KWH	KWH ( Conversion Factor * 320 )	KWH / SKO
	Pressure	Temp °C										
14.00	7	90	85	1455	51	420	640	815.85		94.20		
15.00	7	90	85	1455	51	420	800	705.60	110.25	95.30	352	3.19
16.00	7	90	80	1455	51	420	680	595.35	110.25	96.40	352	3.19
17.00	7	90	85	1455	50	420	1000	474.07	121.28	97.60	384	3.16
18.00	7	90	85	1455	50	420	950	330.75	143.32	99.10	480	3.35

**Supervised by:**  
**M/s. Pepsico India Holdings Pvt. Ltd.**

**Trial Conducted by:**  
**M/s. United One Pvt.Ltd.**

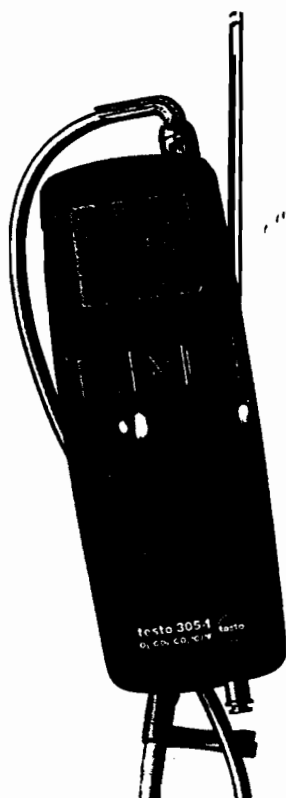
**Mr.N.Gynasekar/Mr.M.Amarapathi/Mr.D.Elangovan/Mr.J.Kannan/Mr.R.Vijaykumar/Mr.K.Vijaykumar**  
**E L E C T R I C A L D E P A R T M E N T**

**Jitin Patnalk /Jaiprakash Natarajan**  
**Manager - Sales & Marketing**

## 11.0 FLUE GAS INSTRUMENT DETAIL

# Your introductory set to gas heater maintenance

Gas heater set  
User-friendly operation  
Incl. probe



The testo 305-1 set is ideally suited to gas heater maintenance. In addition to the flue gas analyser, it contains all of the tools required for easy and efficient inspections on maintenance.

Maintenance is now worthwhile even if rate of use is low.

## ● All tools included in set

## ● User-friendly operation

## ● Switchover buttons for all parameters

## ● Permanently attached, flexible probe



Included in set: e.g. testo 505 for adjusting nozzle pressure



Included in set: e.g. testo 382 multimeter for measuring electronics in gas heaters

## testo 305-1

### with CO display

testo 305-1, flue gas analyser, with CO display, incl. flue gas probe and batteries

Part no. 0632 0305

Available in May 2002

## Ordering data for Accessories

## Part no.

- Probe stop (not in set)**  
To position probe in flue gas pipe
- Multi-purpose clip with carrying loop**  
To prevent flue gas analyser from falling
- Spare filters (10 off)**
- Service labels (80 off)**  
To document flue gas values
- Transport case (plastic)** for instrument and all accessories  
For safe and orderly storage

0170 9054  
0554 0436  
0554 3383  
0554 0442  
0516 0315

## Technical data

Temperature	-10... +400 °C	O <sub>2</sub>	0... +21 Vol. % O <sub>2</sub>
Accuracy	±2 °C (-10... +400 °C)	Accuracy	±0.3% (0... +21 Vol. % O <sub>2</sub> )
Resolution	0.1 °C (-10... +400 °C)	Resolution	0.1% (0... +21 Vol. % O <sub>2</sub> )
Efficiency	0... +99.9 %	CO <sub>2</sub>	0 to CO <sub>2</sub> max Calculation from O <sub>2</sub>
Resolution	0.1% (0... +99.9 %)	Resolution	0.1%
Resolution	0 % (0... +99.9 % qA)	CO	0... +400 ppm CO
		Accuracy	±30% of mv (+100... +400 ppm CO)
			±30 ppm CO (0... +100 ppm CO)
		Resolution	5 ppm CO (0... +400 ppm CO)

## Recommended kit:

### testo 305-1, Gas heater set



Flue gas analysis, CO display:  
testo 305-1 flue gas analyser  
(O<sub>2</sub>, CO<sub>2</sub>, °C/°F, CO)

Gas pressure measurement:  
testo 505 pressure cell

testo 317-1 flue gas spillage  
detector

Electronic connections: testo  
382 multimeter

testo 317-2 gas leak stick

Documenting readings:  
Service labels

Transport case

Part no. 0563 0305

## Recommended kit:

### testo 305-1, Gas heater and oil burner set in one



testo 305-1 flue gas analyser  
with all accessories from: gas  
heater and oil burner set

Gas press. meas.: testo 505  
press. cell

testo 317-1 spillage detector

Electronic connections: testo  
382 multimeter

testo 317-2 gas leak stick

Documenting readings: Service  
labels

Soot meas.: testo smoke pump

Magnetic test for reversing  
valve: magnetic tester

Pump check: Pressure test set

Nozzle change: Nozzle spanner

Transport case

Part no. 0563 0347

## **12.0 CONCLUSION CERTIFICATE**

## CONCLUSION CERTIFICATE

*We hereby state that by using our TLC FIREPOWER-4000  
Multi Functional Fuel Conditioner, your esteemed  
organisation achieves the following*

- ◆ *Improves the Boiler Plant to Higher Efficiency*
- ◆ *Reduces the Amount of Soot and unburnt HydroCarbons & Particulate Emissions like SO<sub>2</sub>, SO<sub>3</sub> and NO<sub>x</sub> in the Flue Gas around 85%.*
- ◆ *Improves Complete Combustion/Heat Transfer/Higher Flame Temperature and maximum Heat Recovery from the Fuel Oil.*
- ◆ *Prevention of Clinker formation and lowering corrosion rate in Heat Transfer surfaces and Chimney.*
- ◆ *Improved working conditions for Boiler Operators due to less Thermal and Gaseous Pollution.*
- ◆ *It is an Anti-pollutant and energy saving product. As a consequence, reduction in Fuel Consumption around 14%.*