पदमा एस राव /Padma S. Rao
मुख्य वैज्ञानिक तथा प्रमुख/Chief Scientist & Head
पर्यावरणीय प्रभाव आकलन, आडिट और योजना
Environmental Impact Assessment, Audit & Planning

Ph/Off : (91) (712) 2247844
EPABX : (91) (712) 2249885-90(Ext.354)
Fax : (91) (712) 2249896
E.Mail : ps_rao@neeri.res.in
eisd@neeri.res.in

सीएसआईआर–राष्ट्रीय पर्यावरण अभियांत्रिकी अनुसंधान संस्थान
नेहरू मार्ग
नागपुर 440 020
(भारत)

CSIR-National Environmental Engineering Research Institute
Nehru Marg
Nagpur 440 020
INDIA

To,
Executive Engineer (Env)
Pimpri Chinchwad Municipal Corporation
Mumbai-Pune Road,
Pimpri, Pune-411018,
Maharashtra, INDIA

EIAAP/PCMC/2025
June 9th, 2025

Subject: Submission of report on Joint meeting for initial Environmental Assessment of Electric Crematoria impact on nearby residential area at Peth No. 32 A in Ravet area in Prabhag No. 16 Pimpri Chichwad, Pune

Reference: Original Application No. 41/2020(WZ) I.A No. 87/2020 (WZ): Meeting on 9th Oct 2024: PCMC Proposed Crematoria near housing societies

Dear Sir,

In reference to above, we are submitting the Report on the Joint Meeting for the Initial Environmental Assessment of the proposed electric crematorium and its potential impact on the nearby residential area at Peth No. 32A, Ravet, situated in Prabhag No. 16, Pimpri Chinchwad, Pune.

The study, aligned with the directives of the Hon'ble National Green Tribunal in Original Application No. 41/2020 (WZ) and I.A. No. 87/2020 (WZ), involved a joint meeting held on 9th October 2024, followed by field visit and scientific/technical work for impact assessment study.

The scope of study included site visits, literature survey, secondary data compilation on emission load profiling, ambient air quality monitoring and undertaking modeling exercise on it leading to the formulation of mitigation strategies specific to proposed electric crematoria operations. We kindly request Pimpri Chinchwad Municipal Corporation (PCMC) to extend support in covering the logistic and operational expenses incurred during the study.

Yours faithfully,

9/6/2025

(Padma S. Rao)

Encl.: as above

Final Report

Report on Joint Meeting for Initial Environmental Assessment of Electric Crematoria Impact on Nearby Residential Area at Peth No. 32A in Ravet Area in Prabhag No. 16 Pimpri Chichwad, Pune

Original Application No. 41/2020(WZ)
I.A. No.87/2020(WZ)
Harmony Co-op. Housing Society & Ors.

Versus

Pimpri-Chinchwad Municipal Corporation & Ors.

CSIR-National Environmental Engineering Research Institute (NEERI),
Nehru Marg, Nagpur 440020 (Maharashtra)
& Hyderabad Zonal Centre, Uppal Road, Hyderabad-500007

May 2025

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1.0 Introduction

This has reference to the Honorable National Green Tribunal, Western Zone Bench, Pune Court Order Original Application No.41/2020(WZ) I.A. No.87/2020(WZ) Harmony Co-op. Housing Society & Ors. Versus Pimpri-Chinchwad Municipal Corporation & Ors. Respondent(s), regarding developing an electric crematoria near the Harmony Co-op. Housing Society. It is being said that the Society, to which the applicant belongs, is located at a distance of 70 m from the place (needs to be verified) where the said crematorium is coming up, which is almost 63% complete (civil work). It has been reported by Pimpri Chinchwad Municipal Corporation (PCMC) that in the development plan of Pimpri Chinchwad New Town Development Authority (PCNTDA), the said reservation (Res. No. 596) at Ward No. 16 in Peth no. 32 A has been approved in the year 1995-96. The total area of said Crematorium reserved area is 98 guthas (9124 sq.m.). **(Figure 1 (a), (b), (c))**

As per letter of Pimpri Chinchwad New Town Development Authority dtd. 15/06/2018 and PCNTDA meeting no. 329 point no. 5, It has been informed that under the subject the said reservation should be developed by the Municipal Corporation. For said work 50% development cost Rs. 2,74,63,337/- has been assigned to the Municipal Corporation. Accordingly, by inviting the tender for the work, the order for the work was issued to the contractor, B.K. Khose and work started as per received work order. At present, after 63% completion of the work on the said site, but the local residents corresponded with the government level and the municipal corporation. Also, citizens complained that the said crematoria would increase the pollution in the area and at the workplace. Therefore, the said work was temporarily closed. Accordingly Hon'ble Commissioner has ordered for a meeting. The Meeting was held twice in the hall of Hon'ble Commissioner. In the meeting dated 30/12/2019 under joint meeting of city corporator of Ward No. 16 & 17, deputy director and officers of the authority, municipal officials, It was ordered to find an alternative site to convert the said crematorium in the ward no. 16 & 17 near the Pavana River and submit a revised proposal. Accordingly, when an alternative site was searched, it could not be found, so a report was submitted in the meeting on 15/02/2020 in Hon'ble commissioner's hall. The meeting was held with the corporator of ward no. 16 and 17 and the deputy director and officers of the authority, municipal officials etc. After discussion, they came to a combined decision that, crematorium work should be start.

The matter was still pending in High Court with the petition filed by the Harmony Co-op. housing Society.

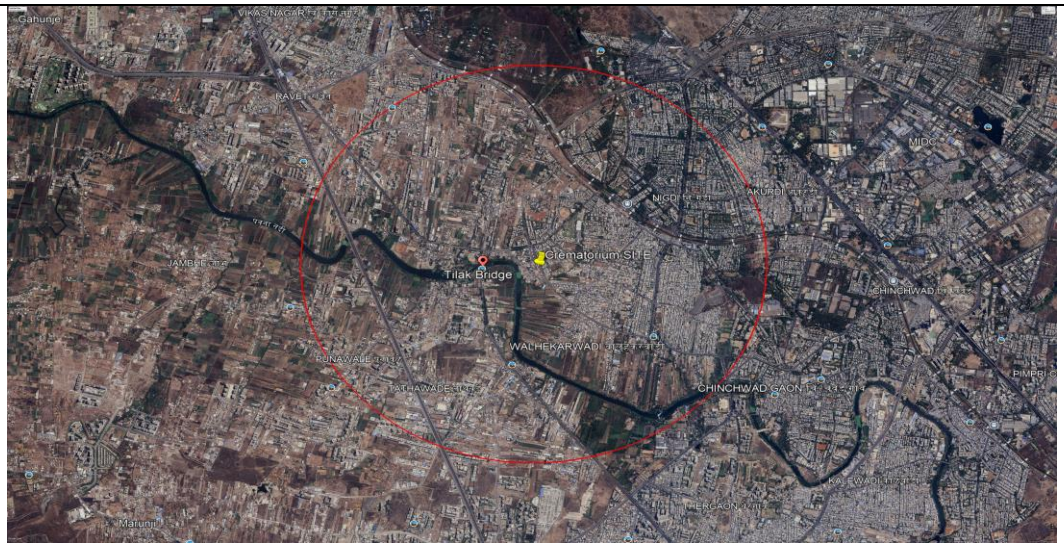


Figure 1(a)

Figure 1(b)

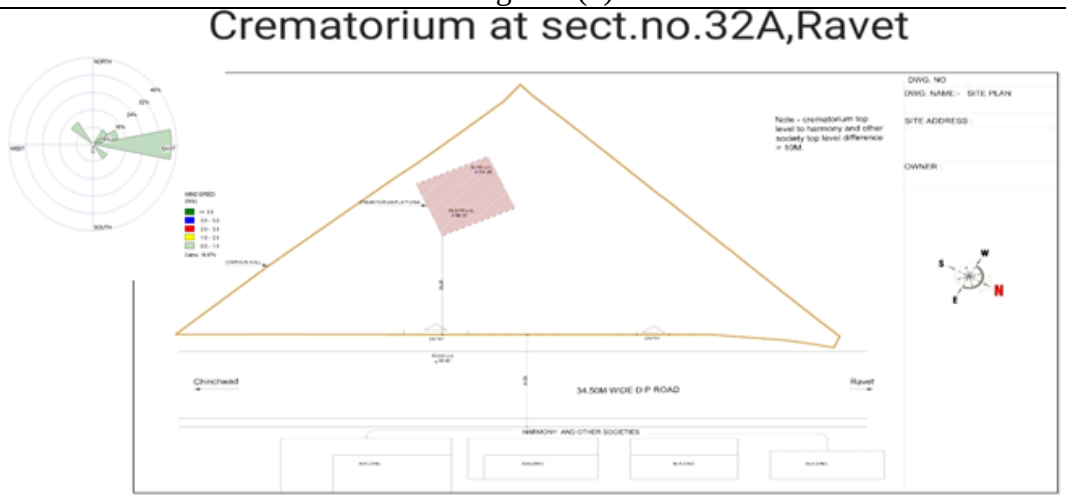


Figure 1(c)

Figure 1(a), (b), (c): Location of Proposed Electric Crematoria in Ravet, PCMC Pimpri Chinchwad

2.0 Hon'ble NGT Directives

The Hon'ble NGT in its Order dated 05/08/2024 has ordered that a committee of representatives from CSIR NEERI along-with PCMC and MPCB to be hence formed to undertake the joint meeting and come up with the task of developing guidelines as to what precautions are required to be taken for running an electric crematorium in a vicinity close to the human habitation.

The Hon'ble NGT directs the committee for undertaking following:

- From the angle of pollution due to burning of dead bodies, it is essential for us to know as to what precautions are required to be taken, if a crematorium is allowed to be set up there and for this, in our opinion, it appears that NEERI along-with PCMC and MPCB should hold a joint meeting within a period of one month and give an opportunity of hearing to the local residents as well, who will be the affected party and suggest the measures, which could be adopted by the PCMC for ensuring that no pollution happens or its minimization.
- Regarding the distance also, it is being pressed by the learned counsel for applicant that since there are no specific guidelines prohibiting the setting up of such kind of facility; we would like to know from the Committee as to whether any guidelines are required to be laid in future keeping in view the pollution angle. In this regard, the Committee would submit its report within a period of one month and thereafter only, we will decide this case finally.
- As per the Hon'ble NGT recommendations, the committee from following institution was made to take up joint meeting to address the issues
  - CSIR-NEERI
  - MPCB
  - PCMC as Nodal Organisation

3.0 CSIR NEERI's Response

Director CSIR-NEERI has nominated Mrs. Padma Rao, Chief Scientist and Chair, Environmental Impact Assessment, Audit and Planning Division, CSIR-NEERI, Nagpur along with Dr. T.V.B.P.S. Ramakrishna, Sr. Principal Scientist, CSIR-NEERI, Hyderabad Zonal Centre as a member of the committee from the Institute.

In this regard, the following communications were made:

- PCMC has shared copy of the NGT order to all members on 3rd Oct 2024.
- CSIR-NEERI has requested PCMC to provide the details of contact person of the member from MPCB for further deliberation.
- CSIR-NEERI has requested PCMC to provide the details of proposed crematoria to the committee member.

- CSIR-NEERI has requested PCMC to hold an Online meeting of committee members at the earliest
- CSIR-NEERI has requested PCMC/MPCB to provide information on emissions from any existing electric furnace and surrounding ambient air quality
- After the meeting, a framework for preparation of scope of work will be made by the committee incorporating budget for undertaking the site survey, scientific study after due approval of the competent authority.
- The Scope of work with inputs from all members of the committee will be submitted well before the hearing date.

The precautions required to be taken if the crematoria is allowed are as follows:

The Central Pollution Control Board (CPCB) has set some guidelines for crematoria, including emission standards and technology initiatives for open pyre crematoria:

Emission Standards:

The outlet emissions from green crematoria should comply with the CPCB's General Emission standards.

https://cpcb.nic.in/displaypdf.php?id=R2VuZXJhbFN0YW5kYXJkcy5wZGY

Technology Initiatives:

Open pyre crematoria can use technology to capture flue gases, treat toxic emissions, and release exhaust safely. Some of these technologies include:

- A canopy to capture flue gases at a temperature above 200°C
- A common hood and blower to treat toxic emissions
- A chimney to release exhaust safely
- A scrubbing unit to ensure high efficiency of gas, dust, and liquid scrubbing
- Demister pads to retain moisture, oil, and grease

Regarding the distance also, it is to inform that, In India, there are no site location criteria for Crematoria's. It was mostly constructed outskirts of the city countryside location close to the urban fringe. Due to urbanisation many residential and commercial/industrial units have developed proximity to these. The reported standard practices followed by some developed countries for citing crematoria's indicate separation distance/buffer zone of these crematoria's from 150m to 500m from any habitable building.

https://ncceh.ca/sites/default/files/FINAL_Field%20InquiryCrematoria%20emissions%20and%20air%20quality%20impacts_EN_0.pdf

In view of this, these are a need to study and develop guidelines on the provision of a buffer zone around crematoria.

4.0 Initial Meeting of the Committee

In reference to above, a meeting was held on October 9, 2024, regarding the NGT matter, attended by committee members from PCMC, MPCB and CSIR-NEERI (online), along with numerous representatives from nearby housing societies affected by the proposed crematoria at the PCMC office.

- PCMC, as the nodal agency, coordinated the meeting and presented the NGT order for the committee's review. Petitioners' representatives voiced their concerns and grievances.
- MPCB clarified that emissions from crematoria are outside its purview; therefore, it does not provide sanctions or approvals for crematoria and does not conduct emission-monitoring studies. As a result, it cannot supply information regarding the pollution impacts of the proposed electric crematoria.
- CSIR NEERI requested the following information related to the installation of the proposed electric crematoria:
  - MPCB to provide guidelines for emission standards and controls applicable to crematoria, if available.
  - MPCB/PCMC to furnish emission data from existing electric crematoria in the region, along with any surrounding air quality data.
  - PCMC to supply detailed designs and drawings of the proposed electric crematoria.
  - PCMC to provide a layout map of the proposed crematoria and its surroundings with precise dimensions.
  - PCMC to supply an area map of the region within a 2-5 km radius of the proposed electric crematoria.
  - PCMC to provide detailed designs and drawings of the proposed air pollution control system for the electric crematoria, if applicable.
- The committee has reviewed these reports to assess emission aspects and impact on the surrounding area. On receipt of the information, approximately three to four months will be needed to complete this review and impact assessment. PCMC may cover the travel and logistics expenses incurred by the committee members during this study. It is proposed to undertake site survey during Jan 2025 along with MPCB and PCMC for assessing the impact scenarios.

5.0 Site Inspection by the Committee

The following team comprising PCMC, MPCB & CSIR-NEERI

(A) PCMC and their Architect

1. Mr. Devatta Gattuwar, Joint City Engineer, PCMC
2. Mr. Harvindersingh Bansal, Executive Engineer, Environment Department, PCMC

3. Mr. Swapnil Shirke, Deputy Engineer, Civil Department, B Zone, PCMC
4. Mr. Ankush Saijrao, Junior engineer, Civil Department, B Zone, PCMC
5. Mr. Paras Netragaonkar, Architect, M/s Shilpi Architect and Consultant
6. Mr. Sumitraj Shinde, Architect Engineer, M/s Shilpi Architect and Consultant

(B) MPCB

1. Mr. Manchak N. Jadhav, Sub-Regional Officer, MPCB

(C) CSIR-NEERI

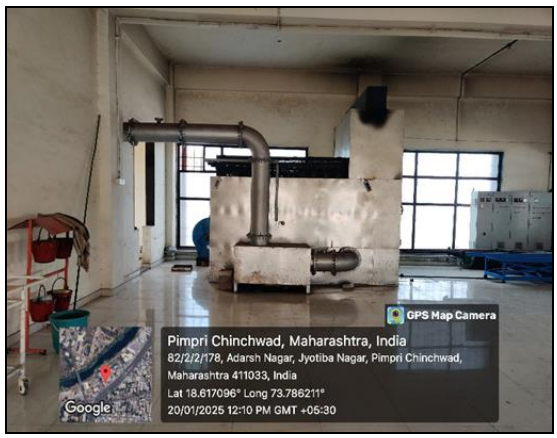
1. Er. (Mrs) B. Padma S. Rao, Chief Scientist and Chair, Environmental Impact Assessment, Audit and Planning Division, CSIR-NEERI, Nagpur
2. Dr. T.V.B.P.S. Ramakrishna, Sr. Principal Scientist, CSIR-NEERI, Hyderabad Zonal Centre
3. Mr. Saurabh Kurve, Project Fellow, CSIR-NEERI, Nagpur

Conducted a site inspection of the proposed site at Ravet, PCMC Ward No. 16, Peth No. 32A where the electric furnace was proposed to be installed, on January 20, 2025. The visit was organized with the assistance of the Pimpri Chichwad Municipal Corporation (PCMC) and their architect and along with the Maharashtra Pollution Control Board (MPCB).

Key observations during the visit are as follows:

- PCMC informed that there is only one furnace & one standby, which has one scrubber to reduce the air pollution.
- PCMC team along with their architect discussed the proposed unit and neighboring areas around the proposed sites, they also discussed various facilities like Green belt, other facilities etc. at the site.
- CSIR-NEERI team informed that following data may be submitted by PCMC to prepare the air impact assessment report.
  - Electric Furnace, process design details
  - APC system chimney details (Stack), Blower, Furnace
  - Location details & Layout Plan
- After the receipt of all requested information the air impact assessment study for emission would be carried out.
- Team also discussed that MPCB should conduct baseline AAQ monitoring in the proposed site as well as nearby residential areas.
- PCMC has taken the team to visit another working electric crematoria near Keshav Nagar for its operation and any, APC, the chimney & associated facilities installed in it.

- The team also discussed about safe distance, buffer zone from crematoria to residential area with MPCB along with the proposed emission standards MPCB informed that about 150 mg/m^3 may be applicable for the electric furnace after control.
- The team also discussed about the proposal of having a safe zone or buffer zone, safe distance from the proposed crematoria to nearest habitation.



Inspection and Site Visit

6.0 Emission Estimation by Electric Crematoria

The emission factor for electric crematoria, as presented below from internationally published references, is taken for impact assessment. Based on the emission load of individual pollutants, dispersion modelling was conducted using a CPCB-approved methodology.

Table 1: Electric Crematorium Operation

Scenario 1 Normal	1 Furnace Working + 1 Standby	6 Bodies per day	18 hours working
Scenario 2 Emergency	2 Furnace Working	12 Bodies per day	24 hours working

CPCB Emission Factor Electric (kg/body) PM_{10} =0.000025, SO_2 = 0.0544, NOx =0.308, CO =0.141, NVOC= 0.013, *$PM_{2.5}$ /PM_{10} ratio considered was = 0.68

Source: *https://cpcb.nic.in/NGT/Annexure_3.1_27.02.2018.pdf*

The Electric Cremation Technical specifications are:

Parameter	**Technical Specifications**
Type	Electrical
Cremation chamber size.	2.40 M (L) x0.95M (W) x 1.10 M (H) Appx.
Furnace charging door.	M.S. fabricated internally insulated with ceramic wool & provided with electrical & mechanical operating system. Gearbox along with 0.5 HP Induction motor Greaves/ Hindustan make.
Power system	3-phase/415 volts /50Hz with neutral.
Operating load.	27 KW normal 27 KW spare capacity
Operating temperature.	650°C.
Body Loading Trolley	The body charging trolley is fabricated from durable material and features a mechanically operated trolley movement for both forward and reverse, as well as hydraulic operation for up and down movement. It is designed with a four-fork configuration to reduce the use of bamboo in the body charging process. The trolley runs on an MS fabricated track.
Scrubber	The Vertical Venturi spray scrubber is designed to control air pollution emissions, ensuring they are within the 150 mg/m³ limit as specified by the Maharashtra Pollution Control Board. The scrubber will be constructed using 3mm thick AISI 304 SS plates and equipped with specially designed spray nozzles, mist eliminators, dampers, and other necessary components. It will be coupled with a 5 HP induction motor-powered AISI 304 SS suction blower for efficient flue gas scrubbing. The system will include inlet water and drain connections, as well as other necessary components such as a cyclonic scrubber, MS (1.5% C) support structures, packing material, scrubber ductwork (downstream from the scrubber), blowers, liquid scrubbing tank, scrubbing liquor, piping, motors, controls and essential accessories.

Parameter	Technical Specifications
Other Accessories	MS-based pipes, fittings, dampers, ball valves, bellows, Y-strainers, drain valves, and reducers will be provided to all units. Additionally, gas sensors (measuring in PPM levels) with small displays for TSP, CO, CO_2, temperature, and flow will be included. Other necessary accessories such as gaskets, foot valves, MS supports, relays, contactors, and control systems will also be provided to all units.
S.S. ducting	All ducting fabricated with SS material up to the scrubber and from outlet of chimney to the main chimney.
Blower	The blower will have an approximate capacity of 1000 CFM and 5 HP, with a centrifugal design. It will be equipped with a motor featuring a variable frequency drive (VFD) to adjust the flow rate as needed. The blower will be positioned downstream of the scrubber to maintain negative pressure in the scrubber line.
Slurry pump	Slurry pump not less than 1.5 HP capacity with handling of up to 20% solids. PVC connection shall be provided for slurry pipelines with bypass attachment.
Fresh Air Blower	Fresh Air blower of 1 HP 600 CFM discharge capacity provided with necessary piping and valves. Induction motor Greaves/Hindustan make
Control panel.	The control panel is constructed from 14 SWG sheet metal and is painted with anti-corrosive paint. It is designed for simplicity in both operation and maintenance. The panel includes all the necessary switchgear for furnace equipment, heaters, etc. Additionally, it features a Thyristor Power Regulator with a PID temperature controller, a contactor bypass arrangement, a changeover switch, an ammeter, a voltmeter, an energy meter, temperature controller, terminals, and more. All internal wiring is done using copper conductors rated for 1.1 kV. The power connection to the control panel is also included. Only Siemens, L&T, or Schneider switchgears are used in its construction.
M.S. Chimney	Chimney offered is self-supporting made out of suitable M.S. plates provided with ladder, platform for air pollution monitoring purpose. The chimney size shall be height up to 30.5 Mtr. TOP OD 470 MM and Bottom OD 1200 mm with necessary EN-8 foundation bolts. The chimney top shall be provided with SS canopy, copper lighting arrestor with G.I. earthling strip Aviation lamp, Sampling point & earth pit. The chimney shall be internally painted with heat resistant aluminum base paint & externally with black epoxy paint chimney shall be conforming IS.
Chimney Foundation	Foundation for self-supported chimney as per given Specification RCC Foundation, Foundation 2600 x 2600x 2000mm, R-25 Grade RCC Concrete, TMT 10 to 16 mm

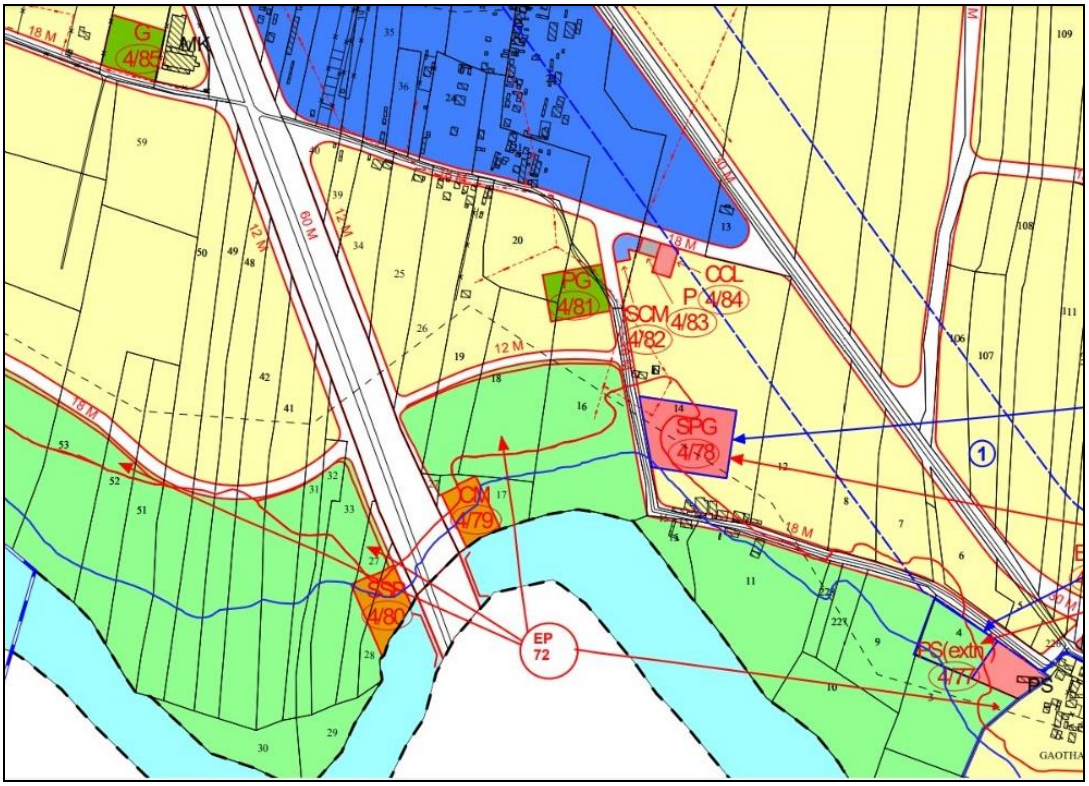


Figure 2(a)

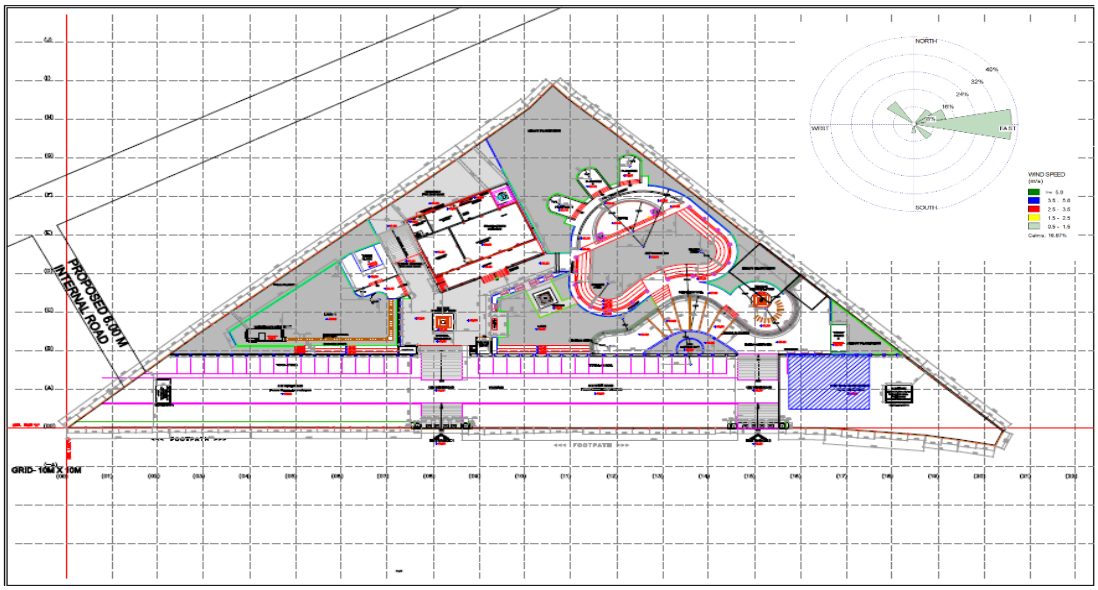


Figure 2(b)

Figure 2(a), (b): Map of proposed Electric Crematoria in ward 17 Ravet, PCMC Pimpri Chinchwad

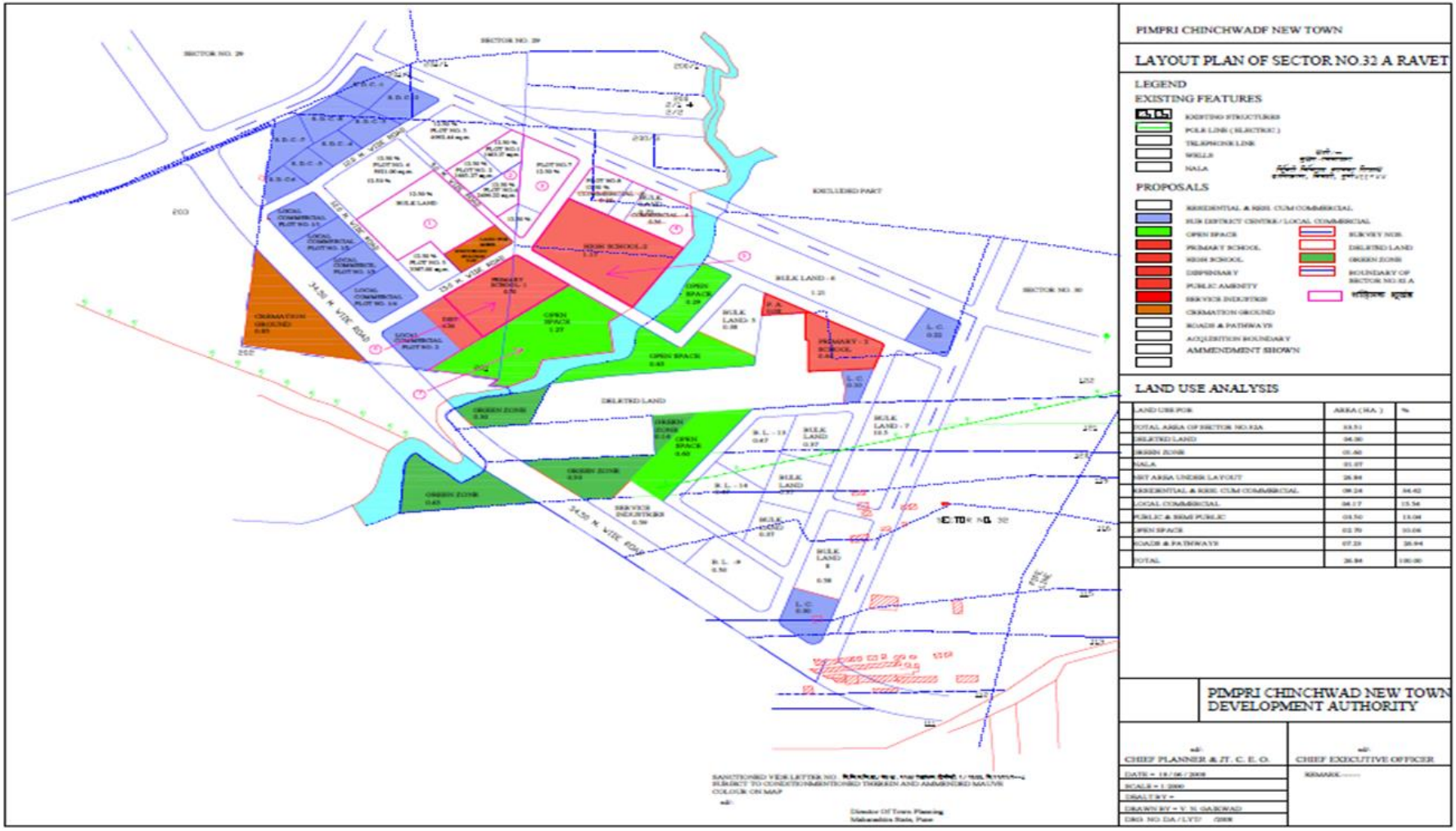


Figure 3: Layout Plan of Sector No. 32 A Ravet, PCMC Pimpri Chinchwad

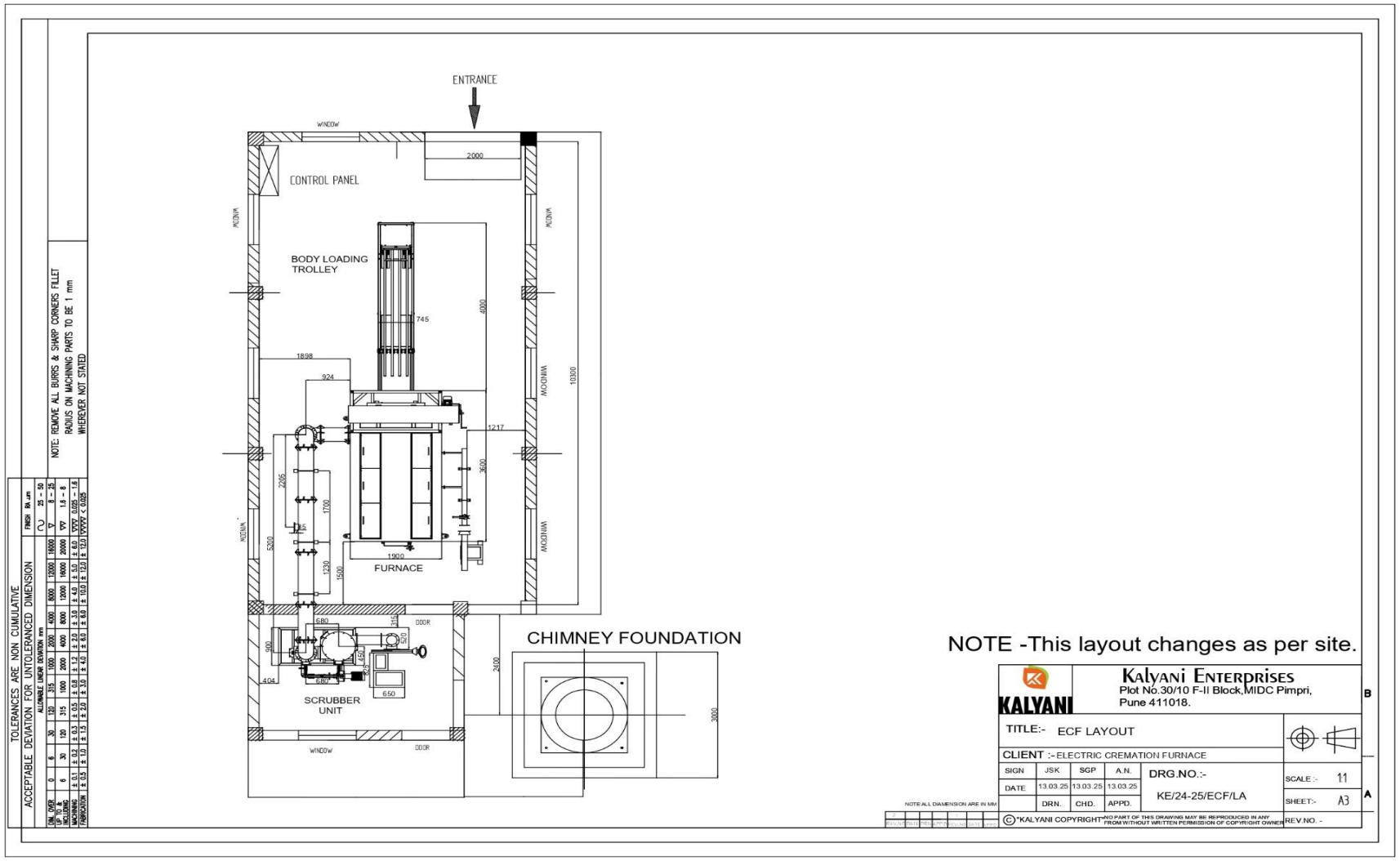


Figure 4: Electric Cremation Furnace Layout

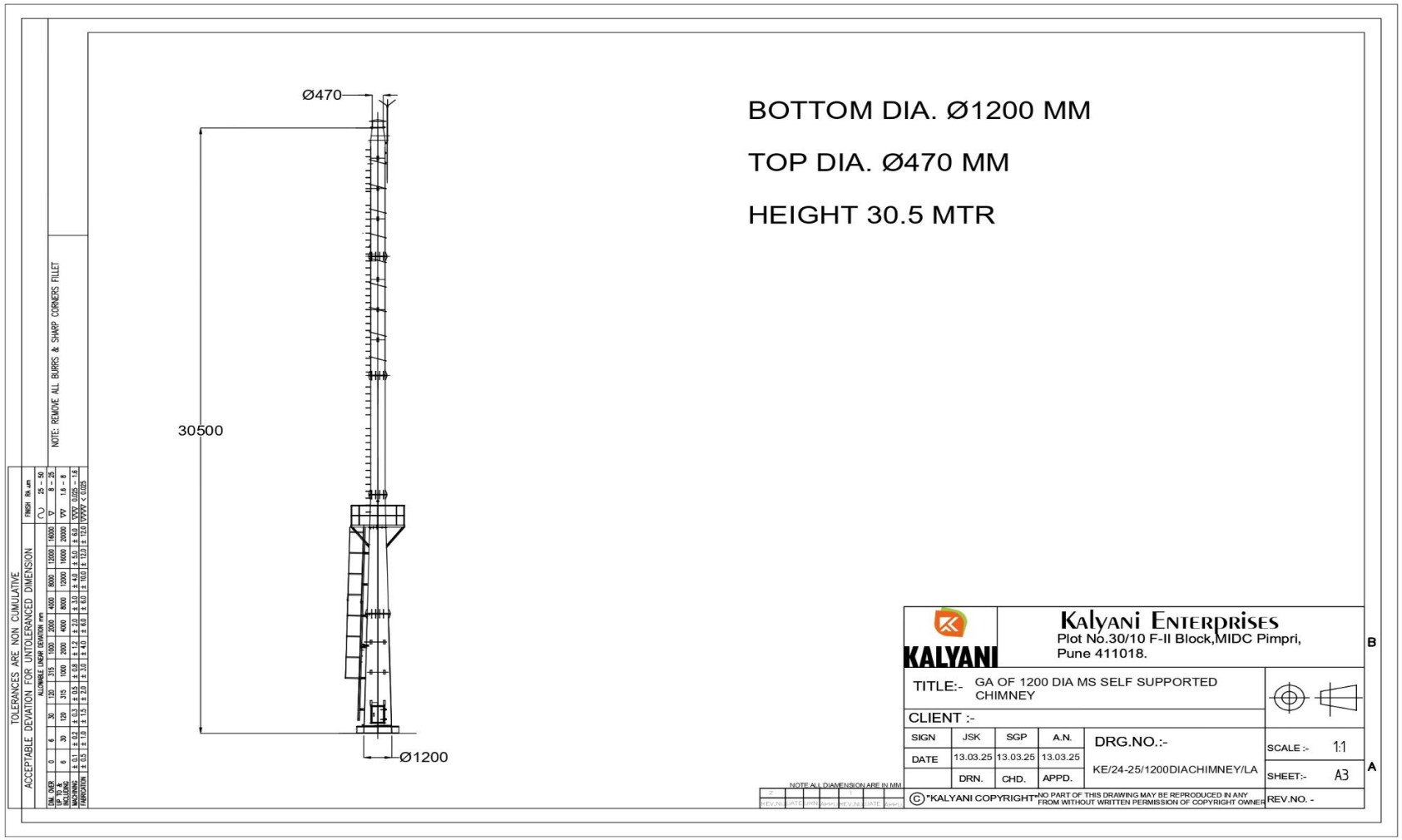


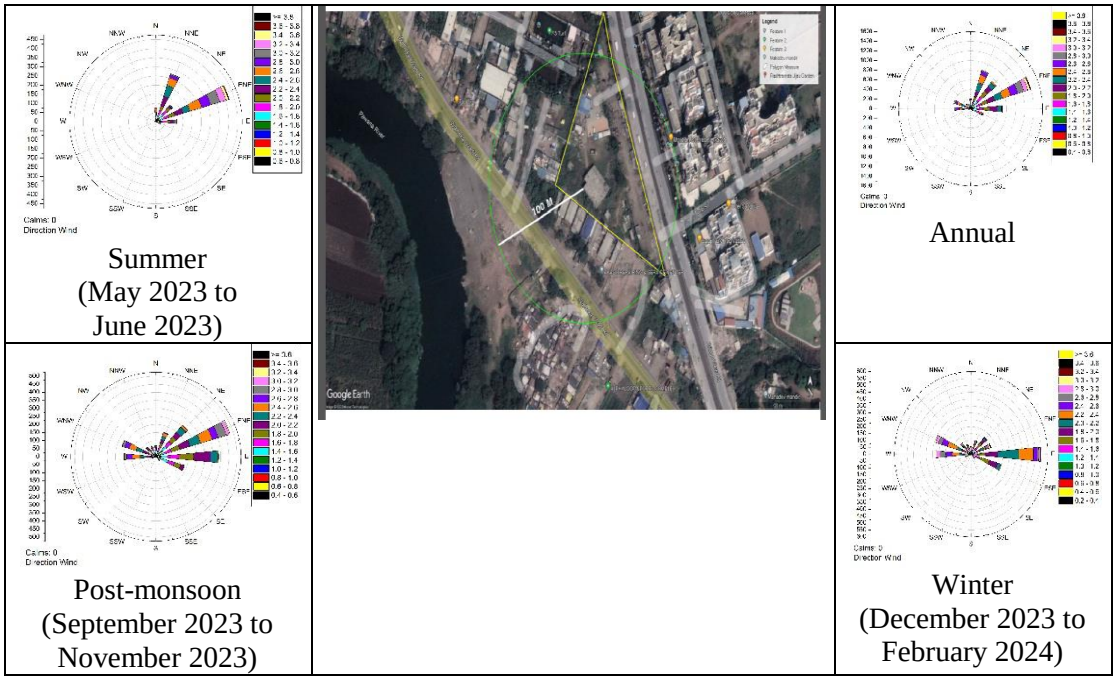
Figure 5: GA of 1200 Dia MS Self Supported Chimney

Prediction of Impact on Air through Dispersion Modelling:

The impacts due to operation of the proposed Electric crematorium (Scenario A1 – Normal & Scenario A2 – Emergency) at Pimpri-Chinchwad on the air environment are discussed in the following sections.

Micrometeorology:

The Windrose for Thergaon, Pimpri Chinchwad (Latitude: 18.616318, Longitude: 73.765797) (CAAQMS Station) 4.5km from Ravet **(Figure 6)** shows the predominant winds are from ENE and NNE during summer, from NNE, E, NE, WNW, W and SE during post-monsoon and from E, WNW, W and SE during winter seasons. The predominant winds are observed from ENE, NNE, NE and E directions on annual basis.



Source: https://airquality.cpcb.gov.in/ccr/#/caaqm-dashboard-all/caaqm-landing/data

Figure 6: Windrose for Thergaon, Pimpri Chinchwad Latitude: 18.616318, Longitude: 73.765797) (CAAQMS Station) 4.5km from Ravet

The meteorological data comprising the hourly wind speed (m/s), wind direction (deg), temperature (˚C), relative humidity (%), atmospheric pressure (mb), and rainfall (mm) are collected from India Meteorological Department and the Windrose is plotted for the winter season and is shown in **Figure 7**. It is noticed that the predominant winds are observed from E direction followed by NW and NE directions **(Figure 7)**. The wind speed has been observed in the range of 0.5 - 1.5 m/s. The hourly meteorological data is used as input for dispersion modelling.

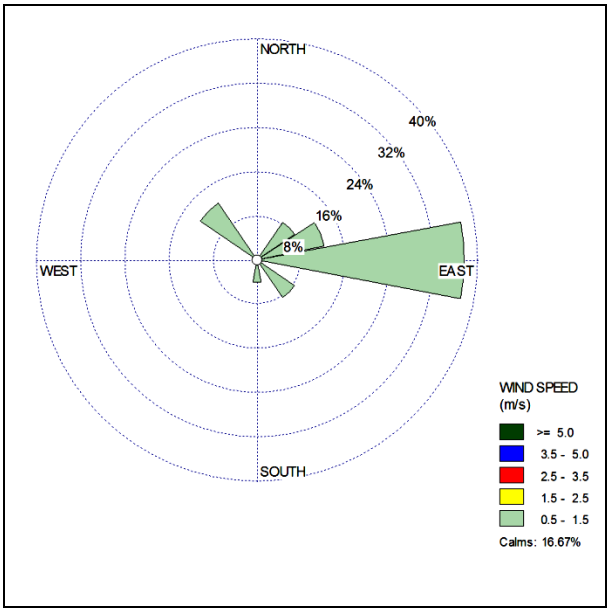


Figure 7: Windrose for Winter Season use for Prediction Modelling

Impacts on Air Environment:

AERMOD (**A**merican **M**eteorological Society **E**nvironmental Protection Agency **R**egulatory **Mod**el) model was used to predict GLCs of particulate matter (PM_{10} and $PM_{2.5}$) and gaseous pollutants (SO_2, NO_x, CO and NVOC) due to operation of the proposed Electric crematorium at Pimpri-Chinchwad and meteorological data for winter season. The Gaussian plume dispersion formulae for continuous sources has also been duly approved by CPCB.

Stack Details and Emissions Rates of Pollutants:

The details of crematorium stack in terms of stack characteristics along with emission rates of different pollutants are given in **Table 2**. The emission rates of PM_{10}, $PM_{2.5}$, SO_2, NO_X, CO and NVOC are computed based on the uncontrolled and controlled emission factors of CPCB for Electric crematoria. The controlled emissions are computed using a reduction factor of 40% for PM_{10}, 20% for $PM_{2.5}$, 60% for SO_2, 10% for NO_X and CO and 100% for NVOC.

Two scenarios further considered are (i) Scenario A1 when normal operation of crematorium for 18 hrs for cremation of 6 bodies using one furnace working and another as standby and (ii) Scenario A2 when emergency operation of crematorium for 24 hrs for cremation of 12 bodies using two furnaces working.

GLCs of Pollutants due to the Proposed Electric Crematorium under Different Scenarios

The hourly meteorological data used for dispersion modelling is given in **Table 3**. The maximum ground level concentrations of different pollutants are predicted using AERMOD (24 hrly average) with emissions data and hourly meteorological data, in an area of 300 m x 300 m with a grid size of 20 m.

As mentioned earlier, the two scenarios considered are Scenario A1 and Scenario A2. The GLCs predicted under these two scenarios are given below:

Uncontrolled Emissions - Scenario A1:

The 24 hrly maximum GLCs of SO_2, NO_X, PM_{10}, CO and NVOC due to the proposed Electric crematorium in uncontrolled emission Scenario A1 are predicted to be 0.021 µg/m^3, 0.117 µg/m^3, 1.0E-05 µg/m^3, 0.054 µg/m^3 and 0.005 µg/m^3 respectively and the maximum GLCs are found to be occurring at a distance of 141 m in W direction from the proposed crematorium. The isopleths showing 24 hrly averaged GLCs of SO_2, NO_X, CO and NVOC are shown in **Figure 8(a)-(d)** respectively. The isopleths are not shown for PM_{10} and $PM_{2.5}$ as the GLCs are very negligible.

Uncontrolled Emissions - Scenario A2

The 24 hrly maximum GLCs of SO_2, NO_X, PM_{10}, CO and NVOC due to the proposed Electric crematorium in uncontrolled emission Scenario A2 are predicted to be 0.031 µg/m^3, 0.176 µg/m^3, 1.0E-05 µg/m^3, 0.080 µg/m^3 and 0.007 µg/m^3 respectively and the maximum GLCs are found to be occurring at a distance of 141 m in W direction from the proposed crematorium. The isopleths showing 24 hrly averaged GLCs of SO_2, NO_X, CO and NVOC are shown in **Figure 9(a)-(d)** respectively. The isopleths are not shown for PM_{10} and $PM_{2.5}$ as the GLCs are very negligible.

Controlled Emissions - Scenario A1

The 24 hrly maximum GLCs of SO_2, NO_X and CO due to the proposed Electric crematorium in controlled emission Scenario A1 are predicted to be 0.008 µg/m^3, 0.106 µg/m^3 and 0.048 µg/m^3 respectively and the maximum GLCs are found to be occurring at a distance of 141 m in W direction from the proposed crematorium. The isopleths showing 24 hrly averaged GLCs of SO_2, NO_X and CO are shown in **Figure 10(a)-(c)** respectively. The isopleths are not shown for PM_{10}, $PM_{2.5}$ and NVOC as the GLCs are very negligible.

Controlled Emissions - Scenario A2

The 24 hrly maximum GLCs of SO_2, NO_X and CO due to the proposed Electric crematorium in controlled emission Scenario A2 are predicted to be 0.012 µg/m^3, 0.158 µg/m^3 and 0.072 µg/m^3 respectively and the maximum GLCs are found to be occurring at a distance of 141 m in W direction from the proposed crematorium. The isopleths showing 24 hrly averaged GLCs of SO_2, NO_X and CO are shown in **Figure 11(a)-(c)** respectively. The isopleths are not shown for PM_{10}, $PM_{2.5}$ and NVOC as the GLCs are very negligible and well below the NAAQS limits

The comparison of ground level concentrations computed using AERMOD for uncontrolled and controlled emissions for all the pollutants in Scenario A1 and Scenario A2 are given in **Table 4**. Reduction in the concentrations of PM emissions is reported with adoption of control measures.

The ambient air quality (background concentrations) of SO_2, NO_X and RSPM (PM_{10}) monitored by MPCB at Pimpri-Chnichwad during December 2023 to February 2024 and the incremental Max. GLCs obtained by prediction model due to the proposed Electric Crematorium are given in **Table 5**. The resulting total PM concentrations (Background concentration + Incremental GLCs) are found to be slightly exceeding the NAAQS w.r.to PM_{10} (NAAQS: PM_{10} -100 µg/m^3). Whereas, the SO_2 and NO_X concentrations are below NAAQS (NAAQS: SO_2 & NO_X - 80

µg/m^3). Also the incremental Max. GLCs of CO are less than NAAQS (NAAQS: CO - 2000 µg/m^3). From the results it may be observed that the contribution of stack emissions from the proposed Electric crematorium is not significant on the ambient air environment.

Stack emission monitoring results of electric crematoria as given in **Annexure VII** & **Annexure IX** reports that PM emissions ranges from 14.5 mg/m^3 to 25.8 mg/m^3, which is less than the emission limit of 50 mg/m^3. In view of this and the predicted dispersion MGLC obtained with controlled emissions scenario 2, the buffer zone of 50m to 60m from the crematoria site with the inclusion of 10m to 15m width green belt alongwith barrier sheets/trees of 10-15m height (as receptor control mechanism) to further safeguard the air quality is recommended.

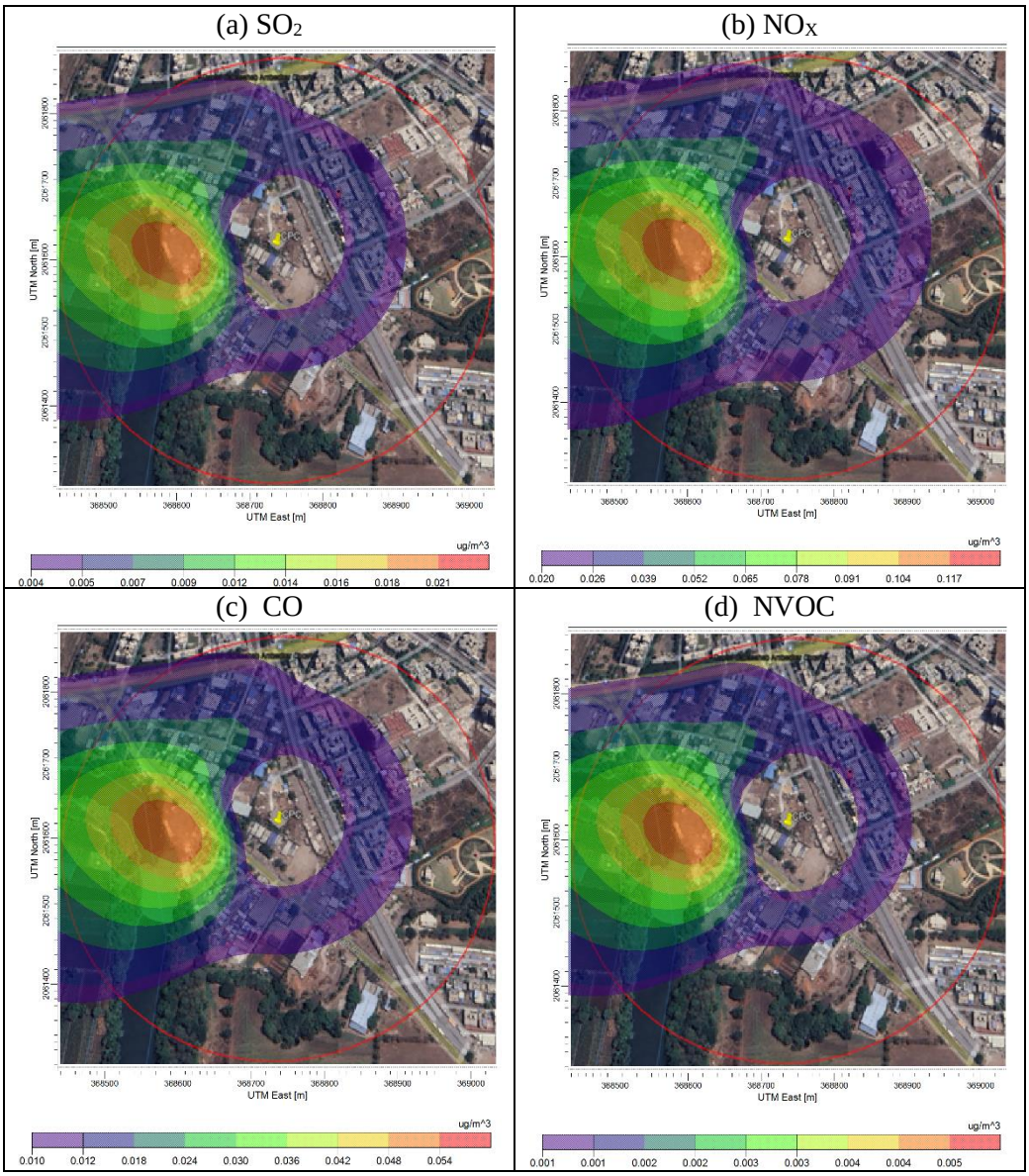


Figure 8: Incremental GLCs of (a) SO_2, (b) NO_X, (c) CO and (d) NVOC due to the Proposed Electric Crematorium in Uncontrolled Emissions in Scenario A1

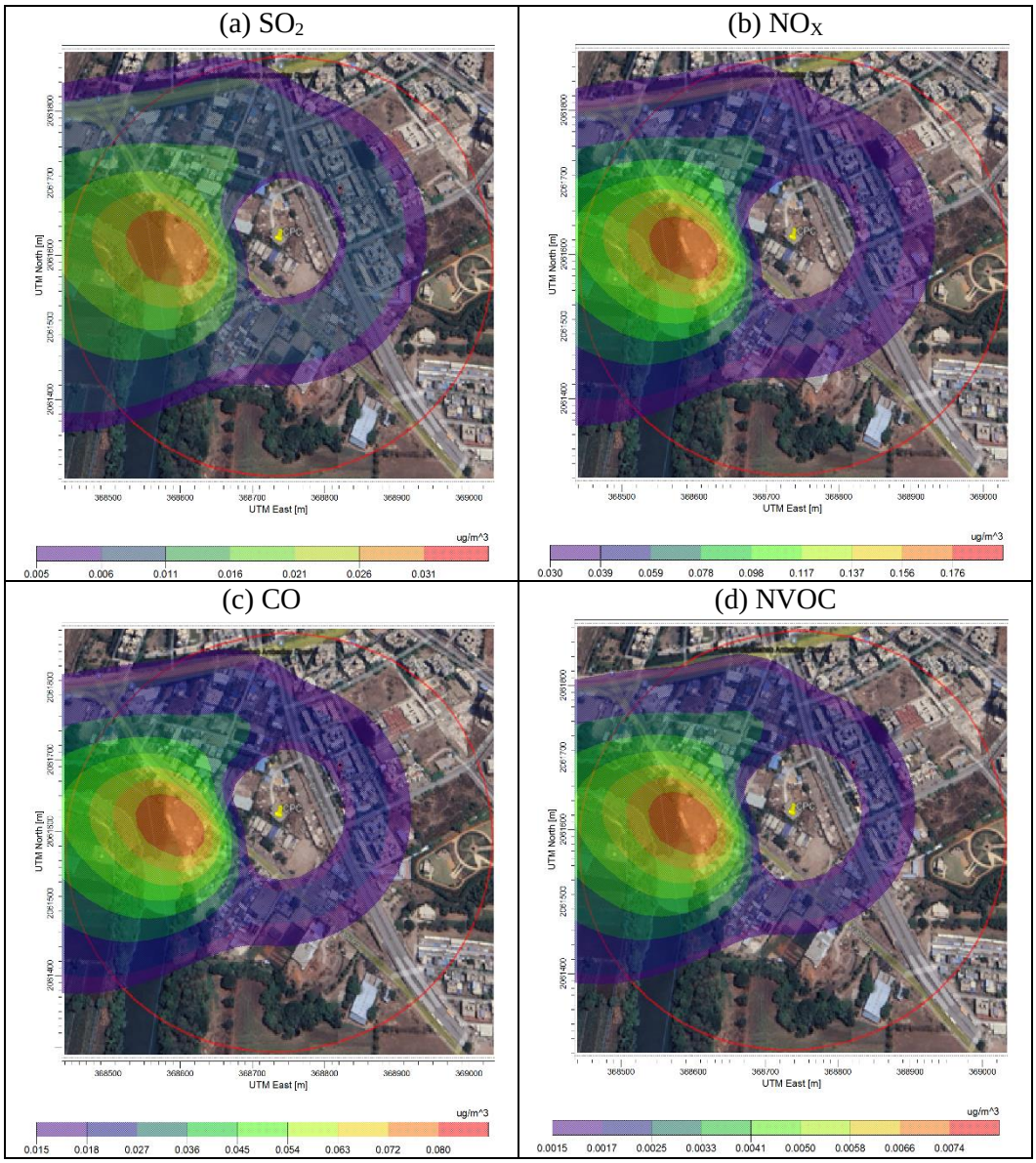


Figure 9: Incremental GLCs of (a) SO_2, (b) NO_X, (c) CO and (d) NVOC due to the proposed Electric Crematorium in Uncontrolled Emissions in Scenario A2

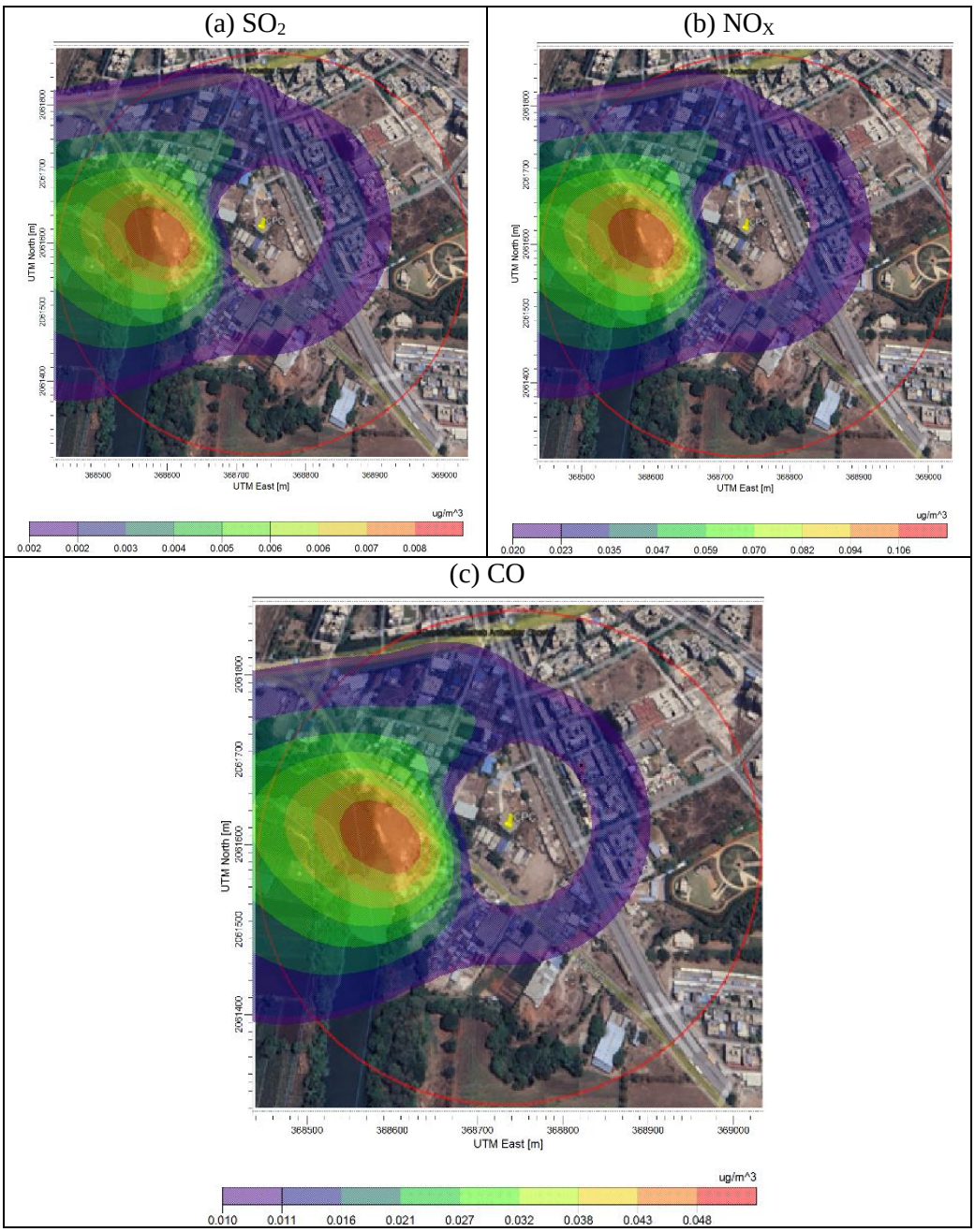


Figure 10: Incremental GLCs of (a) SO_2, (b) NO_X and (c) CO due to the proposed Electric Crematorium in Controlled Emissions Scenario A1

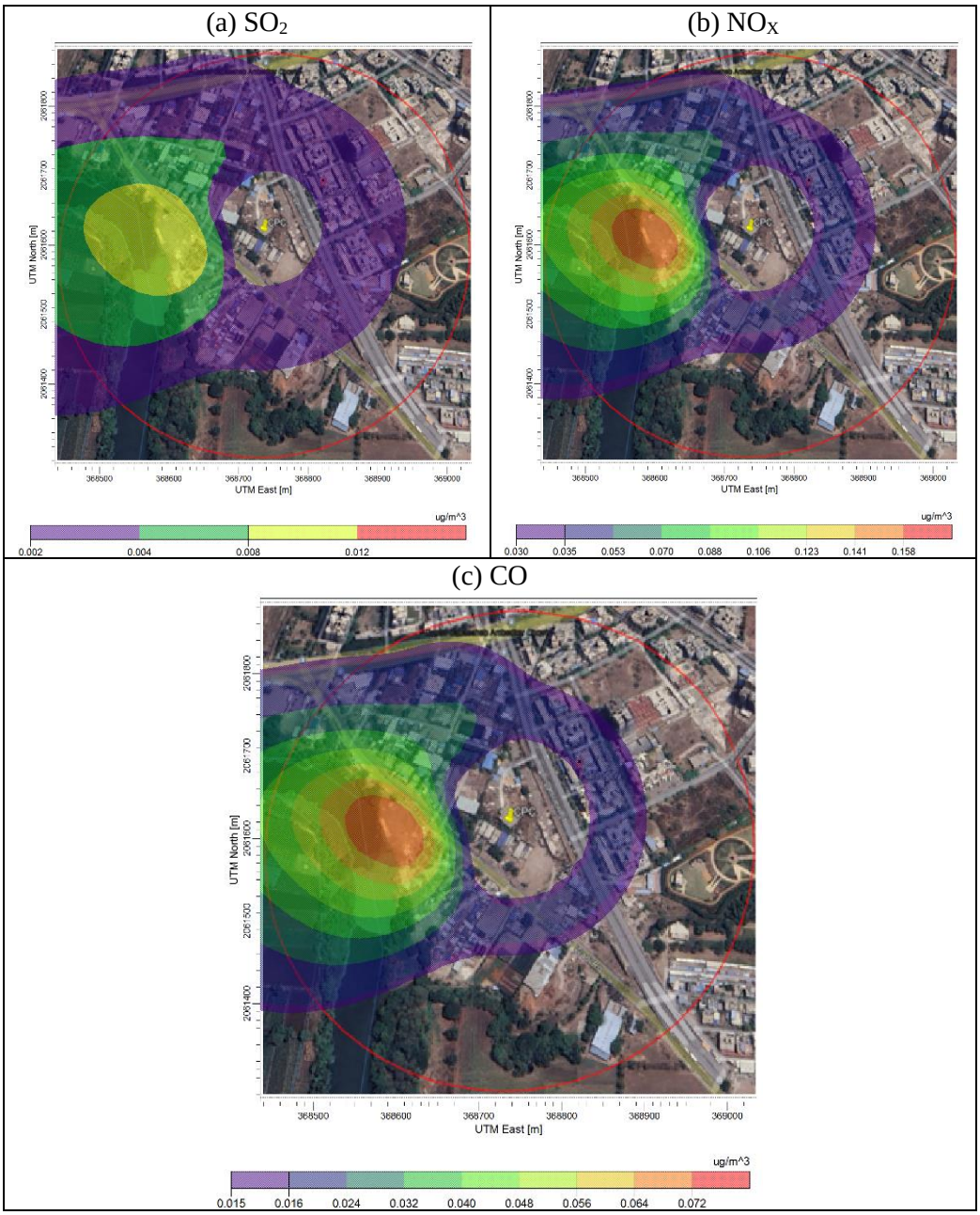


Figure 11: Incremental GLCs of (a) SO_2, (b) NO_X and (c) CO due to the Proposed Electric Crematorium in Controlled Emissions Scenario A2

Table 2: Stack Details and Emission Rates of different Pollutants for Electric Crematorium

Sr. No.	Stack Name	H (m)	D (m)	TS (K)	VS (m/s)	Emission Rate (g/s)		
						Pollutant	Uncontrolled Emissions	Controlled Emissions
Scenario A1: Normal Scenario								
1	Crematorium Stack	30.5	0.47	473	8.0	PM_{10}	2.31E-06	1.39E-06
						$PM_{2.5}$	1.57E-06	1.26E-06
						SO_2	0.00501	0.00201
						NO_X	0.02852	0.02567
						CO	0.01306	0.01175
						NVOC	0.00121	0.0
Scenario A2: Emergency Scenario								
2	Crematorium Stack	30.5	0.47	473	8.0	PM_{10}	3.47E-06	2.08E-06
						$PM_{2.5}$	2.36E-06	1.89E-06
						SO_2	0.00756	0.00302
						NO_X	0.04278	0.0385
						CO	0.01958	0.01762
						NVOC	0.00181	0.0

{H = Stack height (m); D = Stack top internal diameter (m); TS = Stack gas exit temperature (K); VS = Stack gas exit velocity (m/s)}

Table 3: Meteorological Data Used for Dispersion Modelling

Hour	Wind Speed (m/s)	Wind Direction (Deg)	Temperature (K)	Relative Humidity (%)
1	0.25	247.5	290.7	90
2	0.36	315	290.0	90
3	0.50	315	289.4	91
4	0.80	315	289.0	91
5	1.10	67.5	288.8	92
6	1.10	315	288.6	93
7	0.90	37.5	289.4	91
8	1.20	90	290.0	91
9	1.20	67.5	290.4	91
10	1.10	67.5	292.7	82
11	1.20	135	296.0	68
12	1.18	90	298.8	52
13	1.20	90	299.9	48
14	1.30	90	300.7	45
15	1.33	90	302.1	42
16	1.10	90	301.6	32
17	1.10	180	301.0	32
18	0.75	90	300.6	49
19	0.85	135	298.3	55
20	0.92	90	295.6	65
21	0.18	90	293.5	73
22	0.56	90	292.0	75
23	0.65	45	291.6	78
24	0.11	247.5	291.1	84

Table 4: Comparison of GLCs Computed using Uncontrolled and Controlled Emissions from the Proposed Electric Crematorium in Different Scenarios

Pollutant	GLCs due to Uncontrolled Emissions (µg/m^3)	GLCs due to Controlled Emissions (µg/m^3)
Scenario A1: Normal Scenario		
PM_{10}	1.00E-05	1.00E-05
PM2.5	1.00E-05	1.00E-05
SO_2	0.021	0.008
NO_X	0.117	0.106
CO	0.054	0.048
NVOC	0.005	0.0
Scenario A2: Emergency Scenario		
PM_{10}	1.00E-05	1.00E-05
PM2.5	1.00E-05	1.00E-05
SO_2	0.031	0.012
NO_X	0.176	0.158
CO	0.080	0.072
NVOC	0.007	0.0

Table 5: Background (Dec 2023 - Feb 2024) and Incremental GLCs of Pollutants with Controlled Emissions under Different Scenarios

Pollutant	Background Concentration (µg/m^3)			Incremental GLCs (µg/m^3) (B)	Total GLCs (µg/m^3) (A+B)	NAAQS (µg/m^3)
	Min.	Max.	Avg. (A)			
Scenario A1: Electric Crematorium - Normal Scenario						
SO_2	6	88	30.25	0.008	30.26	80
NO_X	20	330	70.52	0.106	70.63	80
PM_{10}	18	174	106.25	1.0E-05	106.25	100
Scenario A2: Electric Crematorium - Emergency Scenario						
SO_2	6	88	30.25	0.012	30.26	80
NO_X	20	330	70.52	0.158	70.68	80
PM_{10}	18	174	106.25	1.0E-05	106.25	100

Proposed Guidelines for Siting and Operation of Crematoria:

Electric Crematorium: A Sustainable Approach to Cremation:

Traditional cremation methods, such as wood-based pyres, have been widely practiced for centuries. However, these methods consume significant natural resources and release harmful emissions into the atmosphere. With urbanization and environmental concerns increasing, the adoption of **electric crematorium** has emerged as a sustainable and efficient alternative. Electric crematoriums not only reduce the environmental impact of cremation but also address public health concerns linked to air pollution and resource consumption.

Technology:

Electric crematoriums use electricity to generate heat, eliminating the need for combustible materials like wood or fossil fuels. The process involves:

1. **Heating Chamber:** An insulated cremation chamber equipped with high-efficiency furnaces/ heaters.
2. **Automated Systems:** Digital controls regulate temperature, ensuring consistent and energy-efficient operation.
3. **Energy Efficiency:** Modern systems use optimized designs to minimize energy consumption while achieving temperatures up to 900-1000°C for effective cremation.

Compared to traditional methods, the electric crematorium process is quicker, cleaner and requires less manual intervention, making it suitable for urban and densely populated areas.

Flue Gas Emissions:

During cremation, the process releases flue gases that include:

- Carbon dioxide (CO_2)
- Carbon monoxide (CO)
- Particulate matter (PM), tarry matter, smoke
- Volatile organic compounds (VOCs)
- Nitrogen oxides (NO_x)
- Dioxins and furans (in cases of incomplete combustion)

Although electric crematoriums produce fewer emissions than wood-based or fossil-fuel-based systems, they still require measures to ensure safe disposal of flue gases.

Flue Gas Treatment

To mitigate the environmental impact of emissions, advanced flue gas treatment systems are integrated into electrical crematoriums:

1. **Scrubbers:** Use water or chemicals to neutralize acidic gases (e.g., NO_x and SO_2), coagulate particulate, and settle it.
2. **Electrostatic Precipitators (ESPs):** Remove fine particulate matter and ash.
3. **Activated Carbon Filters:** Capture dioxins, furans, and other harmful organic compounds.
4. **Catalytic Converters:** Reduce VOCs and convert CO to CO_2, reducing toxicity.
5. **Continuous Monitoring:** Sensors monitor flue gas composition in real-time to ensure emissions remain within permissible limits.

Air Pollution Control (APC) System for Electric Crematorium:

Electric crematoriums, while environmentally cleaner than traditional wood or fossil fuel-based systems, still generate some emissions, including particulate matter, volatile organic compounds (VOCs), carbon monoxide (CO), and nitrogen oxides (NO_x). To mitigate these emissions and ensure compliance with environmental

standards, an **Air Pollution Control (APC) system** needs to be integrated into the crematorium.

Key Components of the APC System:

(1) Primary Combustion Chamber

- The cremation process occurs in a well-insulated furnace having primary chamber with controlled combustion conditions to ensure complete burning of organic matter and reduce the production of harmful emissions.
- Optimized design minimizes the release of unburned particulates and VOCs.

(2) Secondary Combustion Chamber

- Flue gases are directed to a secondary chamber where they are exposed to higher temperatures (800–1000°C) for additional oxidation.
- This process breaks down residual organic compounds, reducing emissions of VOCs, CO, and other pollutants.

(3) Quenching System

- Rapid cooling of flue gases to below critical temperatures (e.g., 200°C) to prevent the formation of dioxins and furans.
- Typically uses water sprays or cooling towers.

(4) Particulate Removal System

- **Scrubbers/ Bag Filters:** Capture fine particulate matter (PM10 and PM2.5) from flue gases along with acidic gases (scrubber)
- **Electrostatic Precipitators (ESPs):** Use electrostatic forces to remove even ultrafine particles.
- **Cyclone Separators:** Remove larger particulates and ash.

(5) Scrubbers

- **Wet Scrubbers:** Neutralize acidic gases like sulfur dioxide (SO_2) and nitrogen oxides (NO_x) using alkaline solutions (e.g., lime or sodium hydroxide) along with particulate.
- **Dry or Semi-Dry Scrubbers:** Use solid sorbents to remove acidic components without water.

(6) Activated Carbon Filters

- Capture and adsorb harmful organic pollutants, such as dioxins, furans, and heavy metals like mercury.

(7) Catalytic Converters

- Reduce carbon monoxide (CO) and nitrogen oxides (NO_x) emissions by converting them into less harmful gases such as carbon dioxide (CO_2) and nitrogen (N_2).

(8) Emissions Monitoring Systems

- Real-time monitoring of emissions to ensure compliance with regulatory standards.
- Measures pollutants like CO, CO2, NO_x, PM, and VOCs.

(9) Chimney and Exhaust Stack along with Suitable Suction System

- Suitable motor/ suction system in front of chimney for flue gas treatment in APC.
- Designed for effective dispersion of treated flue gases at safe heights.
- Equipped with sampling ports for monitoring.

Benefits of APC Systems for Electrical Crematoriums:

- **Environmental Protection:** Significantly reduces emissions, preventing air quality degradation.
- **Health Safety:** Minimizes exposure to hazardous pollutants for workers and nearby communities.
- **Regulatory Compliance:** Ensures adherence to environmental norms and standards.
- **Public Perception:** Enhances acceptance of crematoriums in urban areas by addressing pollution concerns.

Challenges and Considerations:

- **Cost:** Installation and maintenance of APC systems can be expensive.
- **Space Requirements:** Adding APC components may require additional space.
- **Energy Consumption:** Operating blowers suction pumps etc., scrubbers, precipitators, and monitoring systems can increase energy use.
- **Regular Maintenance:** APC systems need periodic cleaning, filter replacement and inspection for optimal performance.

An advanced APC system is an integral part of modern electrical crematoriums, ensuring that emissions are treated effectively before release into the atmosphere. By adopting these systems, cities can balance the needs of traditional practices with environmental sustainability and public health priorities.

Health Hazards from Flue Gases:

Exposure to crematorium emissions can pose health risks to workers and nearby communities, especially if flue gas treatment systems are inadequate:

- **Respiratory Issues:** Fine particulate matter ($PM_{2.5}$ and PM_{10}) can penetrate deep into the lungs, causing respiratory ailments.
- **Cardiovascular Effects:** Long-term exposure to CO and NO_x can contribute to heart-related conditions.

- **Toxicity:** Dioxins and furans are highly toxic and can lead to cancers, immune system damage, and hormonal disruption.
- **General Irritation:** Gases like CO, SO_2, and VOCs can cause throat and eye irritation.

Conclusion:

With reference to the directions issued by this Hon'ble Tribunal regarding the proposed establishment of a crematorium and the related concerns about environmental pollution and regulatory guidelines, CSIR NEERI undertook a site visit with stakeholders, obtained the secondary data on this matter, analyzed it and submits the following:

(1) Compliance with Directions on Pollution Control Measures

In accordance with the directive, a joint meeting was convened within one-month period, involving representatives from the CSIR-NEERI, PCMC, and the MPCB. The meeting included a detailed technical discussion and site assessment. Further, PCMC conducted public hearing of the local residents who are the potentially affected along with the stakeholders to provide an opportunity to present their views, concerns, and suggestions. Minutes of the public hearing and attendance records are attached as Annexure II.

Findings and Recommendations:

Air Pollution Control: It is recommended that clean fuel viz., electric or CNG-based cremation systems be prioritized to minimize particulate emissions and harmful gases.

Chimney Specifications:

Chimneys with adequate height of 30m must be equipped with scrubbers and emission monitoring systems to ensure compliance with regulatory norms.

Buffer Zone:

Adequate green buffering of 50-60m as receptor control mechanism (including minimum width of 10–15 meters of dense green plantation) along with high raised 10-15m barrier walls/trees around the crematorium facing residential areas is advised to absorb emissions and reduce dispersion into the surrounding residential areas.

Operational Time Restrictions: To mitigate peak-hour impact, cremations should be scheduled in a way that avoids early mornings and evenings, which typically coincide with higher population density and traffic exposure.

Odor Control Measures: Use of odor-neutralizing technologies and regular maintenance of the site to avoid accumulation of organic waste is advised.

(2) Consideration of Guidelines on Minimum Distance for Crematoria

While there are presently no binding guidelines prescribing minimum distances between crematoria and residential areas, the Committee has deliberated upon the need for a structured regulatory framework.

Recommendations:

- A safe distance or buffer zone of about 50m - 60m and receptor control including Green belt of 10-15m width and raised barrier walls/trees may be stipulated for the upcoming crematoria from the nearest residential building(s) to mitigate health and nuisance concerns. Further the site should be strengthened including with high raised 10-15m barrier walls/dense green high raised plantation.
- Site selection should also consider prevailing wind direction, topography, and population density to reduce pollution exposure risk.

Electric crematoriums represent a cleaner, more sustainable approach to cremation, reducing the reliance on natural resources and lowering harmful emissions. However, the deployment of robust flue gas treatment technologies and stringent monitoring protocols is essential to minimize health hazards and environmental impact. Adopting and improving this technology aligns with global efforts to promote sustainable and health-conscious urban infrastructure.

The siting and operation of electric crematoria are subject to various guidelines and regulations to ensure safety, environmental protection, and community well-being. These guidelines typically cover aspects such as location, design, operational practices, safety measures, and environmental standards. While the specific regulations can vary by country and local jurisdiction, the following are general guidelines that can apply to the siting and operation of electric crematoria

It is proposed that central and state pollution control authorities collaborate to draft formal guidelines based on these principles, adaptable by local governing bodies. Meanwhile a safe distance of 50-60m width including creation of sufficient green buffer width of 10-15m and barrier sheets/trees of 10-15m height to cover the entire area facing the residential setup.

When planning the site for an electric crematorium, there are several important guidelines and considerations that need to be followed to ensure safety, efficiency, environmental protection and compliance with local regulations. These guidelines may vary depending on regional laws and codes, but generally, the following key principles apply:

(1) Zoning and Land Use Regulations:

- **Permitted Zoning:** Ensure the site is located in an area where crematoriums are allowed by the local zoning laws. Commercial, industrial, or rural areas are typically preferred for such facilities.
- **Buffer Zones:** Maintain appropriate distances between the crematorium and residential areas, schools, hospitals, or other sensitive locations to reduce disturbances (such as noise, emissions, and traffic).
- **Land Ownership and Accessibility:** The site should be accessible by public roads and be of sufficient size for the crematorium's operation, parking, landscaping, and any future expansion.

(2) Distance from Sensitive Areas:

- **Minimum Distance:** Many jurisdictions require a minimum distance (50-60 meters or more on case to case basis) from the crematorium to residential areas to minimize impact on air quality and public health (this may be introduced for upcoming or proposed crematoria).
- **Wind Direction Considerations:** The prevailing wind direction should be taken into account to avoid the spread of smoke or emissions toward populated areas.

(3) Precautions and Environmental Considerations:

- **Emission Controls:** Ensure the crematorium is equipped with proper emission control systems (such as filters, scrubbers, or stacks) to limit harmful pollutants like particulate matter, dioxins, and furans.
- **Air Quality Monitoring:** Regular monitoring of air quality in and around the crematorium should be conducted to comply with environmental regulations. Many jurisdictions require crematoria to meet certain air emission standards.
- **Waste Management:** Proper disposal of ashes and other waste generated by the cremation process must be considered. Many places require the collection and proper disposal of by-products, including the residue from filtration systems.

(4) Health and Safety Standards:

- **Fire Safety:** Crematoriums must adhere to stringent fire safety standards, including installation of fire suppression systems, smoke alarms, and emergency exits. Safety protocols for handling highly flammable materials should be in place.
- **Safety Zones:** Designate clear, secure zones around the cremation units to prevent unauthorized access and ensure the safety of workers and visitors.
- **Staff Training:** Ensure the staff is properly trained in the operation of the electric cremation systems and in safety protocols.

(5) Facility Design and Layout:

- **Efficient Workflow:** The layout should allow for an efficient workflow from receiving bodies to the cremation process and final disposition of ashes. This includes a reception area, preparation room, cremation room, storage for ashes, and administrative space.
- **Noise Control:** Crematoriums should incorporate noise reduction measures, such as insulated walls and doors, to reduce sound from the electric cremators, particularly in residential or mixed-use areas.
- **Parking and Traffic Flow:** Provide adequate parking space for visitors and delivery vehicles, as well as appropriate traffic management to avoid congestion around the facility.

(6) Water and Sewer Systems:

- **Water Usage:** Electric crematoria typically require water for cooling systems and possibly for cleaning. Ensure the site has adequate water supply and is connected to municipal water systems or has a sustainable alternative.
- **Sewer and Waste Disposal:** Proper sewage systems are necessary to handle any waste produced during the cremation process. Wastewater should be treated in accordance with local regulations.

(7) Noise and Odor Control:

- **Odor Control:** Install systems to control and neutralize odors generated during the cremation process, such as filtration units or scrubbers.
- **Noise Abatement:** Cremation units and machinery should be installed with noise reduction features to prevent disturbance to nearby residents.

(8) Regulatory Compliance:

- **Local and National Regulations:** The site and operation must comply with local zoning laws, fire codes, environmental standards, health and safety regulations, and any national or regional guidelines for crematorium operation.
- **Licensing and Permitting:** Ensure that the crematorium has all necessary permits and licenses from relevant authorities, such as environmental permits for emissions, waste disposal, and health and safety certifications.

(9) Community Consultation and Transparency:

- **Public Consultation:** Depending on the location and regulations, it may be necessary to consult with the local community or hold public hearings to address concerns related to the crematorium's operation.
- **Public Education:** Provide clear information about the cremation process, emission controls, and any potential environmental concerns to the local community to build trust.

(10) Future Expansion and Technology Upgrades:

- **Space for Expansion:** If possible, design the facility with potential future growth in mind, allowing for the addition of more cremators or other equipment as demand increases.
- **Adoption of New Technology:** Ensure that the site allows for the integration of advanced technologies for more energy-efficient operations, improved emission control, and better customer service.

Recommendations/Suggestion

- Frequent cleaning and maintenance of Scrubber.

- Inlet and outlet sampling point before/after the scrubber may be provided for emission monitoring.
- The capacity of the chimney to handle waste gases from four furnaces may be assessed/monitored to its design capacity. An additional scrubber may be installed near the chimney to handle the exhaust from all four furnaces. Suitable hydraulic study to be undertaken for this.
- The capacity of scrubber to handle exhaust gases from the furnaces may be assessed and used suitably.
- To provide modified Rain cap to the existing chimneys based on capacity.
- Provision of Suitable tree plantation in surrounding of chimney. Provision of UV Box for disinfection (for 5min) of hospital body
- AQM monitoring (Manual) may be installed in the Crematoria Premises on 4 hourly basis along with MPCB.
- For new crematoria's the creation of buffer zone around it needs to be made.
- Siting Criteria may be framed for setting up new crematoria's.
- Continuous Monitoring of Air Pollution in and around the Crematoria in upwind and downwind direction.
- A buffer distance of minimum 50m-60m be kept from crematorium bed/chimney including green belt of 10-15m width and raised barrier walls/trees of height 10-15m to nearby residential area.

Annexure-I

National Ambient Air Quality Standards – 2009

Sr. No.	Pollutant	Time Weighted Average	Concentration in Ambient Air		
			Industrial, Residential, Rural and other Area	Ecologically Sensitive Area (Notified by Central Govt.)	Methods of Measurement
1	Sulphur Dioxide (SO_2), µg/m^3	Annual *	50	20	- Improved west and Gaeke
		24 Hours **	80	80	- Ultraviolet fluorescence
2	Nitrogen Dioxide (NO_X), µg/m^3	Annual *	40	30	- Modified Jacob & Hochheiser (Na-Arsenite)
		24 Hours **	80	80	- Chemiluminescence
3	Particulate Matter (Size less than 10 µm) or PM_{10} µg/m^3	Annual *	60	60	- Gravimetric - TOEM - Beta attenuation
		24 Hours **	100	100	
4	Particulate Matter (Size less than 2.5 µm) or $PM_{2.5}$ µg/m^3	Annual *	40	40	- Gravimetric - TOEM - Beta attenuation
		24 Hours **	60	60	
5	Ozone (O_3) µg/m^3	8 hours **	100	100	- UV photometric - Chemiluminescence - Chemical method
		1 hour**	180	180	
6	Lead (Pb) µg/m^3	Annual *	0.50	0.50	- AAS/ICP method after sampling on EPM 2000 or equivalent filter paper
		24 Hours **	1.00	1.00	- ED-XRF using Teflon filter
7	Carbon Monoxide (CO) mg/m^3	8 hours **	02	02	- Non Dispersive Infrared Spectroscopy
		1 hour *	04	04	
8	Ammonia (NH_3) µg/m^3	Annual *	100	100	- Chemiluminescence
		24 Hours **	400	400	- Indophenol blue method
9	Benzene (C_4H_4) µg/m^3	Annual *	05	05	- Gas chromatography based continuous analyzer - Adsorption and Desorption followed by GC analysis
10	Benzo Pyrene (BaP) - particulate phase only ng/m^3	Annual *	01	01	- Solvent extraction followed by HPLC/GC analysis
11	Arsenic(As) ng/m^3	Annual *	06	06	- AAS/ICP method after sampling on EPM 2000 or equivalent filter paper
12	Nickel(Ni) ng/m^3	Annual *	20	20	- AAS/ICP method after sampling on EPM 2000 or equivalent filter paper

* Annual arithmetic mean of minimum 104 measurements in a year taken twice a week 24 hourly at uniform intervals

** 24 hourly or 8 hourly or 01 hourly monitored values as applicable shall be compiled with 98% of the time in a year. 2% of the time they may exceed the limits but not on two consecutive days of monitoring

Annexure II

PIMPRI CHINCHWAD MUNICIPAL CORPORATION
B-Ward, Civil Dept. Pimpri Chinchwad Link Road
Near Elpro Mall, Chinchwad–33.
ISO 9001:2008 certified organization for civil and administrative services
Email – bward@pcmcindia.gov.in Website- www.pcmcindia.gov.in
Telephone No. 020-27350153

Outward No. B-Ward/Civil/Kavi/4/ /2024 Date. / /2024

To,
Chief Scientist,
N.E.E.R.I.

Name of Work: - Crematorium at Peth No. 32 A in Ravet area in Prabhag No. 16.....**Regarding Land Reservation.**

Ref: - 1. Work Order No. 95/2/2017-18 dtd. 19/06/2018
2. M.O.M. at Hon. Commissioner Office PCMC dtd. 30/12/2019.
3. M.O.M. at Hon. Commissioner Office PCMC dtd. 15/12/2019.
4. Letter of Appointment of Lawyer of PCMC dtd. 05/10/2020.
5. Approved Report on dtd. 20/12/2020.

Dear Sir,

In Pimpri Chinchwad Municipal Corporation at Ward No. 16 in Peth no. 32 A at Pimpri Chinchwad New Town Development Authority in the development plan of the said reservation (AC 596) has been approved in the year 1995-96. The total area of said Crematorium reserved area is 98 guthas (9124 sq.m.).

As per letter of Pimpri Chinchwad New Town Development Authority dtd. 15/06/2018 and PCNTDA meeting no. 329 point no. 5, It has been informed that under the subject the said reservation should be developed by the Municipal Corporation. For said work 50% development cost Rs. 2,74,63,337/- has been assigned to the Municipal Corporation. Accordingly, by inviting the tender for the work, the order for the work was issued to the contractor, B.K. Khose and work started as per received work order. At present, after 63% completion of the work on the said site, but the local residents corresponded with the government level and the municipal corporation. Also, citizens complained that the said graveyard would increase the pollution in the area and at the workplace Come and stop work repeatedly. Therefore, the said work was temporarily closed. Accordingly Hon'ble Commissioner.

The Meeting was held twice in the hall of Hon'ble Commissioner. In the meeting dated 30/12/2019 under "reference letter 2", there was a joint meeting of city councilors of ward no. 16 & 17, deputy director and officers of the authority, municipal officials. It is ordered to find an alternative site to convert the said crematorium in the ward no. 16 & 17 near the Pavana River and submit a revised proposal. Accordingly, when an alternative site was searched for, an alternative site could not be found, so a report was submitted under "ref no.5" in the meeting on 15/02/2020 in Hon'ble commissioner's hall, a meeting was held with the councilors of ward no. 16 and 17, the deputy director and officers of the authority, municipal officials. After discussion they come to combined decision that, crematorium work should started.

Annexure-III

MAHARASHTRA POLLUTION CONTROL BOARD
MOBILE VAN AMBIENT AIR MONITORING

	Van No: MH01:EE2202 : Pune				Latitude : 18.642141		Longitude : 73.75556		
	Location	**Harmony Society, Near Ravet Police Station, Pimpri Chichwad**					**Report Type:**	**Mean**	
	Date:	**04-March-2024 to 05-March-2024**					**Time Base:**	**Hourly**	
Date & Time	**PM_{10}**	**$PM_{2.5}$**	**SO_2**	**CO**	**OZONE**	**NO**	**NO_2**	**NOx**	**Remark**
	ug/m³	**ug/m³**	**ug/m³**	**mg/m³**	**ug/m³**	**ug/m³**	**ug/m³**	**PPB**	
3/4/2025 15:00	87.73	54.63	12.00	0.41	68.95	12.29	14.36	9.90	
3/4/2025 16:00	98.13	51.67	7.96	0.47	67.11	12.60	13.99	9.24	
3/4/2025 17:00	79.32	57.85	8.24	0.47	61.64	13.64	14.54	9.25	
3/4/2025 18:00	82.17	54.78	9.46	0.54	52.46	37.54	33.66	17.51	
3/4/2025 19:00	85.46	50.23	7.07	0.48	12.32	30.19	23.33	9.42	
3/4/2025 20:00	94.04	46.79	7.27	0.57	8.29	35.92	27.53	10.92	
3/4/2025 21:00	102.27	44.45	9.45	0.58	10.33	32.48	24.41	9.28	
3/4/2025 22:00	131.36	50.25	12.74	0.87	12.77	36.83	27.11	9.80	
3/4/2025 23:00	133.93	100.64	12.76	1.07	15.95	52.60	37.65	12.68	
3/5/2025 0:00	264.40	94.85	6.56	1.56	7.49	69.58	64.36	35.01	
3/5/2025 1:00	243.81	49.83	7.82	1.47	18.94	61.40	63.09	38.67	
3/5/2025 2:00	270.42	44.22	11.28	0.95	22.25	48.05	35.17	12.56	
3/5/2025 3:00	200.56	41.77	11.68	0.63	14.88	40.08	29.21	10.31	
3/5/2025 4:00	145.86	41.17	12.66	0.62	5.42	43.63	32.69	12.34	
3/5/2025 5:00	124.65	40.68	4.34	0.76	1.92	46.06	37.24	16.43	
3/5/2025 6:00	142.02	40.30	4.23	0.82	1.15	51.07	44.64	22.39	
3/5/2025 7:00	160.62	40.05	4.58	1.44	1.76	51.31	69.60	53.37	
3/5/2025 8:00	204.86	50.47	5.22	2.26	2.28	66.55	106.01	88.84	
3/5/2025 9:00	234.81	81.72	3.32	1.16	21.33	53.82	62.14	19.06	
3/5/2025 10:00	188.46	70.07	4.98	0.47	43.60	33.67	23.75	11.14	
3/5/2025 11:00	172.67	60.67	10.61	0.40	60.59	18.73	17.61	9.75	
3/5/2025 12:00	215.08	53.18	9.77	0.38	70.91	18.27	26.36	21.05	
3/5/2025 13:00	160.04	52.78	11.90	0.32	69.68	16.72	23.89	23.93	
3/5/2025 14:00	121.28	69.53	19.19	0.30	78.27	18.25	50.60	57.22	
–									
Min	79.32	40.05	3.32	0.30	1.15	12.29	13.99	9.24	
Date & Time	3/4/2025 17:00	3/5/2025 7:00	3/5/2025 9:00	3/5/2025 14:00	3/5/2025 6:00	3/4/2025 15:00	3/4/2025 16:00	3/4/2025 16:00	
Max	270.42	100.64	19.19	2.26	78.27	69.58	106.01	88.84	
Date & Time	3/5/2025 2:00	3/4/2025 23:00	3/5/2025 14:00	3/5/2025 8:00	3/5/2025 14:00	3/5/2025 0:00	3/5/2025 8:00	3/5/2025 8:00	
AVG	156.00	55.94	8.96	0.79	30.43	37.55	37.62	22.09	

Remark :

Sampling Done By :
ENVEA INDIA PRIVATE LIMITED.

Annexure-IV

MAHARASHTRA POLLUTION CONTROL BOARD
MOBILE VAN AMBIENT AIR MONITORING

Van No: MH01:EE2202:Pune	Latitude :	18.64	Longitude : 73.76	
Location :	**Harmony Society, near Ravet Police Station, Pimpri Chich**		**Report Type:**	**Mean**
Date:	**04-March-2024 to 05-March-2024**		**Time Base:**	**Hourly**

Date & Time	Benzene	Toulene	Ethylbenzene	M+P Xylene	Oxylene	Remark
	ug/m³	ug/m³	ug/m³	ug/m³	ug/m³	
3/4/2025 15:00	2.10	18.53	4.01	10.48	4.99	
3/4/2025 16:00	1.19	10.40	4.67	7.33	3.28	
3/4/2025 17:00	1.10	9.88	3.63	6.39	2.86	
3/4/2025 18:00	1.15	9.86	2.86	5.41	2.41	
3/4/2025 19:00	0.65	5.83	0.86	2.21	0.99	
3/4/2025 20:00	0.41	3.66	0.57	0.97	0.44	
3/4/2025 21:00	0.42	4.26	1.37	2.38	1.11	
3/4/2025 22:00	0.74	6.65	4.49	3.47	1.44	
3/4/2025 23:00	0.95	11.14	5.17	6.93	2.95	
3/5/2025 0:00	1.08	10.23	6.74	6.20	2.72	
3/5/2025 1:00	2.36	18.70	11.34	11.89	6.06	
3/5/2025 2:00	3.75	27.71	13.93	16.66	8.64	
3/5/2025 3:00	3.01	21.47	12.54	12.83	6.55	
3/5/2025 4:00	3.00	20.62	8.54	10.64	5.39	
3/5/2025 5:00	2.78	20.31	6.92	8.92	4.56	
3/5/2025 6:00	3.00	23.18	7.58	10.97	6.09	
3/5/2025 7:00	3.76	29.44	15.70	16.53	9.30	
3/5/2025 8:00	3.65	23.52	12.95	12.58	7.46	
3/5/2025 9:00	3.83	19.08	11.78	10.47	6.26	
3/5/2025 10:00	4.05	23.03	23.71	21.21	10.48	
3/5/2025 11:00	4.44	19.18	13.70	12.45	6.44	
3/5/2025 12:00	6.16	21.18	13.28	12.42	6.50	
3/5/2025 13:00	4.37	16.03	9.46	8.00	4.28	
3/5/2025 14:00	5.39	18.43	12.97	10.84	5.37	
Min	0.41	3.66	0.57	0.97	0.44	
Date & Time	3/4/2025 20:00	3/4/2025 20:00	3/4/2025 20:00	3/4/2025 20:00	3/4/2025 20:00	
Max	6.16	29.44	23.71	21.21	10.48	
Date & Time	3/5/2025 12:00	3/5/2025 7:00	3/5/2025 10:00	3/5/2025 10:00	3/5/2025 10:00	
AVG	2.64	16.35	8.70	9.51	4.86	

Remark :

Envea India Pvt. Ltd. * Navi Mumbai *

Sampling Done By :
ENVEA INDIA PRIVATE LIMITED.

Annexure-V

MAHARASHTRA POLLUTION CONTROL BOARD MOBILE VAN AMBIENT AIR MONITORING							
Van No: MH01:EE2202 : Pune			Latitude : 18.642141			Longitude : 73.75556	
Location	Harmony Society, Near Ravet Police Station, Pimpri Chichwad.					Report Type:	Mean
Date:	04-March-2024 to 05-March-2024					Time Base:	Hourly
Date & Time	**Temperature**	**RH**	**Solar Rad**	**WS**	**WD**	**Rain**	**Remark**
	°C	**%**	**W/M²**	**m/s**	**degree**	**mm**	
3/4/2025 15:00	34.04	30.30	421.63	0.14	158.67	0.00	
3/4/2025 16:00	34.33	29.01	348.63	0.23	231.56	0.00	
3/4/2025 17:00	34.00	27.41	212.13	0.52	293.35	0.00	
3/4/2025 18:00	33.34	28.32	45.55	0.08	21.40	0.00	
3/4/2025 19:00	30.95	32.32	0.00	0.26	168.39	0.00	
3/4/2025 20:00	29.05	34.90	0.00	0.51	137.42	0.00	
3/4/2025 21:00	27.30	38.47	0.00	0.16	192.51	0.00	
3/4/2025 22:00	25.82	41.45	0.00	0.34	150.53	0.00	
3/4/2025 23:00	25.23	38.58	0.00	0.31	139.33	0.00	
3/5/2025 0:00	23.96	37.82	0.00	0.51	142.35	0.00	
3/5/2025 1:00	22.95	37.08	0.00	0.46	143.32	0.00	
3/5/2025 2:00	21.85	39.71	0.00	0.32	183.64	0.00	
3/5/2025 3:00	20.94	42.37	0.00	0.47	138.06	0.00	
3/5/2025 4:00	20.74	42.88	0.00	0.41	137.60	0.00	
3/5/2025 5:00	19.80	44.89	0.00	0.38	168.61	0.00	
3/5/2025 6:00	19.06	47.07	0.00	0.36	138.85	0.00	
3/5/2025 7:00	18.41	47.83	0.00	0.07	177.69	0.00	
3/5/2025 8:00	19.57	47.70	0.35	0.27	132.75	0.00	
3/5/2025 9:00	24.57	35.40	33.70	0.16	278.03	0.00	
3/5/2025 10:00	27.40	28.67	42.13	0.25	146.76	0.00	
3/5/2025 11:00	29.30	25.98	31.28	0.10	151.20	0.00	
3/5/2025 12:00	30.83	25.36	46.65	0.13	180.04	0.00	
3/5/2025 13:00	32.34	24.90	427.20	0.19	167.35	0.00	
3/5/2025 14:00	34.00	23.41	495.58	0.06	351.93	0.00	
Min	18.41	23.41	0.00	0.06	21.40	0.00	
Date & Time	3/5/2025 7:00	3/5/2025 14:00	3/4/2025 19:00	3/5/2025 14:00	3/4/2025 18:00	3/4/2025 15:00	
Max	34.33	47.83	495.58	0.52	351.93	0.00	
Date & Time	3/4/2025 16:00	3/5/2025 7:00	3/5/2025 14:00	3/4/2025 17:00	3/5/2025 14:00	3/4/2025 15:00	
AVG	26.66	35.49	87.70	0.28	172.14	0.00	
Remark :						Envea India Pvt. Ltd. Navi Mumbai	**Sampling Done By** : ENVEA INDIA PRIVATE

Annexure-VI

GADARK LAB PVT. LTD.
INDUSTRIAL ANALYSTS & CONSULTANTS
LAB.: H-54, Additional M.I.D.C. Kudal, Taluka - Kudal, District - Sindhudurg - 416 525.
Tel. : (02362) 223519 • E-mail : info@gadark.in • Website : www.gadark.in
OFF.: 15, Hindustan Kohinoor Industrial Complex, L.B.S. Marg, Vikhroli (West), Mumbai - 83.
Tel.: (022) 2577 7069 / 2577 7070 / 2085 0091 • +91 93213 12367

TEST REPORT

No. GL/K/0609/23
Date 04/07/2023

Organisation : **M/s. KALYANI ENTERPRISES**
PLOT NO. 30/10, F-II BLOCK, MIDC
PIMPRI, PUNE – 411 018.

SITE -: THERGAON SHAMSHAN BHUMI,
G WARD, PIMPRI – CHINCHWAD MUNICIPAL,
CORPORATION, PUNE.

EFFICIENCY OF SCRUBBER SYSTEM : ELECTRIC CREMATORIUM

Ambient Temperature (°C)	**28**	
Duration of Sample collection (Min)	**20**	
Stack Height (Meter)	**30.5**	
Location of Sampling	**Scrubber System Inlet**	**Scrubber System Outlet**
Area (sq.m.)	0.0314	0.6363
Date of Sample collection	28/06/2023	28/06/2023
Time of Sampling (Hrs)	13:30	13:30
Temperature of flue gas (°C)	340	86
Average Velocity of flue gas (m/s)	9.1	4.9
Average volume of flue gas Discharged (m^3/hr)	1029	11224
Average volume of flue gas Discharged (Nm^3/hr)	500	9317
Total Volume of flue gas Sampled (Lit at 25°C)	1040	954
Weight of Total Particulate Matter collected (mg)	826.8	24.6
Concentration of Total Particulate Matter in the flue gas (mg/Nm^3)	795.0	25.8
Efficiency of Scrubber (%)	**96.75**	

DRAIN WATER COLOUR : 4.0 Hyzen unit

For **GADARK LAB PVT. LTD.**

AUTHORISED SIGNATORY
[KAILAS V. CHITALKAR]

CHECKED BY

Recognised by Ministry of Environment, Forest and CC, Government of India, vide Gazette Notification No. 3221, dated 24th August 2021, valid upto 15th October 2023. ISO 9001 : 2015 Certified & ISO 45001 : 2018 Certified.

Annexure-VII

GADARK LAB PVT. LTD.
INDUSTRIAL ANALYSTS & CONSULTANTS
LAB.: H-54, Additional M.I.D.C. Kudal, Taluka - Kudal, District - Sindhudurg - 416 525.
Tel. : (02362) 223519 • E-mail : info@gadark.in • Website : www.gadark.in
OFF.: 15, Hindustan Kohinoor Industrial Complex, L.B.S. Marg, Vikhroli (West), Mumbai - 83.
Tel.: (022) 2577 7069 / 2577 7070 / 2085 0091 • +91 93213 12367

TEST REPORT

No. K/0609 Contd.
Date 04/07/2023

Organisation : **M/s. KALYANI ENTERPRISES**
PLOT NO. 30/10, F-II BLOCK, MIDC
PIMPRI, PUNE – 411 018.

SITE -: **THERGAON SHAMSHAN BHUMI,**
G WARD, PIMPRI – CHINCHWAD MUNICIPAL,
CORPORATION, PUNE.

STACK EMISSION ANALYSIS REPORT : ELECTRIC CREMATORIUM

Date of Sample collection	28/06/2023	
Time of Sampling (Hrs)	13:30	
Volume of flue gas Sampled (Lit at 25°C)	39.6	
Location of Sampling	**Scrubber System Outlet**	**LIMITS**
Concentration of Particulate Matter (mg/Nm^3)	25.8	**50.0**
Concentration of Hydrochloric Acid (HCL) (mg/Nm^3)	Below Detectable Limit	**50.0**
Concentration of of Hydrogen Floride (HF) (mg/Nm^3)	Below Detectable Limit	**Not Specified**
Concentration of Sulphur Dioxide (SO_2) (mg/Nm^3)	Below Detectable Limit	**Not Specified**
Concentration of Oxides of Nitrogen (NOx) (ppm)	10.9	**400.0**
Concentration of Lead (Pb) (mg/Nm^3)	Below Detectable Limit	**Not Specified**
Concentration of Mercury (Hg) Compounds as (Hg) (mg/Nm^3)	Below Detectable Limit	**0.05**
Concentration of Hydrocarbon (HC) (mg/Nm^3)	Below Detectable Limit	**Not Specified**
Concentration of Carbon Monoxide (CO) (mg/Nm^3)	Below Detectable Limit	**Not Specified**

Remarks :- All the results are well within prescribed MPCB Limits for Human Dead bodies

For **GADARK LAB PVT. LTD.**

AUTHORISED SIGNATORY
[KAILAS V. CHITALKAR]

CHECKED BY

Recognised by Ministry of Environment, Forest and CC, Government of India, vide Gazette Notification No. 3221, dated 24th August 2021, valid upto 15th October 2023. ISO 9001 : 2015 Certified & ISO 45001 : 2018 Certified.

Annexure-VIII

GADARK LAB PVT. LTD.
INDUSTRIAL ANALYSTS & CONSULTANTS
LAB.: H-54, Additional M.I.D.C. Kudal, Taluka - Kudal, District - Sindhudurg - 416 525.
Tel. : (02362) 223519 • E-mail : info@gadark.in • Website : www.gadark.in
OFF.: 15, Hindustan Kohinoor Industrial Complex, L.B.S. Marg, Vikhroli (West), Mumbai - 83.
Tel.: (022) 2577 7069 / 2577 7070 / 2085 0091 • +91 93213 12367

TEST REPORT

No. GL/K/1005/24
Date 15/10/2024

Organisation : **M/s. KALYANI ENTERPRISES**
PLOT NO. 30/10, F-II BLOCK, MIDC
PIMPRI, PUNE – 411 018.

SITE -: VAIKUNTH VIDYUT DAHINI,
NAVI PETH, PUNE MUNICIPAL CORPORATION
PUNE.

EFFICIENCY OF SCRUBBER SYSTEM : ELECTRIC CREMATORIUM

Ambient Temperature (°C)	**29**	
Duration of Sample collection (Min)	**20**	
Stack Height (Meter)	**30.5**	
Location of Sampling	**Electric Furnace No. 2, 3 Comon Scrubber System Inlet (Neeri APC System)**	**Electric Furnace No. 2, 3 Comon Scrubber System Outlet (Neeri APC System)**
Area (sq.m.)	0.1257	0.6363
Date of Sample collection	09/10/2024	09/10/2024
Time of Sampling (Hrs)	13:00	13:00
Temperature of flue gas (°C)	356	78
Average Velocity of flue gas (m/s)	16.9	6.1
Average volume of flue gas Discharged (m^3/hr)	7646	13972
Average volume of flue gas Discharged (Nm^3/hr)	3622	11862
Total Volume of flue gas Sampled (Lit at 25°C)	740	665
Weight of Total Particulate Matter collected (mg)	714.2	9.6
Concentration of Total Particulate Matter in the flue gas (mg/Nm^3)	965.2	14.5
Efficiency of Scrubber (%)	**98.50**	

DRAIN WATER COLOUR : 4.0 Hyzen unit

For **GADARK LAB PVT. LTD.**

AUTHORISED SIGNATORY
[SACHIN B. GAONKAR]

CHECKED BY

Recognised by Central Pollution Control Board (MoEF and CC, Govt. of India), under the EP Act, 1986, valid upto 21st August 2025. ISO 9001 : 2015 and ISO 45001 : 2018 Certified.

Annexure-IX

GADARK LAB PVT. LTD.
INDUSTRIAL ANALYSTS & CONSULTANTS
LAB.: H-54, Additional M.I.D.C. Kudal, Taluka - Kudal, District - Sindhudurg - 416 525.
Tel. : (02362) 223519 • E-mail : info@gadark.in • Website : www.gadark.in
OFF.: 15, Hindustan Kohinoor Industrial Complex, L.B.S. Marg, Vikhroli (West), Mumbai - 83.
Tel.: (022) 2577 7069 / 2577 7070 / 2086 0091 • +91 93213 12367

TEST REPORT

No. K/1005 Contd.
Date 15/10/2024

Organisation : **M/s. KALYANI ENTERPRISES**
PLOT NO. 30/10, F-II BLOCK, MIDC
PIMPRI, PUNE – 411 018.

SITE -: VAIKUNTH VIDYUT DAHINI,
NAVI PETH, PUNE MUNICIPAL CORPORATION
PUNE.

STACK EMISSION ANALYSIS REPORT : ELECTRIC CREMATORIUM

Date of Sample collection	09/10/2024	
Time of Sampling (Hrs)	13:00	
Volume of flue gas Sampled (Lit at 25°C)	39.5	
Location of Sampling	**Electric Furnace No. 2, 3 Comon Scrubber System Outlet**	**LIMITS**
Concentration of Particulate Matter (mg/Nm³)	14.5	**50.0**
Concentration of Hydrochloric Acid (HCL) (mg/Nm³)	Below Detectable Limit	**50.0**
Concentration of of Hydrogen Floride (HF) (mg/Nm³)	Below Detectable Limit	**Not Specified**
Concentration of Sulphur Dioxide (SO_2) (mg/Nm³)	Below Detectable Limit	**Not Specified**
Concentration of Oxides of Nitrogen (NOx) (ppm)	4.7	**400.0**
Concentration of Lead (Pb) (mg/Nm³)	Below Detectable Limit	**Not Specified**
Concentration of Mercury (Hg) Compounds as (Hg) (mg/Nm³)	Below Detectable Limit	**0.05**
Concentration of Hydrocarbon (HC) (mg/Nm³)	Below Detectable Limit	**Not Specified**
Concentration of Carbon Monoxide (CO) (mg/Nm³)	Below Detectable Limit	**Not Specified**

Remarks :- All the results are well within prescribed MPCB Limits for Human Dead bodies

For **GADARK LAB PVT. LTD.**

AUTHORISED SIGNATORY
[SACHIN B. GAONKAR]

CHECKED BY

Recognised by Central Pollution Control Board (MoEF and CC, Govt. of India), under the EP Act, 1986, valid upto 21st August 2025. ISO 9001 : 2015 and ISO 45001 : 2018 Certified.

Annexure-X

Specification of Continuous Emission Monitoring system
Continuous Emission Monitoring System.
Electro Chemical Technology
Range:
1. NOX 0-1000 mg/Nm3
2. So2 0-1000 mg/Nm3
3. CO 0-1000 mg/Nm3
4.CO2 100Vol.%
5.HC 0-1000mg/Nm3
6. Flow 0-100 m/s
7. Stack Temperature 0 - 400 °C
Display: 2 Line Display
Analyzer Specifications:
Operating Temperature: 4°C to 65°C
Power Supply: 230 VAC, 50 Hz
Digital Interface: RS 485, MODBUS protocol
Accuracy: ± 1 % of FS
Repeatability: 1% of FS
Span Drift: ± 1 % of Span per week
Zero Drift: ± 1 % of Span per week
Response time: T90<15 sec
Auto and manual calibration facility High / Low Gas, low flow & other programmable Events available PTFE sample lines & sample components Highly efficient automatic purge &drain
Certifications: TUV Certified
Package includes: Sample conditioning Unit with Industrial cabinet SMART controller- based sampling unit. Double-stage gas conditioning. Aspirator/ Vacuum Generator for sampling flue gas fine filters to remove drain, dust and mist in sample gas. Auto drain and auto purging
2-way solenoid valves for switching sampling, purging, draining and calibration. Flow meter to regulate and monitor the flow of sample gas.
Tubing in PTFE (1/4” diameter)(Up to 50 Meters included) Industrial Cabinet Dimension: 800 (D) x 600 (W) x 1500 (H) mm