

Case Study – 2

Low Tension Ceramic Insulators manufacturing industry having tunnel kiln (Fuel: Natural Gas)

Implementing the technology

Flue gas exhaust at the tunnel kiln was monitored. %O<sub>2</sub> in flue gas varies from 5.1% to 15.6%.

| Parameter             | Unit | Exhaust (Flue Gas) |       | Firing Zone          |
|-----------------------|------|--------------------|-------|----------------------|
|                       |      |                    |       |                      |
| O <sub>2</sub>        | %    | 14.1               | 12.0  | 20.3                 |
| CO                    | ppm  | 1266               | 1137  | 20                   |
| Combustion Efficiency | %    | 45.2               | 57.5  | O <sub>2</sub> > 20% |
| CO <sub>2</sub>       | %    | 3.01               | 5.0   | O <sub>2</sub> > 20% |
| Excess Air            | %    | 344.6              | 137.5 | O <sub>2</sub> > 20% |
| Pressure              | mbar | 0.05               | 0.08  | 0.24                 |

The Carbon Monoxide (CO) level is alarmingly high. The reason is **No Proper Mixing of Combustion air and the fuel**, most possibly due to **Not Cleaning** the burners for **8 – 10 years** and possible damage to the burner tip.

The same can be maintained by regular monitoring of flue gas sample with the help of a portable flue gas analyzer or by installing O<sub>2</sub>sensor at the furnace exhaust for flue gases and a modulating motorized damper for combustion air control.

**Recommendations:**

It is suggested to control the combustion air through reducing the RPM of combustion air blower by 1-2 Hertz at a time by monitoring required temperature within kiln and set the appropriate frequency and monitoring the required O<sub>2</sub> percentage in flue gas to optimize the air fuel ratio and thus combustion efficiency at the kiln.

The proper control of air to fuel ratio can result in combustion efficiency more than 75 % with old burners as well. Thus increase in 15% combustion efficiency will result in saving of approximately **85,540 SCM** gas per annum.

Benefit

|               |   |
|---------------|---|
| Environmental | <ul style="list-style-type: none"> <li>• Per Day reduction in the gas consumption: <b>234 SCM.</b><br/>Per Year reduction in gas consumption: <b>85,540 SCM.</b></li> <li>• Per Day reduction in GHG (CO<sub>2</sub>) emission: <b>489 Kg</b><br/>Per Year Reduction in GHG (CO<sub>2</sub>) emission: <b>160 MT</b></li> </ul> |
| Economical    | <p>Investment: <b>Rs. 20,000/-</b> (For VFD)<br/>Annual Savings: <b>Rs. 16,25,000/-</b> per annum<br/>Payback Period: <b>Immediate</b></p>  |

