REVISED SPECIFICATIONS FOR CREMATOR (FURNACE AND CHIMNEY) FOR LPG CREMATORIUM

The Furnace System shall comprise of:

1. Primary Combustion Chamber
2. Body Loading Trolley
3. Hot Duct
4. Secondary Combustion Chamber
5. Venturi Wet Scrubber,
6. Cyclone Separator
7. Mist Eliminator
8. Dilution System
9. Activated carbon absorption unit
10. Stack/Chimney
11. Control Panel
12. Ash Chamber/Ash removal

1.Technical Specifications

1	Primary Chamber	Minimum 3.2 m x 2.1 m x 1.5 m (interior dimensions) Made with MS of minimum plate thickness of 5 mm.
2	Secondary Chamber	Separate secondary chamber shall be provided above the primary chamber, designed properly so as to facilitate a minimum of two seconds residence time to ensure combustion of the flue gas flow. For the estimation of residence time in the secondary chamber its volume shall be calculated starting from the secondary burner tip to the thermocouple. The minimum flow of the flue gas in the secondary chamber shall be 0.6m3 /sec at 1050°C.
3	Door of primary chamber	Front opening, vertical sliding, counter weight balanced with view port.
4	Furnace bed & Structure	Made up of cast iron with high quality IS 8 refractory bricks as insulation.
5	Proper thermal insulation shall be provided for primary and secondary chambers and connecting pipes.	
	Internal	IS 8 refractory brick lining with min. thickness 230 mm to withstand 1500°C with high quality castable fire clay and mortars with specific type of curing to the furnace.

	External	Outer skin temperature of the furnace wall to be maintained below 50°C. Rock wool and as per TS 6701 and ASTM C-680
6	Fuel	Liquefied Petroleum Gas/Natural gas
7	LP Gas cylinders	Minimum 8 numbers
8	Gas pipe line from gas cylinder storage room	Copper piping with pressure gauge
9	Burner System	Fuel: Liquefied Petroleum Gas/Natural gas, 4 Nos. for the primary chamber and 2 Nos. for secondary chambers each having 100 kW with minimum LPG draw 4kg/hr in such a way that High pressure, full length burners on either side of primary and secondary chambers. Features: • Fully automatic burners with fan, motor, pump, ignition transformer & electrode, flame sensor, sequence controller, gas solenoid valve, air/gas pressure switches. • Step less fully modulating operation • Allows air gas fine tuning • Ability to obtain optimum combustion values by regulating combustion air and gas • Integrated with PLC control for burner trip alarm/hooter and other specified safety features.
10	Dilution system with ID fan	ID fan with at least 3 HP and 1270 CFM blowers to bring down the concentration of pollutants.
11	Combustion Air Supply	With at least 1HP blower for the supply of air for incineration of the body in the primary chamber and for supply of excess air to the secondary chamber.
12	Motors	All motors should conform to IE-2 specifications.
13	Ventury scrubber, cyclone separator and mist eliminator	Integrated or separate units shall be provided to remove particulate matter and harmful emissions before letting it out to the atmosphere.
14	Activated carbon adsorption unit.	The unit should be packed with activated carbon adsorbents to limit odorous emissions.
15	Chimney	30m height chimney as per CPCB norms and State PCB norms. Made of MS bottom dia 1000 mm, top dia 325 mm with specified thickness as per the drawing. From bottom up to 18m ht. MS sheet with thickness varying from 8 mm to 6 mm with inner lining lagged with high alumina refractory in the conical area. From 18m-24m ht, MS cylinder 400 mm dia and 5 mm thick. From 24 m -30 m, MS cylinder 325 mm dia.
16	Support for chimney and ladder	Tower supported chimney with a conical bottom in MS , coated with epoxy paint .
17	Chimney connection	300 mm dia. MS refractory lagged pipe from 3 HP ID blower to chimney/ manifold.

18	Foundation for chimney	As per site condition	
19	Sampling port	At 11m from the chimney bottom.	
20	Lightning arrestor	At the top of the chimney and to be connected to the ground	
21	Earth pit	Up to 3m as per requirement.	
22	Temperature Sensor	Adequate nos. of k-type thermocouples/RTD in primary and secondary chambers. In the Secondary chamber the location of the thermocouple shall be at the end of the secondary chamber or before admission of dilution medium.	
23	Temperature control and indication	Solid State digital type temperature indicator controller 0-1200°C in each chamber.The sensor must be inserted at the top of the cremation furnace chambers.	
24	Safety controller	PLC based control. Safety features: • Able to prevent the charging door from being opened unless the temperature in the primary chamber is below the set point or when the burners are in ignited mode. • Automatically shut down the fuel flow to the burner at the end of the cremation cycle.	
25	Ash removal facility	At rear side of primary chamber, scraping by manual operation, with hinged type door manually operated.	
26	Painting	Steel items other than SS to be painted with high temperature resistant paints.	
27	Trolley	Stretcher type trolley fully SS with SS bed and provision for easy sliding of the body into the primary chamber with min. size of 11ft x 3 ft x 2ft	
28	Temperature	Primary chamber	850 ± 50°C
		Secondary chamber	1100 ± 50°C
		Chimney/stack	Min. 200°C
29	Cremation time/body	60-90 minutes	
30	LPG consumption	12 ± 2 kg (max.)	
31	Emissions	As per KSPCB standards	
32	Operation and maintenance	The agency authorized should provide 12 months free O&M for the entire system. During this period one personnel of the local body shall be trained by the agency for operating the systems. After the free service of 12 months the service provider should be ready to undertake the O&M for a period of 10-15 years, if required by the LSGIs.	

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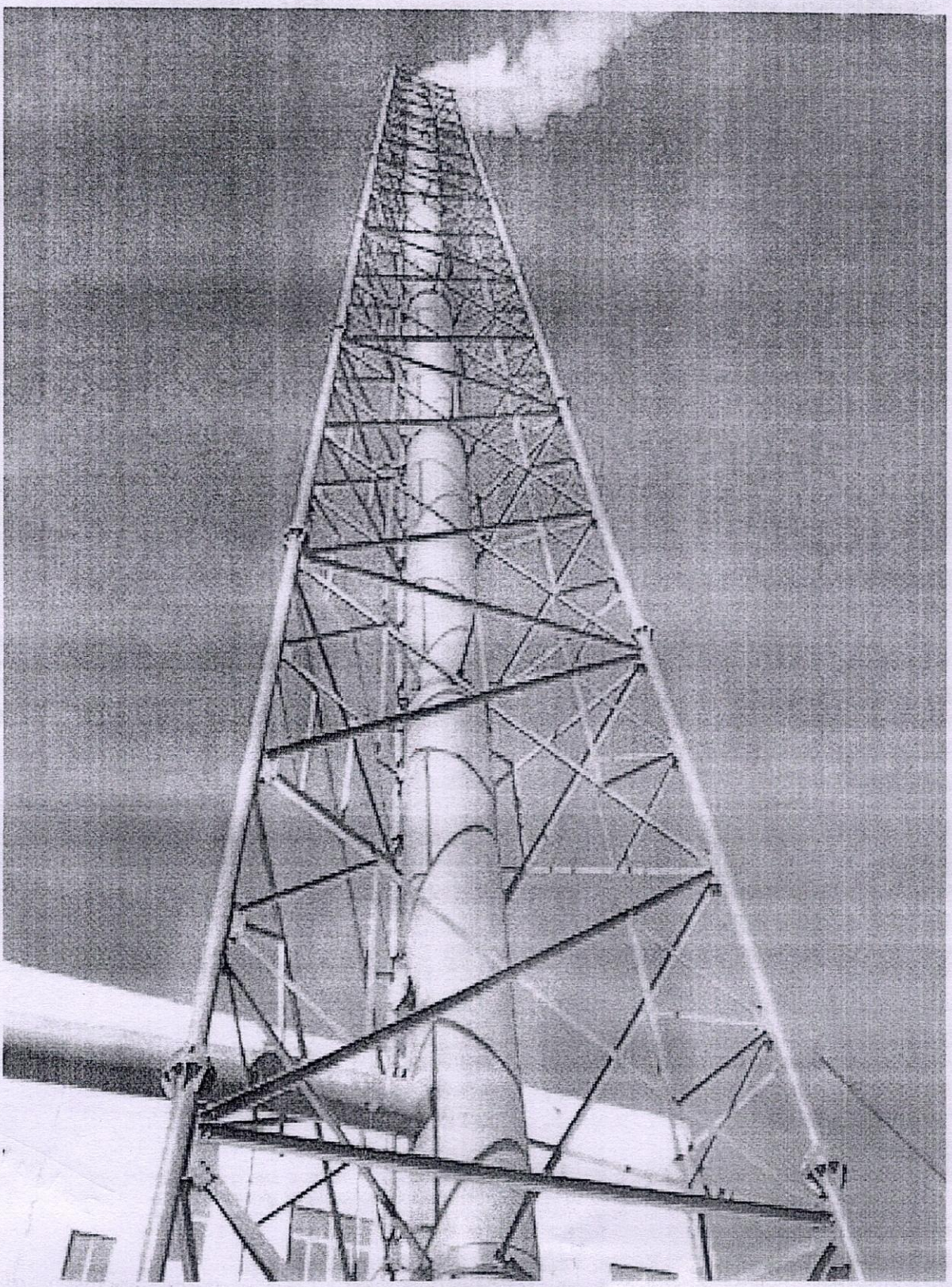

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