

# Polludrone<sup>®</sup>

Ambient Air Quality Monitoring System



# About Polludrone®















Polludrone® is a Continuous Ambient Air Quality Monitoring System (CAAQMS). It is capable of monitoring various environmental parameters related to Air Quality, Noise, Odour, Meteorology, and Radiation. Polludrone® measures the particulate matter and gaseous concentrations in the ambient air in real-time. Using external probes, it can also monitor other auxiliary parameters like traffic, disaster, and weather.

Polludrone® is an ideal choice for real-time monitoring applications such as Industries, Smart Cities, Airports, Construction, Seaports, Campuses, Schools, Highways, Tunnels, and Roadside monitoring. It is the perfect ambient air quality monitoring system to understand a premise's environmental health.



## Product Features

-  **Patented Technology**  
Works on innovative e-breathing technology for higher data accuracy.
-  **Retrofit Design**  
Plug and play design for ease of implementation.
-  **Compact**  
Lightweight and compact system that can be easily installed on a pole or wall.
-  **Internal Storage**  
Internal data storage capacity of upto 8 GB or 90 days.
-  **On-device Calibration**  
On-site device calibration capability using built-in calibration software.
-  **Identity And Configuration**  
Geo-tagging allows you to get the exact location of the device, consisting of latitude and longitude coordinates.
-  **Tamper Proof**  
IP 66 Grade certified secure system to avoid tampering / malfunction / sabotage.
-  **Over-The-Air Update**  
Automatically upgradeable from a central server without any onsite visit.
-  **Network Agnostic**  
Supports a wide range of connectivity options like GSM / GPRS / WiFi / LoRa / NBIoT / Ethernet / Modbus / Relay / Satellite.
-  **Real-Time Data**  
Continuous monitoring and real-time data transfer at configurable intervals.
-  **Weather Resistant (IP 66)**  
Durable enclosure designed to withstand extreme weather conditions.
-  **Fully Solar Powered**  
The system works 100% on solar power, making it ideal for off-grid locations.



# Key Benefits



## Robust And Rugged

Durable enclosure to sustain extreme climatic conditions.



## Monitor Multi-parameter

Compatible with a wide range of parameters including PM, Gases and Meteorological parameters



## Seamless Connectivity

A wide range of options for wired and wireless connectivity.



## Secure Cloud Platform

Secure platform for visualising and analysing data, with easy API integration for immediate action.



## Accurate Data

Gives accurate readings in real-time to detect concentrations in ambient air.



## Easy to install

Effortless installation with versatile mounting arrangements.

# Polludrone<sup>®</sup> Usecases



## Industrial Fenceline

Pollution monitoring at the industry fenceline helps to monitor air pollution levels and ensures that industries comply with policies and safety regulations.



## Smart City and Campuses

Pollution monitoring at strategic locations in smart cities and campuses empowers authorities to obtain actionable insights for pollution control and citizen welfare.



## Roads, Highways and Tunnels

Pollution monitoring at roads and tunnels can help create pollution mitigation action plans to control vehicular emissions.



## Airports

Pollution and noise monitoring at taxiways and hangars facilitate analysing the impacts on travelers and surrounding neighbourhoods.

# Polludrone® Variants

| Variants          | Applications                   | Parameters   |
|-------------------|--------------------------------|--|
| Polludrone® Lite  | General Purpose, Smart campus  | PM <sub>2.5</sub> , PM <sub>10</sub> , CO <sub>2</sub> , CO, Noise, Light, UV-Radiation, Temperature, Humidity, Pressure   |
| Polludrone® Smart | Extensive, Smart cities        | PM <sub>2.5</sub> , PM <sub>10</sub> , CO <sub>2</sub> , CO, SO <sub>2</sub> , NO, NO <sub>2</sub> , O <sub>3</sub> , Noise, Light, UV - Radiation, Temperature, Humidity, Pressure  |
| Polludrone® Pro   | Critical, Industrial fenceline | PM <sub>1</sub> , PM <sub>2.5</sub> , PM <sub>10</sub> , PM <sub>100</sub> (TSP), CO <sub>2</sub> , CO, SO <sub>2</sub> , NO, NO <sub>2</sub> , O <sub>3</sub> , H <sub>2</sub> S, Noise, Light, UV-Radiation, Temperature, Humidity, Pressure |
| Polludrone Custom | As per request                 | Choose up to 9 Gases, Particulate Matter, and Noise with Optional External Modules   |

## Parameters

| Sensor  | ID        | Range                       | Resolution                     | Min. Detection         | Drift                  | Working Principle                 | Expected Sensor Life |         |
|---|-----------|-----------------------------|--------------------------------|------------------------|------------------------|-----------------------------------|----------------------|---------|
| Suspended Particulate Matters with size less than 2.5µ (PM <sub>2.5</sub> ) | OZPM_1*   | Upto 5000 µg/m <sup>3</sup> | 0.1 µg/m <sup>3</sup>          | 1 µg/m <sup>3</sup>    | N.A.                   | Optical Particle Counter          | 18 Months            |         |
| Suspended Particulate Matters with size less than 10µ (PM <sub>10</sub> )   |           |                             |                                |                        |                        |                                   |                      |         |
| Ultra Fine Particulate Matters with size less than 1µ (PM <sub>1</sub> )    |           |                             |                                |                        |                        |                                   |                      |         |
| Total Suspended Particulates (TSP) (PM <sub>100</sub> )                     |           | Upto 30 mg/m <sup>3</sup>   |                                |                        |                        |                                   |                      |         |
| Carbon Monoxide (CO)  | OZCO_1*   | 0-5 ppm                     | 0.01 ppm                       | 0.01 ppm               | < 1ppm / year          | Electrochemical                   | 2 years              |         |
|   | OZCO_4    | 0-50 ppm                    | 0.05 ppm                       | 0.05 ppm               | < 2% / Month           |                                   |                      |         |
|   | OZCO_2    | 0-100 ppm                   | 0.1 ppm                        | 0.1 ppm                | < 2% / Month           |                                   |                      |         |
|   | OZCO_3    | 0-1000 ppm                  | 0.75 ppm                       | 0.75 ppm               | < 2% / Month           |                                   |                      |         |
| Carbon Dioxide (CO <sub>2</sub> )   | OZCO2_1*  | 0-5000 ppm                  | 1 ppm                          | 400 ppm                | ±5 ppm / Year          | Non Despersive Infrared           |                      |         |
| Nitric Oxide (NO)   | OZNO_1*   | 0-5 ppm                     | 0.001 ppm                      | 0.01 ppm               | < 2% / Month           | Electrochemical                   | 2 years              |         |
|   | OZNO_2    | 0-100 ppm                   | 0.5 ppm                        | 0.5 ppm                | ±50 ppb / Year         |                                   |                      |         |
| Nitrogen Dioxide (NO <sub>2</sub> )   | OZNO2_1*  | 0-10 ppm                    | 0.001 ppm                      | 0.01 ppm               | ±20 ppb / Year         |                                   |                      |         |
|   | OZNO2_2   | 0-100 ppm                   | 0.2 ppm                        | 0.2 ppm                | < 2% / Month           |                                   |                      |         |
|   | OZNO2_3   | 0-500 ppm                   | 0.5 ppm                        | 0.5 ppm                | < 2% / Month           |                                   |                      |         |
| Ozone (O <sub>3</sub> )   | OZO3_1*   | 0-10 ppm                    | 0.001 ppm                      | 0.01 ppm               | ±20 ppb / Year         |                                   |                      |         |
| Oxygen (O <sub>2</sub> )  | OZO2_1    | (0-25) %VOL                 | 0.1 %VOL                       | 0.1 %VOL               | < 2% / Month           |                                   |                      |         |
| Hydrogen Sulfide (H <sub>2</sub> S)   | OZH2S_1*  | 0-1.5 ppm                   | 0.001 ppm                      | 0.01 ppm               | ±100 ppb / Year        |                                   |                      |         |
|   | OZH2S_2   | 0-50 ppm                    | 0.05 ppm                       | 0.05 ppm               | < 2% / Month           |                                   |                      |         |
|   | OZH2S_3   | 0-200 ppm                   | 0.2 ppm                        | 0.2 ppm                | < 2% / Month           |                                   |                      |         |
|   | OZH2S_4   | 0-2000 ppm                  | 2 ppm                          | 2 ppm                  | < 2% / Month           |                                   |                      |         |
| Sulfur Dioxide (SO <sub>2</sub> )   | OZSO2_1*  | 0-10 ppm                    | 0.001 ppm                      | 0.01 ppm               | ±20 ppb / Year         |                                   |                      |         |
|   | OZSO2_2   | 0-100 ppm                   | 0.2 ppm                        | 0.2 ppm                | < 2% / Month           |                                   |                      |         |
|   | OZSO2_3   | 0-2000 ppm                  | 5 ppm                          | 5 ppm                  | < 2% / Month           |                                   |                      |         |
| Ambient Noise   | OZN_1*    | Upto 140 dB                 | 1 dB                           | 0.5 dB                 | N.A.                   | Capacitive                        |                      |         |
| Temperature   | OZTEMP_1* | -40 to 125°C                | 0.01°C ppm                     | -40 °C                 | N.A.                   | Solid State Semiconductor Sensing |                      |         |
| Humidity  | OZHUM_1*  | 100% Rh                     | 0.10% ppm                      | 0.10%                  | N.A.                   |                                   |                      |         |
| Barometric Pressure   | OZPRES_1* | 300-1100 hPa                | 0.18 Pa                        | 300 hPa                | N.A.                   |                                   |                      |         |
| Pyranometer Solar Radiation 300 - 1100 nm                                   | OZUV_1    | Light Intensity             | Up to 1,00,000 Lux             | 1 Lux                  | 1 Lux                  | N.A.                              | Photoconductivity    | 3 Years |
|   |           | Visible Light               | Upto 5000 Lux                  | 0.1 Lux                | 0.1 Lux                | N.A.                              |                      |         |
|   |           | UV Radiation                | 0.1-100,000 uW/cm <sup>2</sup> | 0.1 uW/cm <sup>2</sup> | 0.1 uW/cm <sup>2</sup> | N.A.                              |                      |         |
|   |           | UV Index                    | 0-12                           | -                      | -                      | N.A.                              |                      |         |

**Note:** Expected Sensor Life can vary, subject to actual concentration on-site. In the interest of continued product improvement, we reserve the right to change design features and specifications without prior notification. The data contained in this document is for guidance only. Oizom® accepts no liability for any consequential losses, injury or damage resulting from the use of this document or the information contained within.

### External Modules



**Anemometer**  
OZWSD\_1\*  
Wind Speed: 0-40 m/s  
Wind Direction: 0-359°  
Working Principle: Ultrasonic



**Rain Gauge**  
OZRAIN\_1\*  
Resolution: 0.25 mm  
Working Principle: Tipping Bucket



**Vibration Sensors**  
PPV: +/- 2G  
Range frequency: 0.5 - 250 Hz  
Range velocity: ±50 mm/s (±2 in/s)  
Working Principle: MEMS

\* Indicates standard delivery timeline

# Specifications

## Mechanical

|                |   |
|----------------|---|
| Size           | 360mm (H) x 328mm (W) x 200mm (D)                               |
| Weight         | 7.2 Kg (instrument weight)                                      |
| Material       | Aluminum Magnesium Alloy, Mild-steel (With Powder Coating), FRP |
| Certifications | CE, FCC, NEMA 4X, IP66, RoHS                                    |

## Electrical

|                        |   |
|------------------------|---|
| Avg. Power Consumption | Up to 7 Watt (Actual consumption will vary upon the number of parameters)                         |
| Power Input Options    | AC : External 110-240V AC, 50-60Hz<br>DC : Uninterrupted 24V DC, 2 Ampere 60 Watt 24V Solar Panel |
| SMPS Specs             | 24V, 2Amps output UL-62368 & CAN/CSA C22.2 Certified  |
| Battery Backup Time    | Up to 12 Hours  |
| Battery Specs          | Lithium iron phosphate (LiFePO4) battery cell with rated voltage 12.8V Capacity 6Ah               |

## Technical

|                       |   |
|-----------------------|---|
| Processor             | Quad Core ARM Cortex                      |
| Memory                | 2GB RAM / 8GB eMMC ROM                    |
| Device Interface      | On-device Software / API / Cloud Platform |
| Internal Data Storage | Upto 8 GB or 90 days                      |

## Environmental

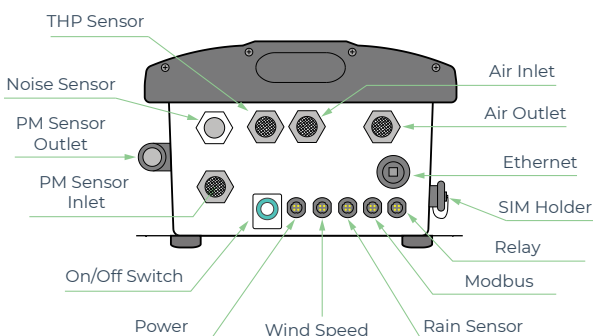
|                       |                 |
|-----------------------|-----------------|
| Operating Temperature | -20 °C to 60 °C |
| Operating Humidity    | 0-93% RH        |
| Recommended Humidity  | 15-90% RH       |
| Storage Conditions    | 10 - 40°C       |










## Sensing

|                            |   |
|----------------------------|---|
| Gas Measurement Principle  | Active Sampling with Sampling rate of 325 mL/Sample |
| Dust Measurement Principle | Active Sampling with Sampling rate of 1 L / min     |
| Warm up time               | < 48 hours for data stabilisation                   |

## Communication

|                      |  |
|----------------------|--|
| Data Interval        | 5-30 minutes (configurable)  |
| Data-push Protocol   | HTTP post request to host server   |
| Data-pull            | HTTP request on device IP  |
| Firmware Updates     | Over-The-Air Firmware Update   |
| Standby Connectivity | GSM (2G/3G/4G) for remote diagnosis, FOTA updates, and cloud calibration |
| Certification        | PTCRB, CE, FCC, RoHS, ICASA  |

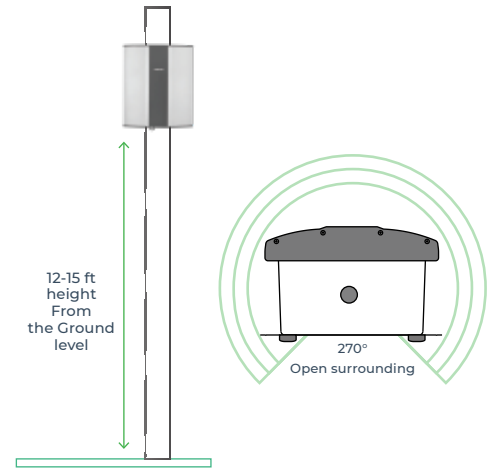


|          | Connectivity Options   | Specification                      |
|----------|--|------------------------------------|
| Wireless |  GSM      | Global 2G / 3G / 4G                |
|          |  LoRa     | 868 MHz / 915 MHz                  |
|          |  LTE      | CAT-M1                             |
|          |  NB-IoT   | CAT-NB1                            |
|          |  sigfox   | 868 to 869 MHz, 902 to 928 MHz     |
|          |  Wi-Fi    | AP Mode and Station Mode           |
| Wired    |  Ethernet | Satellite                          |
|          |  Modbus   | Static / DHCP Configuration        |
|          |  RELAY    | RS485 RTU / TCP<br>2 Channel Relay |

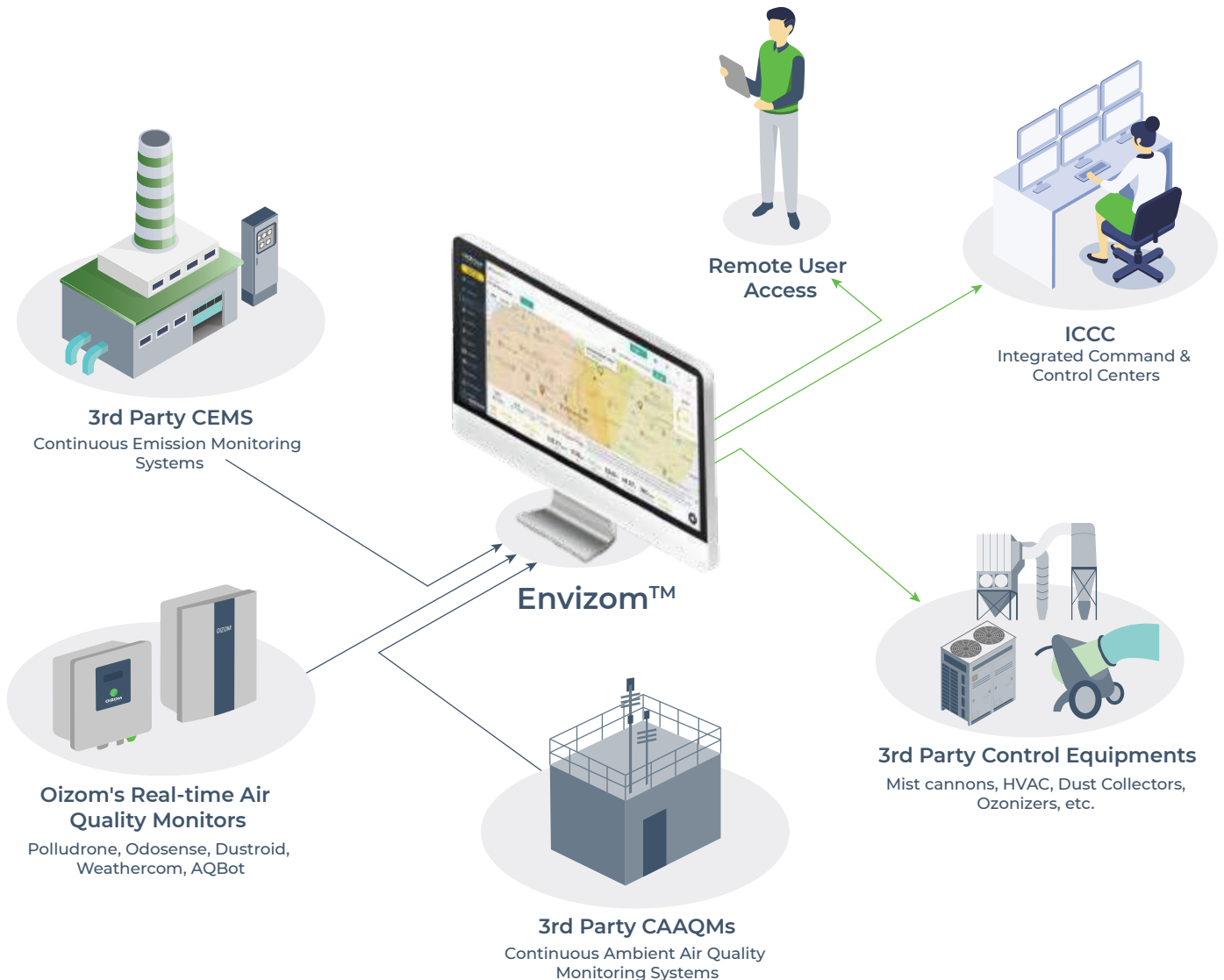
# Functional Specifications

Proper location selection is critical for optimised data collection. It varies as per the purpose of the project. According to U.S. EPA QA handbook (Vol II, Section 6.0 Rev.1), the selection of locations should be based on monitoring purposes.

|                      |   |
|----------------------|---|
| Preferred Mounting   | Pole / Wall (preferably 270° open surrounding)                              |
| Installation Height  | 12-15 feet (4-5 meters)   |
| Direction            | As per maximum direct sunlight exposure                                     |
| Power Availability   | Constant AC / DC supply within a 2-meter range from the unit or solar panel |
| Network Availability | Uninterrupted network connection  |



# Solution Architecture





# Envizom™

## Data Visualisation and Analytics Platform



Envizom™ is an Environmental visualisation and analytics platform for real-time air quality data acquisition. Our Environmental Data Interpretation Engine, powered by Artificial Intelligence & Machine Learning algorithms, provides highly accurate data and actionable insights, empowering users to make well-informed decisions. Envizom™ uses secured HTTPS servers for data storage. Alternatively, this data can also be stored on-premise local servers.

With the Report module, users can get immediate and automated daily / weekly / monthly reports through SMS and Email to gain comprehensive insights into the air quality of their areas or industrial zones. The Analytics module provides comparative detailed data on changes in air quality data over time, enabling a clear understanding of the factors contributing to pollution.

## Envizom™ Capabilities



Real-time Data



Easy to Integrate API



Smart alerts



Advanced Analytics



Pollution Rose Charts



Automated Reports

## Privacy First Platform



Data Privacy

The data shared with the client uses an encryption server through HTTPS Secure Socket layers. Envizom™ also uses AES encryption for connection that adds to data safety.



Data Ownership

Envizom™ creates a secured and encrypted password combination for the user login. Oizom® ensures 100% privacy of the data and doesn't share without relevant permissions.



Data Transparency

Data collected from Oizom® equipment runs through the Environment Data Interpretation Engine. It processes various algorithms and eliminates environmental impact interferences on the sensors.



SANS

OWASP  
Open Web Application Security Project

IEC

IEC 62443-4-1



Security Tested



100w Cybersecurity Practices



TCM SECURITY

# Case Studies



## Smart city air quality monitoring in Agra, India

The pollution in Agra is affecting historic sites, including the Taj Mahal. To assist authorities in gaining insights into the city's atmosphere with air quality, Oizom deployed Polludrone® systems throughout the city.



India



Polludrone Custom



Smart City

## Ensuring environmental safety and reassuring communities at Dangote Cement Plant

Oizom's Polludrone® systems are monitoring pollution and dust levels at the Dangote Cement Plant, addressing the environmental safety and air quality concerns raised by neighboring communities that confirm the air quality at sites is safe for all.



Ethiopia



Polludrone Smart



Fenceline Monitoring



## Ensuring safety during Skanska's Tunnel Construction in Norway

Skanska improved safety and efficiency using the Oizom® instrument to monitor the air quality minutely, enabling better explosive use decisions and new industry standards.



Norway



Polludrone Pro



Construction



# Case Studies



## Riyadh Airport authorities analyse the pollution trend in the airport region with Polludrone®

At Riyadh Airport, Oizom's Polludrone® is monitoring the pollution due to frequent dust storms to ensure the safety of flights while taking off and landing.



Saudi Arabia



Polludrone Custom



Airport

## Air Quality monitoring in smart cities for Arunachal Pradesh Pollution Control Board

APSPCB monitors the various parameter levels of air pollution in Namsai and Kharsang of Arunachal Pradesh in real-time with Polludrone®. Air quality data is displayed on an LED screen to assure citizens' safety.



India



Polludrone Smart



Smart City



## A City in Texas monitoring the air quality with Oizom to ensure citizens' safety

Galena Park deployed Oizom's Polludrone® to improve its city's air quality management methods by monitoring the impact of oil refinery emissions.



Texas



Polludrone Pro



Smart city



# Oizom<sup>®</sup> Gas Sensor

The Oizom<sup>®</sup> Gas Sensor (OGS) module is designed to accurately measure low concentrations of various gases at ppb, and ppm levels in the ambient air. The sensor is capable to monitor the point source gases on real-time basis. Each sensor is integrated into a metal casing along with the ultra-low-noise support electronics, which makes it compact and reliable. This allows accurate gas detection even at very low concentrations in the atmosphere.

1. Proprietary gas sensing technology
2. Independent calibration of each sensor
3. Low-noise electronic design



## Data and Calibration

### 1 Laboratory Calibration

All air quality monitoring systems are calibrated at the ISO/IEC 17025:2017 certified calibration laboratory using standard NIST traceable calibration gas standards as per the international guidelines by U.S. EPA.(Vol II, Section 6.0 Rev.1)



### 2 Collocation Calibration

Post lab calibration, the monitors are operated adjacent to a custom-built reference station housing U.S. EPA-designated Federal Equivalent Method (FEM) for collocation calibration to ensure optimum data quality.



### 3 On-site Calibration

On-site calibration of Oizom<sup>®</sup> devices can be performed using standard calibration gas cylinders of known concentration or by co-locating with a reference standard.



# About Oizom®



Leaders in sensor based  
air quality monitoring



Plug and play monitors  
for hassle free setup



Low powered solutions  
for multiple applications

Oizom® is an environmental monitoring company that offers accurate air quality monitoring solutions for better decision-making. Using our patented monitoring technology, Oizom's system monitors various environmental parameters related to Air Quality, Noise, Odour, Weather, Radiation, etc. Our data analytics platform derives various actionable insights for authorities, communities, and industries. With smart environmental solutions, Oizom® aims to empower future cities with reliable and accurate environmental monitoring.

Over the past decade, Oizom® has focused on environmental monitoring technology and solutions, and till now, we've deployed 3000+ devices. We are monitoring the environmental health of more than 200 million people worldwide. The solutions we provide are in 65+ major cities worldwide. With a network of partners, Oizom® has expanded its reach and made a strong presence in over 70 countries worldwide.

## Other Oizom® Products



### Odosense®

Odour Monitoring System

Odosense® monitors various odourful and toxic gases in the environment and provides insight into odour dispersion.



### Dustroid®

Real-time Dust Monitor

Dustroid® is an online particulate monitoring system to measure a wide spectrum of particulate matter sizes.



### Weathercom®

Automatic Weather Station

Weathercom® is an automatic weather station designed to measure various meteorological parameters.



### AQBot™

Single Parameter Air Quality Monitor

AQBot™ is an industrial grade single parameter air quality monitor with automation capabilities.





Trusted by

**70+ Countries**



Solutions Installed in

**65+ Cities**



Total Devices Installed

**3000+**



Total Population Covered

**200 million+**

## Oizom Customers



**Changing the way Industries monitor air quality**



Get in touch



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