

COMMON MONITORABLE PARAMETERS – KHURJA CERAMIC CLUSTER
GEF-UNIDO-BEE PROJECT "PROMOTING ENERGY EFFICIENCY & RENEWABLE ENERGY IN SELECTED MSME CLUSTERS IN INDIA"

PROJECT BACKGROUND

The aim of this project is to develop and promote an environment for introducing energy efficiencies and enhanced use of renewable energy technologies in process applications. The project is being executed in 12 selected MSME clusters in five varied sectors identified as the most energy consuming sectors. These include brass, ceramic, dairy, foundry and hand tool sectors. This will result in improving the productivity and competitiveness of the units, as well as, to reduce their overall carbon and improve the local environment.

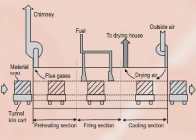
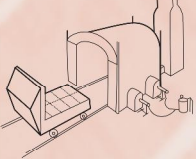

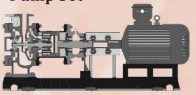
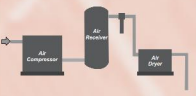
PROJECT COMPONENTS

The project will work at the cluster level, as well as, support policy-making to achieve its aim. The project has the following components:

- Increasing the level of end-use demand and implementation of energy efficiency and renewable energy technologies and practices by MSMEs
- Increasing the capacity of suppliers of energy efficiency and renewable energy products, service providers and finance providers
- Scaling up the project to a national level
- Strengthening policy, institutional and decision making frameworks

For further information please contact:

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S. No.	EQUIPMENT	PARAMETER	INSTRUMENT	FREQUENCY OF MEASUREMENT	UNIT	REF. RANGE	VALUE	REMARKS BY SUPERVISOR
1	Tunnel Kiln 	Specific Energy Consumption (Energy consumption per ton of material helps to calculate the specific energy consumption)	Fuel Flow Meter	Each operation cycle	kg of fuel/ton			
		Kiln Temperature (It is very important to know the temperature at various sections of the kiln to ensure that temperature inside the kiln is within the limits)	Thermocouple	Hourly	°C	For Tunnel Kiln: Pre-heating Zone: 200-800°C Heating Zone: 800-1200°C Cooling Zone: 700-200°C For Shuttle Kiln: Up to 1100°C		
	Shuttle Kiln 	Oxygen Level in Flue Gas (An increase in oxygen percentage in flue gas indicates reduced combustion efficiency and increased fuel combustion)	Oxygen Analyzer	Hourly	%	Furnace Oil - 4-5% Natural Gas - 2-3%		
		Flue Gas Temperature (It signifies the amount of sensible heat carried away outside the furnace. Monitor the flue gas temperature on chimney, before any waste heat recovery device)	Thermocouple	Daily	°C	Furnace Oil : ≤ 180 - 220 °C Natural Gas - ≤ 140°C		
		Side Wall Temperature (It gives insights about refractory lining of the furnace and also heat loss from furnace surface)	Thermocouple	Daily	°C	≤ 10°C higher than ambient temperature		
		Firing Cycle (Firing cycle time decides the actual energy consumption. Optimal firing cycle will improve the specific energy consumption)	Electronic Timer	Each Operation Cycle	min.	For Tunnel: 19 - 20 hours For Shuttle: Upto 12 hours for soaking and then cooling		
Loading Density of Ware (A proper density of the kiln car will reduce the additional energy consumption as thermal storage)	Electronic Weighing Scale	Loading per car	kg/m ³	Standard ± 10%				
2	Motors 	Voltage (Either the extreme high or the extreme low voltages will damage the motor and hence shorten the life of the motor)	Power Analyzer	Weekly	V	±5% of rated voltage		
		Current (Over-current can eventually lead to permanent damage to the motor or electrical device)	Power Analyzer	Weekly	A	±5% of rated current		
		Power Factor (Low PF can contribute to low efficiency, higher losses, and unnecessary electric utility charges)	Power Analyzer	Weekly	PF	Close to unity		
3	Pump Set 	Pressure (Regularly check suction and discharge heads and also ensure proper maintenance of pump)	Pressure Gauge	Weekly	kg/cm ²	As per manufacturer's recommendation (refer to name plate details)		
		Water Flow Rate (A good performing pump should deliver required amount of flow)	Flow Meter	Weekly	m ³ /hr			
		Power Consumption (It gives insight about the motor loading and pump efficiency)	Power Analyzer	Weekly	kW			
4	Compressed Air System 	Pressure (Pressure variation leads to decrease in system efficiency and higher energy consumption)	Pressure Gauge	Daily	kg/cm ²	Main header: ≤ 0.3 bar Distribution Line: ≤ 0.5 bar		
		Temperature (Increased temperature of compressed air means decrease in efficiency)	Thermocouple	Daily	°C			
		Specific Power Consumption (It gives the energy consumption to produce 1 cfm of compressed air. Comparison of this value with OEM's catalogue gives deviation in SEC.)	Power Analyzer	Daily	kWh/cfm	As per manufacturer's recommendation		
		Loading and Unloading Time (Running hours and loading hours signifies the actual utilization of the air compressors over the day)	Electronic Timer	Daily	min.			