**Environmental Monitoring Guide**

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**Parameter being used:**

MQ131(Air 11-Ozone) : measures the ozone

**Description of the parameter:**

The increase and decrease in number represents the amount of ozone there is in the atmosphere. This increase or decrease is important because we measure the amount of ozone in the air to determine how much it affects the environment as a whole. Here, ground-level or "bad" ozone is an air pollutant that is harmful to breathe and it damages crops, trees and other vegetation. Also an increase amount of UV radiation can lead to more cases of skin cancer, cataracts, and impaired immune systems. Also for marine phytoplankton, which are the base of the ocean food chain, are already under stress from UV radiation.

**Standard values for this parameter:**

**Target values for ozone from 2010**

|  |  |  |
| --- | --- | --- |
| **Objective** | **Parameter** | **Value** |
| Protection of human health | Maximum daily 8 hour mean | 120 **ug/m3** not to be exceeded more than 25 days per calendar year averaged over 3 years |
| Protection of vegetation | AOT40, calculated from 1 hour values from May to July | 18000 ug/m3-h averaged over 5 years |

**Long-term objectives for ozone from 2020**

|  |  |  |
| --- | --- | --- |
| **Objective** | **Parameter** | **Value** |
| Protection of human health | Maximum daily 8 hour mean | 120 **ug/m3** |
| Protection of vegetation | AOT40, calculated from 1 hour values from May to July | 6000 ug/m3-h |

The public must be informed if ozone levels exceed the following thresholds

|  |  |  |
| --- | --- | --- |
|  | **Parameter** | **Threshold** |
| **Information Threshold** | 1 hour average | 180 ug/m3 |
| **Alert Threshold** | 1 hour average | 240 ug/m3 |

**Code used to program sensor**:

define LED 13

void setup() {

  Serial.begin(9600);

  Serial.println("O3 testing");

}

 //

void loop() {

  float  O3 = (float)analogRead(A0) / 3.154;// average ppm is 820 that is equal to 260 dobson unit for this area AW

  Serial.println("O3: "+String(O3, 3)+" DU");

  analogWrite(LED, O3);

  delay(30000);

}

**Values of the parameter at the University of Aruba:**

O:3 258.085 DU

O:3 258.402 DU

O:3 258.085 DU

O:3 257.768 DU

O:3 257.134 DU

O:3 255.549 DU

O:3 255.866 DU

O:3 256.183 DU

O:3 256.817 DU

O:3 257.134 DU

O:3 257.768 DU

O:3 257.451 DU

**How we used the sensor:**

1. We set up the parameter
2. Connect the parameter to the laptop
3. Downloaded Arduino
4. Copied code from parameter from the pdf sent and put it into Arduino
5. We changed the measuring unit from parts per million to Dobson unit
6. We adjusted the codes so we could get results every 30 seconds
7. We walked around with the laptop and the parameter and measured the ozone in different parts of the school

**Description of how the sensor works:**

The MQ series of gas sensors use a small heater inside with an electro-chemical sensor. They are sensitive for a range of gasses and are used indoors at room temperature.

