

تقرير فني

لقياسات الأتربة الكلية العالقة والجسيمات الصدرية الأقل من 10 ميكرون والضوضاء وشدة الاستضاءة وبعض الغازات العضوية والغير عضوية المتطايرة وانبعاثات مدخنة المولد داخل جامعة 6 أكتوبر - محافظة الجيزة



Technical Report On

Measurement of TSP, PM₁₀, Noise Level, Intensity of Illumination, Volatile Organic & Inorganic Compounds, Stack Gas Emissions For Generator inside October 6 University -6th of October city – Giza Government

CONSULTANCY FIRM

AMATEC CONSULTING FOUNDATION

For environmental and scientific assistance

Prof. Dr. Ashraf A. Zahran

Main Consultant

Eng. Zahran Abd El-Hamid

Executive Manager

Eng. Marwan Ashraf Zahran

Technical Manager

Eng. Amal Mahmoud

Environmental Specialist

Eng. Mohamed Khaled

Environmental Specialist

Eng. Marwan Adel

Environmental Specialist

Eng. Amr Gamal

Environmental Specialist

Eng. Nossayla Ehab

Environmental Specialist

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1. INTRODUCTION

AMATEC Consulting Foundation for Environmental & Scientific Assistance is considered one of the most important foundations in Egypt because of its large track history of work in the field of the environment since 1999, and through the working group, which consist of a number of university professors who specialize in different environmental fields from both inside and outside Egypt. AMATEC keen to offer its services through EIA studies, measurements and environmental consulting for different industrial sectors.



October 6 University is the first private university in the Arab Republic of Egypt. O6U is instituted by the Republican Decree number 243 1996. The university is a member of the Association of Arab Universities and the Association of African Universities.



The University includes fourteen Faculties, University Hospital, and two hotels for male and female students. It has also established a center for quality assurance and accreditation having units in all the faculties, to enhance and disseminate quality culture. The University comprises a modern library, equipped with state of the art audio/visual technology, a large collection of books and references, spacious conference and reading halls, and connected through the internet to several electronic library networks. Additionally, the university has established a center of excellence for training and human resources development to enhance and transfer practical expertise in all production generate graduates who combine both theory and practice.

- All the degrees awarded by the University are recognized and accredited by the Supreme Council of Egyptian Universities.
- The University is in collaborative partnerships and agreements with many foreign and Egyptian academic institutions.
- Total student population is about 25000, of which about 1500 are international students drawn from more than 30 nationalities.
- The total area of the University campus is 170,000 square meter (excluding the three storey Central Library building which amounts to 9000 square meter).
- Educational and administrative buildings in O6U occupy (22%) of the total area of the University campus whereas the rest is green area and playgrounds.
- The University campus houses four educational buildings, university hospital and female hostel, in addition to an administrative building. As for the central library and male hostel, they lie about 150 meters off University campus.

- The University has (124) studying halls and classrooms provided with audio, visual and multimedia devices can accommodate up to 12000 students at a time. • The total capacity of the teaching halls and rooms in addition to labs, workshops and special halls can accommodate up to 22000 students at a time.
- The Faculty of Pharmacy is the first in all private universities that acquired the certificate of Quality Assurance and the Accreditation of the National Authority in February 2014, followed by the Faculty of Languages and Translation, and the Department of Biomedical Equipment, Faculty of Applied Medical Sciences in 2017, Faculty of Medicine, Faculty of information systems and computer science and The Faculty of Tourism and Hotels in 2018, Faculty of dentistry and faculty of physical therapy and reaccreditation for the faculty of pharmacy in 2019.
- The University offers its services to both national and international Students through the several administrations such as: Student's Affairs, Epidemics' Affairs, Cultural Relations, Public Relations, Youth Welfare. Social Responsibility administration and transportation services. The University offers postgraduate programs in different disciplines in collaboration with a number of national universities.

Over view on Green Matrix

The UI GreenMetric World University Ranking is an initiative of Universitas Indonesia which is being launched in 2010. As part of its strategy of raising its international standing, the University hosted an International Conference on World University Rankings on 16 April 2009. It invited a number of experts on world university rankings such as Isidro Aguillo (Webometrics), Angela Yung-Chi Hou (HEEACT), and Alex Usher (Educational Policy Canada). It was clear from the discussions that current criteria being used to rank universities were not giving credit to those that were making efforts to reduce their carbon footprint and thus help combat global climate change. UI GreenMetric founders were aware that a number of top world universities, for example Harvard, Chicago, Copenhagen have been taking steps to manage and improve their sustainability. There are also cooperative efforts among groups of universities. A grading system which includes information on sustainability at 300 universities exists under the title the United States Green Report Card. This is excellent, however, results are given in terms of a grade (A to F) rather than a ranking and the number of universities included is relatively circumscribed. UI GreenMetric founders saw the need for a uniform system that would be suitable to attract the support of thousands of the world's universities and where the results were based on a numerical score that would allow ranking so that quick comparisons could be made among them on the criteria of their commitment to addressing the problems of sustainability and environmental impact.



Criteria and indicators of the UI GreenMetric

Abbr.	Criterion	Weight	Indicators
SI	Setting & Infrastructure	15%	<ul style="list-style-type: none"> The ratio of open space area to total area (200) Total area on campus covered in forest vegetation (100) Total area on campus covered in planted vegetation (200) Total area on campus for water absorption besides the forest and planted vegetation (100) The total open space area divided by total campus population (200) Percentage of university budget for sustainability efforts (200) Percentage of operation and maintenance activities of building during Covid-19 pandemic (100) Campus facilities for disabled, special needs and or maternity care (100) Security and safety facilities (100) Health infrastructure facilities for students, academics and administrative staff's wellbeing (100) Conservation: plant, animal and wildlife, genetic resources for food and agriculture secured in either medium or long-term conservation facilities (100)
EC	Energy & Climate Change	21%	<ul style="list-style-type: none"> Energy efficient appliances usage (200) Smart building implementation (300) Number of renewable energy sources on campus (300) Total electricity usage divided by total campus' population (kWh per person) (300) The ratio of renewable energy production divided by total energy usage per year (200) Elements of green building implementation as reflected in all construction and renovation policies (200) Greenhouse gas emission reduction program (200) Total carbon footprint divided by total campus' population (metric tons per person) (200) Number of innovative program(s) during covid-19 pandemic (100) Impactful university program(s) on climate change (100)
WS	Waste	18%	<ul style="list-style-type: none"> Recycling program for university's waste (300) Program to reduce the use of paper and plastic on campus (300) Organic waste treatment (300) Inorganic waste treatment (300) Toxic waste treatment (300) Sewage disposal (300)
WS	Water	10%	<ul style="list-style-type: none"> Water conservation program & implementation (200) Water recycling program implementation (200) Water efficient appliances usage (200) Consumption of treated water (200) Percentage of additional handwashing and sanitation facilities during Covid-19 pandemic (200)

TR	Transportation	18%	<ul style="list-style-type: none"> The total number of vehicles (cars and motorcycles) divided by total campus' population (200) Shuttle services (300) Zero Emission Vehicles (ZEV) policy on campus (200) The total number of Zero Emission Vehicles (ZEV) divided by total campus population (200) Ratio of ground parking area to total campus' area (200) Program to limit or decrease the parking area on campus for the last 3 years (from 2018 to 2020) (200) Number of initiatives to decrease private vehicles on campus (200) Pedestrian path on campus (300)
ED	Education & Research	18%	<ul style="list-style-type: none"> The ratio of sustainability courses to total courses/modules (300) The ratio of sustainability research funding towards total research funding (200) Number of scholarly publications on sustainability (200) Number of events related to sustainability (200) Number of student organizations related to sustainability (200) University-run sustainability website (200) Sustainability report (100) Number of cultural activities on campus (100) Number of university program(s) to cope with Covid-19 pandemic (100) Number of sustainability community services project organized and/or involving students (100) Number of sustainability-related startups (100)

October 6 University further has:

Consists of 14 Faculties as shown in Figure 1, 2 and Figure 3, that provide specializations in the fields of medical, technological and humanities as follows:

1. Faculty of medicine and surgery
2. Faculty of pharmacy
3. Faculty of physical therapy
4. Faculty of dentistry
5. Faculty of Applied health sciences technology
6. Faculty of engineering
7. Faculty of information system and computer sciences
8. Faculty of applied arts
9. Faculty of mass media and communication arts
10. Faculty of education
11. Faculty of economic and management
12. Faculty of tourism and hotel management
13. Faculty of languages and translation
14. Faculty of Nursing



Figure (1): Layout of the area of October 6 University

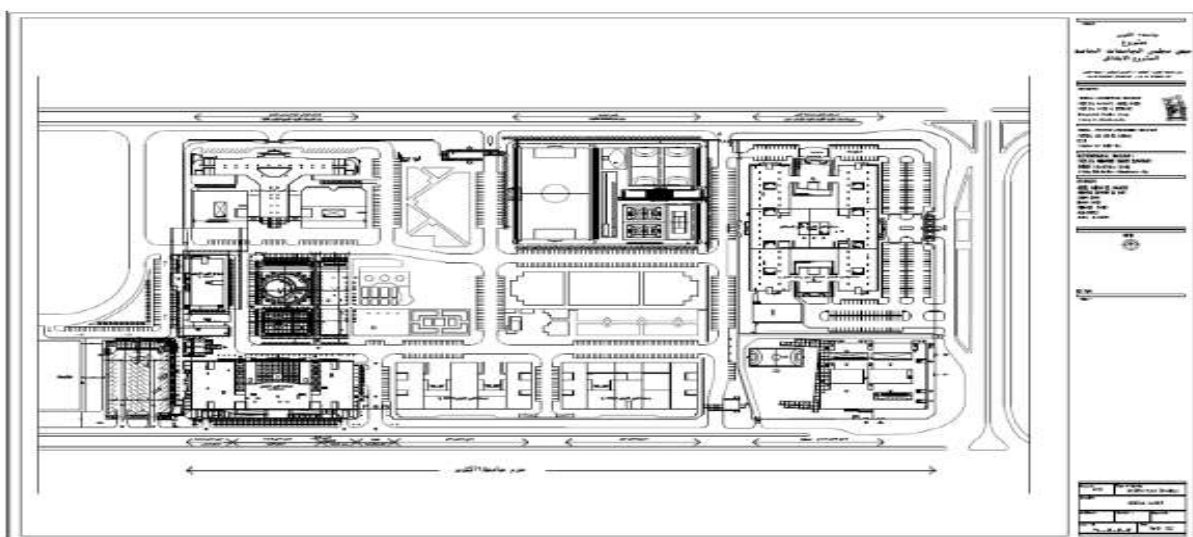


Figure (2): Shown October 6 University (O6U) and it's Main Buildings Architecture Plan & google images

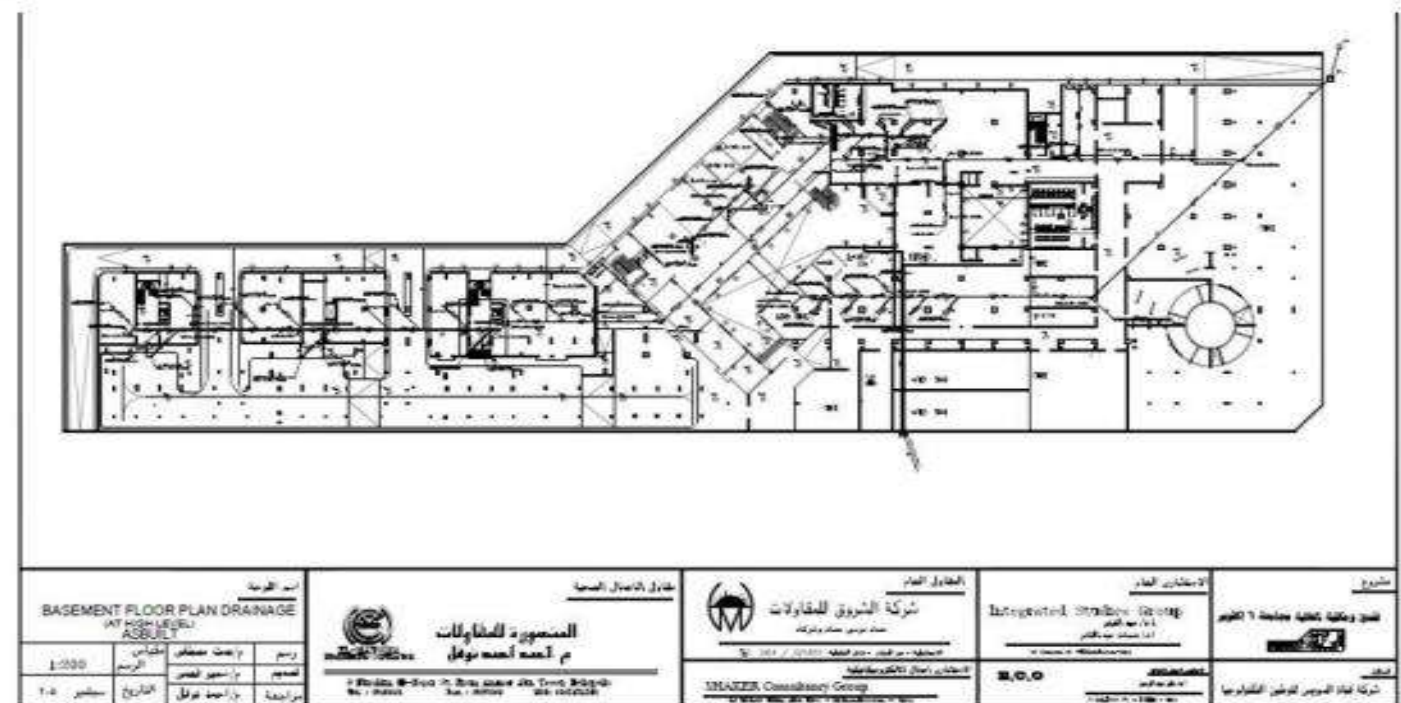


Figure (3): Shown October 6 University (O6U) Central Library & Student Hotel Buildings
Architecture Plan



Figure (4): Shown the measurement sites Inside October 6 University (O6U)

2. OBJECTIVE

The team work of AMATEC Consulting Foundation for Environmental and Scientific Assistance had visited the site of October 6 University- 6th of October city – Giza Government in October, 2022 and selected several sites inside the field which represent the different steps of production process to measure TSP, PM₁₀, Noise Level, Intensity of Illumination, Volatile Organic & Inorganic Compounds, Stack Gas Emissions for Generator.

3. TIME OF SAMPLING

Time of sampling was during working hours.

4. MEASUREMENTS

Measurement of different pollutants in the working environment were done using modern instruments with high sensitivity; TSP using Dust Detective, Noise Levels using a Digital Sound Level Meter, Intensity of Luminance by using Luminance Intensity Meter, Organic & Inorganic Compounds using TIGER handheld VOC detector, CO₂ Using CO₂ METER & TEMP, Stack Gas and using SENSONIC 2000. All equipment was recalibrated in the credit reference laboratory. Table (1) shows the different instruments of measurement.

Table (1): Different instruments of measurements

	<p>1. Dust Detective</p> <ul style="list-style-type: none"> ■ Instrument Model: CEL-712 micro dust Pro ■ Company: CASELLA CEL. ■ Parameters: <ul style="list-style-type: none"> - Total Suspended Particulates TSP(mg/m³) - Particulate matter less than 10 micron PM₁₀ (mg/m³) - Particulate matter less than 2.5 micron PM_{2.5} (mg/m³)
	<p>2. Digital Sound Level Meter</p> <ul style="list-style-type: none"> ■ Instrument Model: AR834 ■ Company: SMART SENSOR ■ Parameters: Noise Levels (dB)
	<p>3. Luminance Intensity Meter</p> <ul style="list-style-type: none"> ■ Instrument Model: 710113 ■ Company: Digital™ meters ■ Parameters: Luminance Intensity (Lux) or (Candle / foot²)
	<p>4. Organic and Inorganic Gases Detector</p> <ul style="list-style-type: none"> ■ Instrument Model: TIGER handheld VOC detector ■ Company: IONSCIENCE ■ Parameters: Volatile Organic Compounds: TVOCs, Toluene, Xylene, Acetaldehyde, Ethylene,... etc. - Inorganic Gases: O₂ - NO₂ - H₂S - SO₂
	<p>5. CO₂ METER & TEMP</p> <ul style="list-style-type: none"> ■ Instrument Model : 7752 ■ Company: AZ INSTRUMENT CORP ■ Parameters: Carbon dioxide
	<p>6. Stack gas Analyzer</p> <ul style="list-style-type: none"> ■ Instrument Model: SENSONIC 2000 ■ Company: MADUR ■ Parameters: <ul style="list-style-type: none"> Stack Gas Emissions which include ... - Carbon Monoxide - Nitrogen Monoxide - Nitrogen Dioxide - Sulfur Oxides - Flow gas temperature

5. TYPE OF MONITORING

5.1 Baseline Monitoring:

A survey should be conducted on basic environmental parameters in the area surrounding the proposed project before construction begins (pre-audit study). Subsequent monitoring can assess the changes in those parameters over time against the baseline.

5.2. Impact Monitoring:

The biophysical and socio-economical (including public health) parameters within the project area, must be measured during the project construction and operational phases in order to detect environmental changes, which have occurred as a result of project implementation.

5.3. Compliance Monitoring:

This form of monitoring employs a periodic sampling method, or continuous recording of specific environmental quality indicators or pollution levels to ensure project compliance with recommended environmental protection standards.

6. ENVIRONMENTAL AUDITING

6.1. Definition

Auditing refers to the examination and assessment of a certain type of performance. The audit should be undertaken upon a project run in operation, for some time.

6.2. Types of audits

The following types of audit that are recommended to be implemented in different phases of the EIA process:

Table (2): Types of Audit

Decision Point Audit	examines the effectiveness of EIA as a decision-making tool
Implementation Audit	Ensures that approved conditions have been met
Performance Audit	examines the responses of agencies concerned with project management
Project Impact Audit	examines environmental changes arising from project implementation
Predictive Technique Audit	examines the accuracy and utility of predictive techniques by comparing actual against predicted environmental effects
EIA Procedures Audit	critically examines the methods and approach adopted during the EIA study

Environmental auditing should compare monitoring results with information generated during the pre-project period. Comparisons can be made with similar projects or against standard norms.

Environmental Audit should be carried out upon the completion of project construction and after 2 years of project operation in order to obtain information on:

- The condition of natural/social/economical resources prior to project implementation after the project construction is completed,
- Whether or not, all the mitigation measures implemented are effective to control adverse impact, or enhance beneficial impacts,
- Whether or not all degraded landscape due to project implementation have been restored into original condition,
- What are the impacts of boom-bust scenario among the workforce involved in project implementation and the local economy, and the effect on the local economy of project implementation.

7. MATERIALS AND METHODS

7.1 Total Suspended Particulate (TSP), and Particulate matter less than 10 μm (PM_{10})

TSP was measured by the Dust Detective using A filter paper (GF/A), this techniques depend on the weight of filter paper before and after the sampling. One of the very important steps is "put the filter before and after the sampling in Desiccators to neglect the error of the humidity".

In the particulate matter (PM_{10}) sampling mode, air is drawn through a particle size Separator then through a filter medium. Particle size Separation is achieved by impacting. Critical to the collection of the correct particle size is the correct flow rate through the impactor. For the mini-vol., the actual volumetric flow rate must be 5 liters per minute at ambient conditions.

Table (3): Air Quality Limits ($\mu\text{g}/\text{m}^3$) of TSP in ambient and working environment.

Pollutant	Level ($\mu\text{g}/\text{m}^3$) for time exposure 24 hr	Level ($\mu\text{g}/\text{m}^3$) for time exposure annual (for one year)	Level (mg/m^3) for time exposure 8 hr	Area
TSP ambient	230	125		Urban
	230	125		Industrial
TSP in working places			10	Working Environment
PM_{10} ambient	150	100		Urban
	150	100		Industrial
PM_{10} in working places			3	Working Environment
$\text{PM}_{2.5}$ ambient	100	70		Urban
	100	70		Industrial
$\text{PM}_{2.5}$ in working places			3	Working Environment

7.2. Noise

Noise levels measured by using a Sound Level Meter "OMEGA HHSL1"

**Table (4): Intensity of sound inside the work place and closed places
Maximum permissible noise Levels Inside places of productive activities:**

No.	TYPE OF PLACE AND ACTIVITY	MAXIMUM PERMISSIBLE NOISE [level equivalent to decibel (A)]
1.	Work place with up to 8 hour shifts and aiming to limit noise hazards on sense of hearing	90
2.	Work place where acoustic signals and good audibility are required	80
3.	Work rooms for the follow up, measurement and adjustment of high performance operations	65
4.	Work rooms for computers, typewriters or similar equipment	70
5.	Work rooms for activities requiring routine mental concentration	60

Maximum permissible period for exposure to noise in the work place (factories and workshops):

- * The value given hereafter is indicated on the basis of not affecting the sense of hearing.
 - Intensity of noise shall not exceed 90 decibels (A) during a daily 8-hour work shift.
 - In case of increasing noise level intensity over 90 dB (A), the period of exposure must be reduced according to the following table:

Table (5): Time exposure for deferent noise levels.

Noise intensity level decibel (a)	95	100	105	110	115
Period of exposure (one hour)	4	2	1	½	1/4

- The instantaneous noise intensity level during the working hours shall not exceed 135 decibels.
- In case of exposure to different noise intensity levels of over 90 decibels:
 - (1) For intermittent periods during a shift, the result must not exceed:

$$\frac{A_1}{B_1} + \frac{A_2}{B_2} + \dots$$
 over the integer one

whereas:

- A** the period of exposure to a specific level of noise (hour).
- B** the permissible period of exposure at the same noise level (hour)

In case of exposure to intermittent noise emanating from sledgehammers: Depends on the exposure period (number of impacts during the daily shift) according to noise intensity as per the following table:

Table (6) Noise intensity

Noise intensity (Decibel)	Number of permissible impacts during the daily working hours
135	300
130	1000
125	3000
120	10000
115	30000

Noise issuing from sledgehammers shall be considered intermittent if the period between impacts is one second or more. If the period is less, the noise shall be considered continuous and subject to the preceding four items.

Table (7): The maximum permissible limit for noise intensity in the different areas

TYPE OF AREA	PERMISSIBLE LIMIT FOR NOISE INTENSITY DECIBEL (A)	
	Day from 7:00 am to 10:00 pm	Night from 10:00 pm to 7:00 am
Commercial, administrative and downtown areas	50	40
Residential areas in which can be found some workshops or commercial establishments or which are located on a main road	55	45
Residential areas in the governorate	60	50
Residential suburbs with low traffic	65	55
Residential rural areas, hospitals and gardens	70	60
Industrial areas (heavy industries)	70	70

Day from 7 a.m. to 10 p.m
Night from 10 p.m. to 7 a.m

Acceptable levels of noise has been amended in Implementing regulation by Prime Minister's Decree No. 1095 for 2011 as shown in the following pages.

الحدود المسموح بها لمستوى الصوت ومدة التعرض الآمن له
جدول رقم (١) : الحدود المسموح بها لمستويات الضوضاء داخل أماكن العمل
والأماكن المغلقة :

م	تحدد نوع المكان والنشاط	الحد الأقصى المقترح لمستوى الضوضاء المكافئة ذي سبيل Leq	مدة التعرض (ساعة)
١	(أ) أماكن العمل (الورش والمصانع) وما شابه ذلك ذات وردية حتى ٨ ساعات (للمنشآت التي تم ترخيصها قبل ٢٠١١)	٩٠	٨
	(ب) أماكن العمل (الورش والمصانع) وما شابه ذلك ذات وردية حتى ٨ ساعات (للمنشآت التي يتم ترخيصها بدءاً من عام ٢٠١١)	٨٥	٨
٢	قاعات الأفراح والاحتفالات المغلقة (بشرط ألا يتجاوز هذا المستوى حدود القاعة) .	٩٥	٤
٣	المكاتب الإدارية - حجرات العمل لوحدة الحاسب الآلي أو ما شابه ذلك	٦٥	-
٤	حجرات العمل للأنشطة التي تتطلب تركيز ذهني روتيني - الساحات العامة للبنوك - حجرات التحكم في الأنشطة الصناعية - المطاعم والكافيتريات	٦٠	-
٥	المستشفيات والعيادات الطبية، المكتبات العامة، المتاحف، مكاتب البريد، قاعات المحاكم، المساجد ودور العبادة.	٤٥	-
٦	الجامعات والمدارس والمحاضرات والمعاهد وما في حكمها	٤٠	-
	الملاعب ومساحات المساتي التعليمية	٥٥	-
٧	المباني السكنية - الفنادق وما في حكمها	٥٠	-
	داخل غرف المعيشة	٣٥	-
	داخل غرف النوم		-

٧٨ الوقائع المصرية - العدد ١٩٩ (تابع) في ٢٨ أغسطس سنة ٢٠١١

بالنسبة إلى البند رقم ١ (أ، ب) تقل مدة التعرض إلى النصف مع زيادة مستوى الضوضاء بمقدار ٣ ديسيبل d B (A) لعدم التأثير على حاسة السمع مع ارتداء سدادات الأذن المناسبة .

يجب ألا يتجاوز مستوى الضوضاء اللحظي خلال فترة العمل ١٣٥ ديسيبل .

يتم قياس الضوضاء داخل أماكن العمل والأماكن المغلقة بمستوى L_{Aeq} طبقاً للمواصفات الدولية (Parts ١ & ٢) /ISO ١٩٩٦ /ISO ٩٦١٢ أو المواصفات المصرية رقم ٢٨٢٦ الجزئين الأول والثاني، ورقم ٥٥٢٥ الصادرة في هذا الشأن.

مستوى الضوضاء المكافئة L_{Aeq} هو متوسط الضغط الصوتي المكافئ عند مستوى القياس (A) خلال فترة زمنية محددة، ويعبر عنها بالديسيبل .

جدول رقم (٢) : الحد الأقصى المسموح به للضوضاء المتقطعة والصادرة من المطارق الثقيلة

عدد الطرقات المسموح بها خلال فترة العمل اليومي	ذروة مستوى الضغط الصوتي (ديسيبل) L_{Cpeak}
٣٠٠	١٣٥
١٠٠٠	١٣٠
٢٠٠٠	١٢٥
١٠٠٠٠	١٢٠
٣٠٠٠٠	١١٥

تترقف مدة التعرض للضوضاء المتقطعة على مستوى الضوضاء طبقاً للجدول السابق (عدد الطرقات خلال الوردية اليومية) .

تعتبر الضوضاء الصادرة من المطارق الثقيلة متقطعة إذا كانت الفترة بين كل طرقة والتي تليها ١ ثانية أو أكثر. أما إذا كانت الفترة أقل من ذلك فتعتبر ضوضاء مستمرة ويطبق عليها ما جاء في جدول رقم (١) .

7.3 lightness

Intensity of Illumination Level was measured by Lux meter, and all results were compared to quality limits of Egyptian law as shown in table (8).

Table (8): safe levels of lighting intensity in industrial processes and work offices.

Type of Work	Luminance	
	Candle / foot ²	Lux
A) Industrial Processes		
Work, which doesn't require accuracy in details, such as handling of large materials or sorting parcels.	20	215
Work, which require medium accuracy in details such as assembling large machinery Parts, grinding grains, tools stores and tasks which are necessary for this work.	30	323
Work which require accurate details such as assembling middle manufactures or working on large -scale instruments	50	538
Work which require high accuracy such as assembling of very small manufactures, polishing material, or work on mid-sized machines	100	1076
Work which require very high accuracy such as examining and repairing watches and jewelry, sorting out tiny materials, paint work, fine turnings and similar works.	200	2152
B) Office Work		
Roads, elevators and ladders	20	215
Normal office work such as keeping books and files	30	323
Office work such as reading, writing or working on machinery written and calculator or lighting panels posters and ads	70	753
Drawing and manual transcription and accurate reading and similar works.	100	1076
Design work, engineering drawing and similar works.	150	1614

* Lighting ratio is measured at the level of the surface of the work according to the conditions of each work.

7.4 Organic & Inorganic Compounds

TIGER handheld VOC detector is an intrinsically safe portable gas detector, designed for the detection of some gases such as (TVOC's, Xylen, Butanol, ..etc) and others hydrocarbon fuels, solvents, semi-conductor gases using photo ionization detector PID. Specific gases are detectable dependent on their photo ionization potentials instrumental components and programmed data. A typical range of detectable gases is provided in the technical specifications. A small internal pump draws gas through the Photo Check probe and through a photo ionization detector (PID) cell. Ultra violet (UV) light from the photec lamp penetrates and converts some of the gas within PID cell into positive and negative ions. These are then separated electrically within the cell into a detectable current, which is particularly large for hydrocarbon gases present. The photo-ionization current is amplified and scaled for display as a concentration, either ppb or ppm or mg/m³ units for a specific target gas and photec lamp combination.

7.5 Stack Gas Emissions

SENSONIC 2000 were used to determine the quality of stack gas emissions by measuring concentrations of Carbon Monoxide, Nitrogen Oxides, Sulfur Oxides and other parameters and then comparing these concentrations by AQLs in the Egyptian Environmental Law for Power Generating Units as shown in table(9).

Table (9) Air Quality Limits for different pollutants in stack emissions of Generators

Fuel Type	Maximum limit of emissions (mg/m ³)			
	TSP Total Suspended Particulates	CO Carbon Monoxide	SO ₂ Sulfur Dioxide	NO _x Nitrogen Oxides
Natural Gas	50	150	100	600
Diesel	100	250	400	600

8. Results for Air Pollution Measurements

8.1 Total Suspended Particulate (TSP)

Levels of Total Suspended Particulate (TSP) measured at 5 sites inside the working environment of October 6 University. Results ranged between 0.039 and 0.106 mg/m³ as shown in Table (10) and figure (4). Air Quality Limit for air pollutants by Law 4/1994, which modified to Law 9/2009, is also present in table (3). It is important to mention that all measured sites recorded levels lower than AQL (10 mg/m³).

Table (10): Levels of Air Pollutants (TSP) at various sites inside October 6 University -6th of October city – Giza Government, October, 2022.

Site No.	Site Description	Parameters	Air Quality Limit AQL	Average TSP	Avg/ AQL %
D.01	الدور الارضي	TSP (Working Environment)	10 mg/m ³	0.069	0.694
D.02	مبنى كلية التمريض الدور الاول			0.055	0.550
D.03	الدور الثاني			0.045	0.447
D.04	امام المبنى			0.106	1.057
D.05	Garden (طريق الكباش)			0.039	0.385

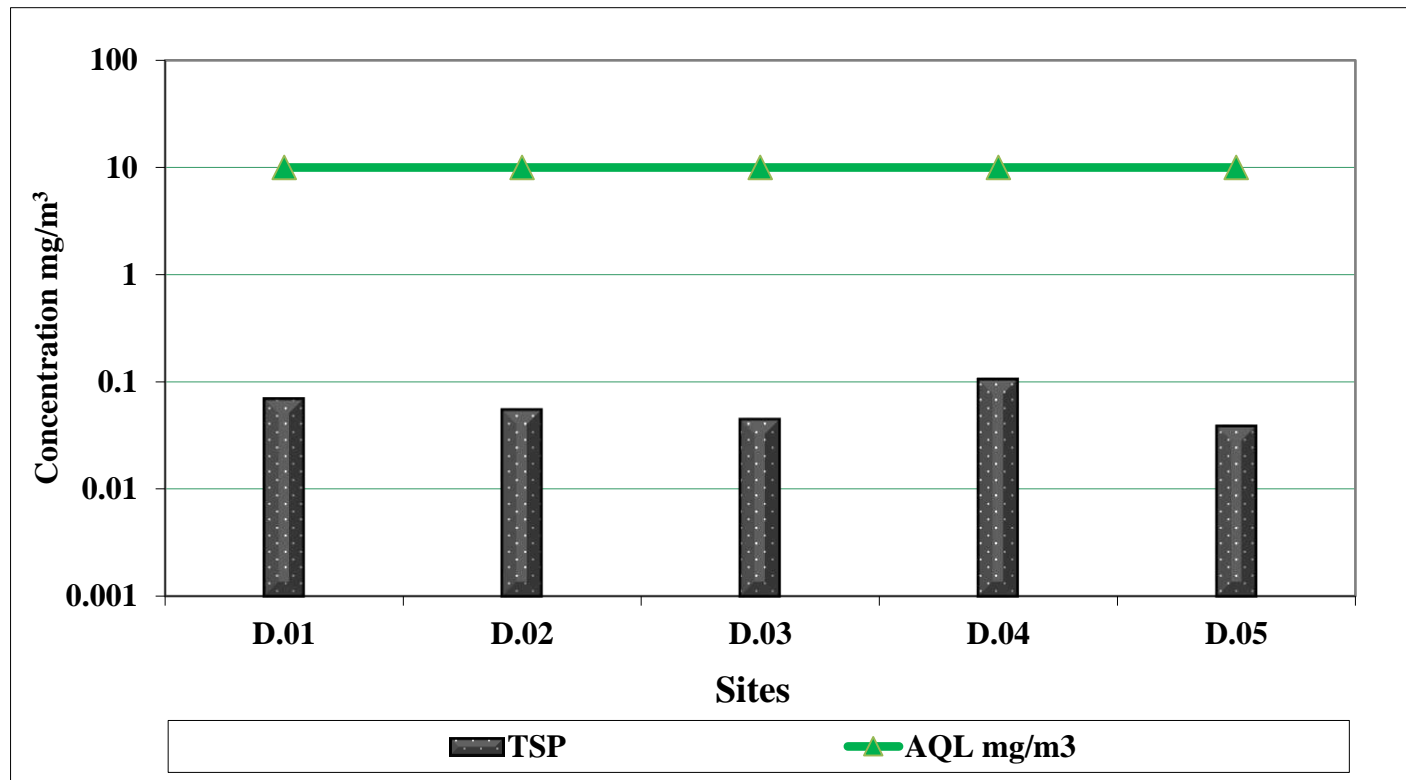


Figure (5): Levels of Air Pollutants (TSP) at various sites inside October 6 University -6th of October city – Giza Government, October, 2022.

8.2 Particulate Matter Less Than 10 Micrometer (PM₁₀)

Levels of PM₁₀ measured at 5 sites inside the working environment of October 6 University. Results ranged between 0.018 and 0.042 mg/m³ as shown in Table (11) and Figure (5). Air Quality Limit for air pollutants by Law 4/1994, which modified to Law 9/2009, is also presented in Table (3). It is important to mention that all measured sites recorded levels lower than AQL (3 mg/m³).

Table (11): Levels of Air Pollutants (PM₁₀) at various sites inside October 6 University -6th of October city – Giza Government, October, 2022.

Site No.	Site Description		Parameters	Air Quality Limit AQL	Average PM ₁₀	Avg/ AQL %
P.01	مبنى كلية التمريض	الدور الارضي	PM ₁₀ (Working Environment)	3 mg/m ³	0.028	0.925
P.02		الدور الاول			0.022	0.733
P.03		الدور الثاني			0.018	0.596
P.04		امام المبني			0.042	1.410
P.05	Garden (طريق الكباش)				0.015	0.513

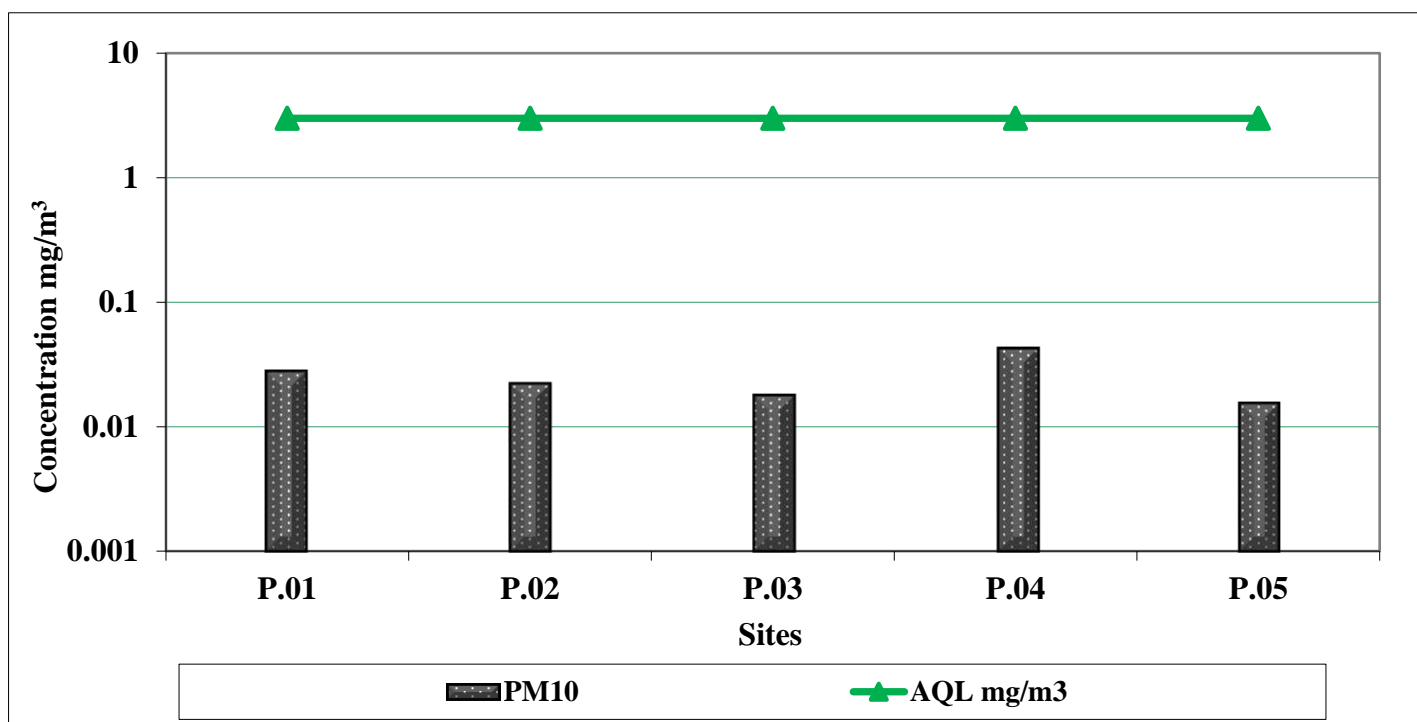


Figure (6): Levels of Air Pollutants (PM₁₀) at various sites inside October 6 University -6th of October city – Giza Government, October, 2022.

8.3. Noise Level

Noise Levels monitored in the morning during lectures and sessions at 5 selected sites as shown in table (12) and figure (6). These sites represent the working environment of **October 6 University**. Results were compared to allowable levels established by law 4/94, which modified to law 9 for 2009 and labor law No 12/2003. Results indicated that **all** sites within limits **except 3** sites exceeds the allowable levels as shown in table (12). Although without students the result would decrease and would be (45, 48, 47, 50, 52 dB). Tables (4, 6, and 7) show the permissible levels for noise. The law gave the time exposure as shown in table (5). In case of using earplugs, (decrease from 10-15 dB).

Table (12): Noise Levels (dB) at various sites inside October 6 University -6th of October city – Giza Government, October, 2022.

Site No.	Site Description		Noise Levels dB				Allowable levels according to law	Exposure time according to law (Hrs.)		Actual Exposure Time (Hrs.)	Using ear plugs decrease 15 dB
			Range		Average	Average (In case of The absence Of students)		Environmental law 4/94	Labor Law No. 12 of 2003		
			Max.	Min.							
N.01	الدور الارضي		56.8	49.7	52.3	45	55	8	8	4	37.3
N.02	مبنى كلية التمريض		62.3	55.4	58.9	48		8	8	4	43.9
N.03	الدور الثاني		51.3	47.5	49.0	47		8	8	4	34.0
N.04	امام المبنى		70.9	63.3	67.4	50		8	8	4	52.4
N.05	Garden (طريق الكباش)		61.7	55.5	59.3	52		8	8	4	44.3

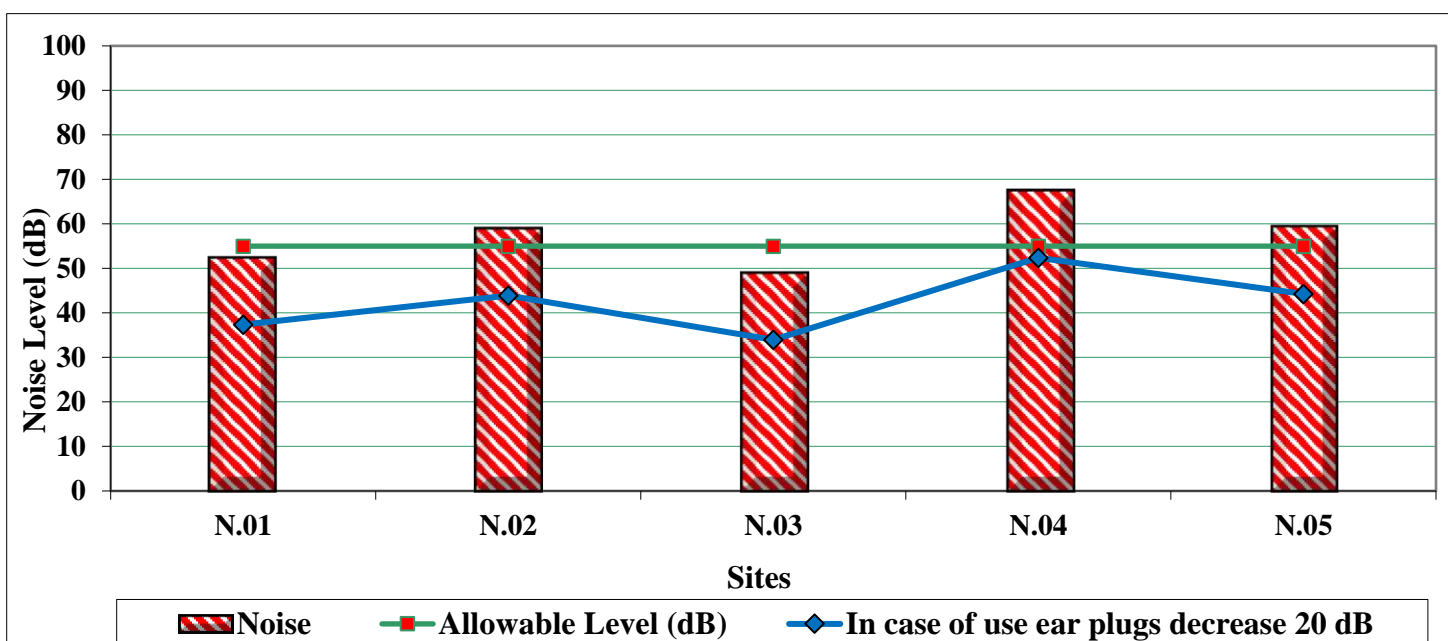


Figure (7): Noise Levels (dB) at various sites inside October 6 University -6th of October city – Giza Government, October, 2022.

8.4 Intensity of Illumination

Intensity of Illumination Levels measured at 3 sites by Lux meter in different sites inside working environment. Table (13) shows results of illumination measurements. The results indicated that **all** sites within allowable levels.

Table (13): The Intensity of Illumination Levels (Lux) at various sites inside October 6 University -6th of October city – Giza Government, October, 2022.

Site No.	Site Description		Illumination Intensity (Lux)			Permissible Level (Lux)
			Range		Average	
			Max.	Min.		
L.01	مبنى كلية التمريض	الدور الارضي	490	208	351	215
L.02		الدور الاول	1152	259	620	
L.03		الدور الثاني	746	392	607	

8.5. Organic and Inorganic Compounds:

8.5.1 Volatile Organic Compounds:

Total Volatile Organic Compounds (TVOC's) measured in 5 sites as shown in table (14) and figure (7). Results indicated that **all** sites within acceptable limits.

Table (14): Total Volatile Organic Compounds (TVOC's) at various sites inside October 6 University -6th of October city – Giza Government, October, 2022.

Site No.	Site Description		VOCs	Unit	Range		Average	Permissible Levels
					Max.	Min.		
V.01	مبنى كلية التمريض	الدور الارضي	TVOC`S	mg/m ³	0.126	0.106	0.114	50
V.02		الدور الاول			0.126	0.036	0.072	
V.03		الدور الثاني			0.020	0.004	0.012	
V.04		امام المبنى			0.024	0.004	0.013	
V.05	Garden (طريق الكباش)				1.485	1.391	1.430	

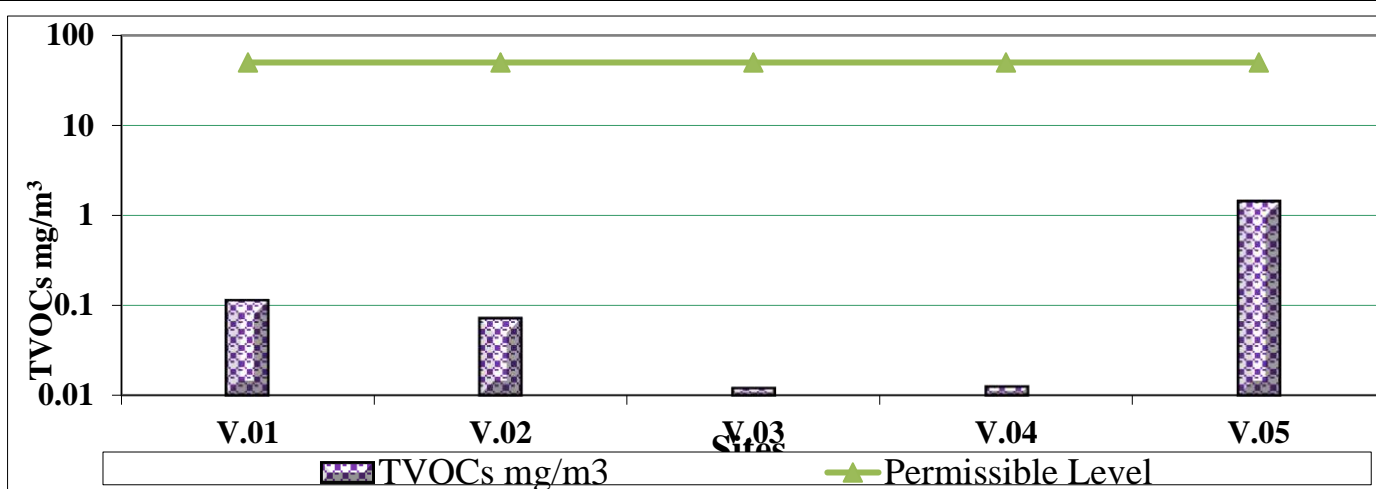


Figure (8): Total Volatile Organic Compounds (TVOC's) at various sites inside October 6 University -6th of October city – Giza Government, October, 2022.

8.5.2 Sulfur Dioxide (SO₂):

Sulfur Dioxide concentrations were measured at 5 sites inside the working environment as shown in table (15) and figure (8). It is important to mention that the **measured site recorded levels within the acceptable limit according to** Law No. 4 of 94 and its amended regulations by Resolution No. 1741 of 1995 and its amendments to Law No. 9 of 2009 and its Regulations No. 338 of 1995 and its amendments by Resolution No. 1741 of 2005 and Resolution No. 1095 of 2011 and Resolution No. 710 of 2012 and Labor Law No. 12 of 2003.

Table (15): Concentration of Sulfur Dioxide October 6 University -6th of October city – Giza Government, October, 2022.

Site No.	Site Description		SO ₂	Unit	Range		Average	Permissible Levels
					Max.	Min.		
S.01	مبنى كلية التمريض	الدور الارضي	SO ₂	mg/m ³	0.107	0.086	0.097	2
S.02		الدور الاول			0.101	0.047	0.065	
S.03		الدور الثاني			0.036	0.002	0.016	
S.04		امام المبني			0.009	0.002	0.005	
S.05	Garden (طريق الكباش)				1.158	1.095	1.138	

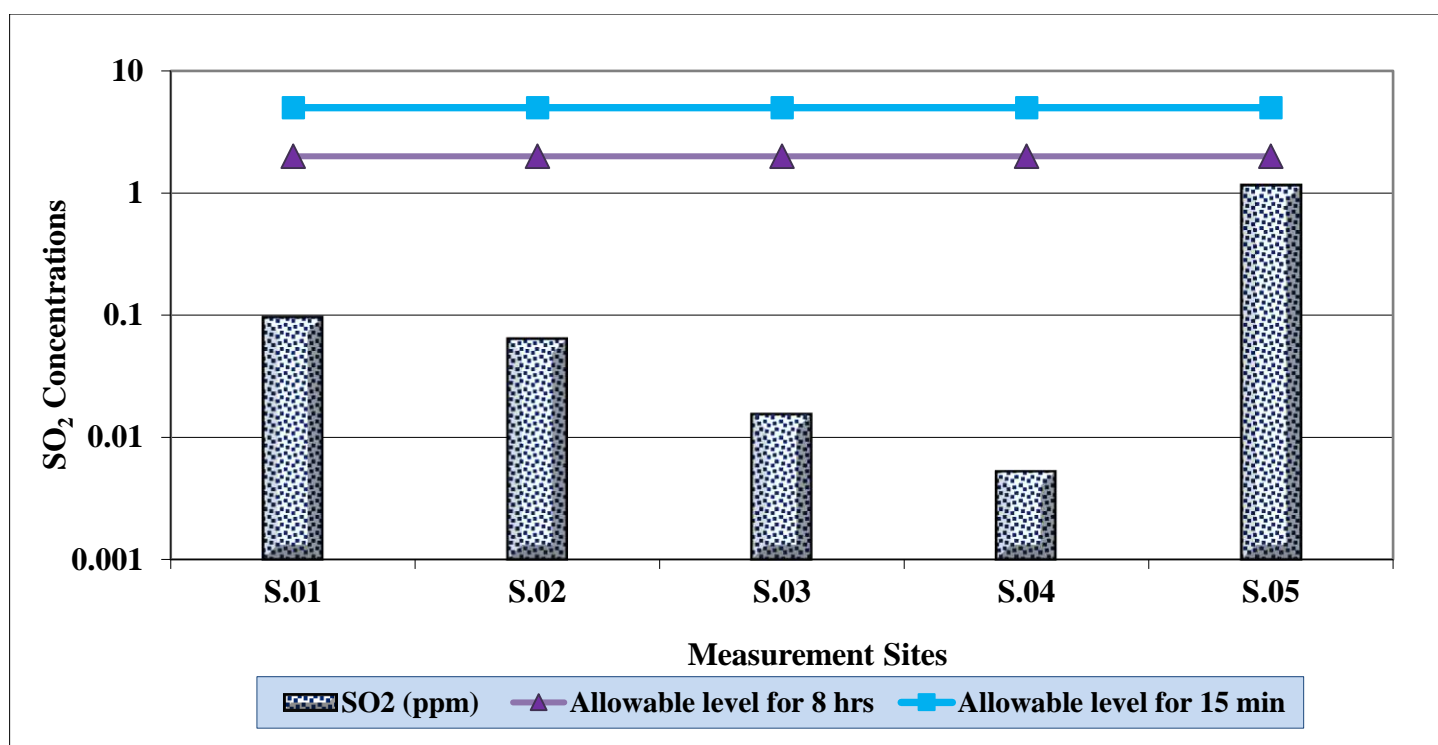


Figure (9): Sulfur Dioxide (SO₂) at various sites inside October 6 University -6th of October city – Giza Government, October, 2022.

8.5.3. Nitrogen Dioxide:

Nitrogen Dioxide have been measured in 5 sites as shown in table (16) and figure (9). The Air Quality Limit (AQL) for Nitrogen Dioxide gas shown in table (16). It is important to mention that **all measured sites were recorded levels within the acceptable limit according to Law No. 4 of 94 and its amended regulations by Resolution No. 1741 of 1995 and its amendments to Law No. 9 of 2009 and its Regulations No. 338 of 1995 and its amendments by Resolution No. 1741 of 2005 and Resolution No. 1095 of 2011 and Resolution No. 710 of 2012 and Labor Law No. 12 of 2003.**

Table (16): Concentration of Nitrogen Dioxide October 6 University -6th of October city – Giza Government, October, 2022.

Site No.	Site Description		NO ₂	Unit	Range		Average	Permissible Levels
					Max.	Min.		
N.01	مبنى كلية التمريض	الدور الارضي	NO ₂	mg/m ³	0.188	0.081	0.119	3
N.02		الدور الاول			0.075	0.007	0.030	
N.03		الدور الثاني			0.092	0.017	0.044	
N.04		امام المبنى			0.057	0.002	0.013	
N.05	Garden (طريق الكباش)				1.422	0.994	1.079	

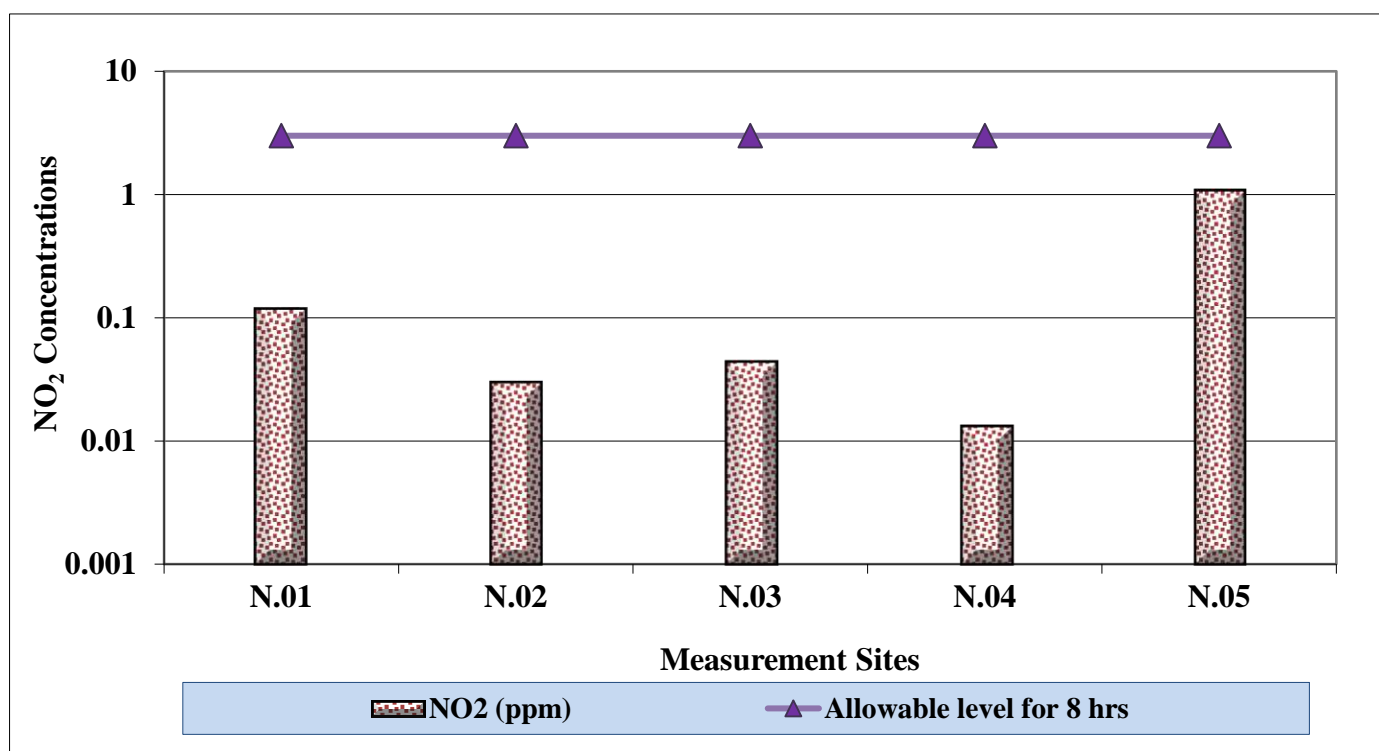


Figure (10): Nitrogen Dioxide (NO₂) at various sites inside October 6 University -6th of October city – Giza Government, October, 2022.

8.5.4. Carbon Dioxide:

Carbon Dioxide concentrations measured in 5 sites as shown in table (17) and figure (10). It is important to mention that the measured sites recorded levels within the acceptable limits (5000 ppm) according to Law No. 4 of 94 and its amended regulations by Resolution No. 1741 of 1995 and its amendments to Law No. 9 of 2009 and its Regulations No. 338 of 1995 and its amendments by Resolution No. 1741 of 2005 and Resolution No. 1095 of 2011 and Resolution No. 710 of 2012 and Labor Law No. 12 of 2003.

Table (17): Concentration of Nitrogen Dioxide October 6 University -6th of October city – Giza Government, October, 2022.

Site No.	Site Description		CO ₂	Unit	Range		Average	Permissible Levels
					Max.	Min.		
C.01	مبنى كلية التمريض	الدور الارضي	CO ₂	mg/m ³	246	162	201	5000
C.02		الدور الاول			360	273	317	
C.03		الدور الثاني			471	367	409	
C.04		امام المبنى			422	410	416	
C.05	Garden (طريق الكباش)				419	413	416	

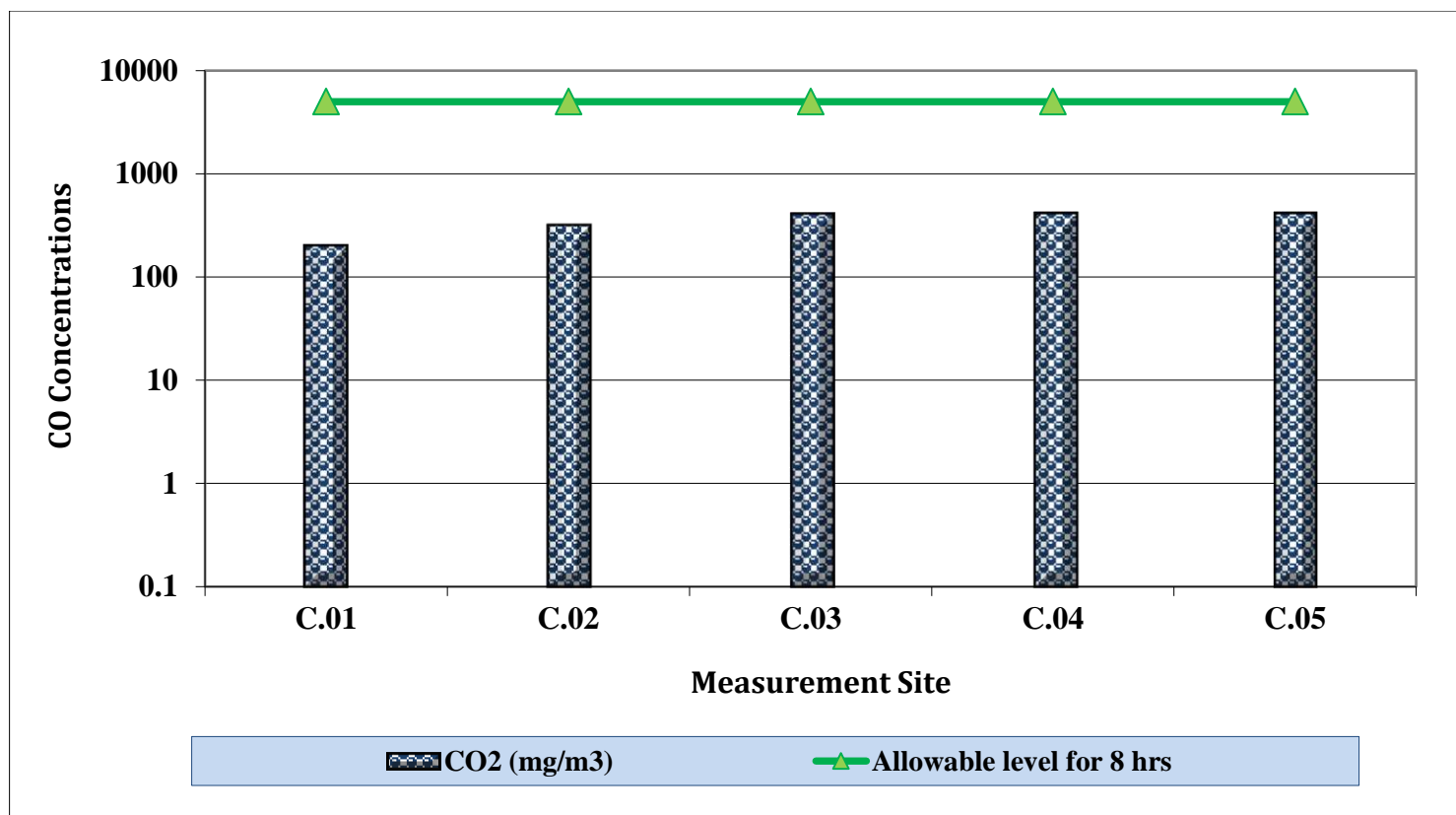


Figure (11): Carbon Dioxide (CO₂) at various sites inside October 6 University -6th of October city – Giza Government, October, 2022.

8.6 Stack Gas Emissions

Stack Gas Emissions were measured using SENSONIC 2000 for **Generator**, all parameters such as **CO**, **NO_x** and **SO₂** Concentrations were **lower** than AQL as shown in table (18) and Figure (11).

Table (18): Concentration of different Stack Gas Emissions for Generator inside October 6 University - 6th of October city – Giza Government, October, 2022.

Site No.	Site Description	T _{amb.} (°C)	T _{gas} (°C)	O ₂ (%)	CO ₂ (%)	CO mg/m ³	NO _x mg/m ³	SO _x mg/m ³
Air Quality Limit						250	600	400
G.01	Generator	124	33	18.15	2.06	214	489	6

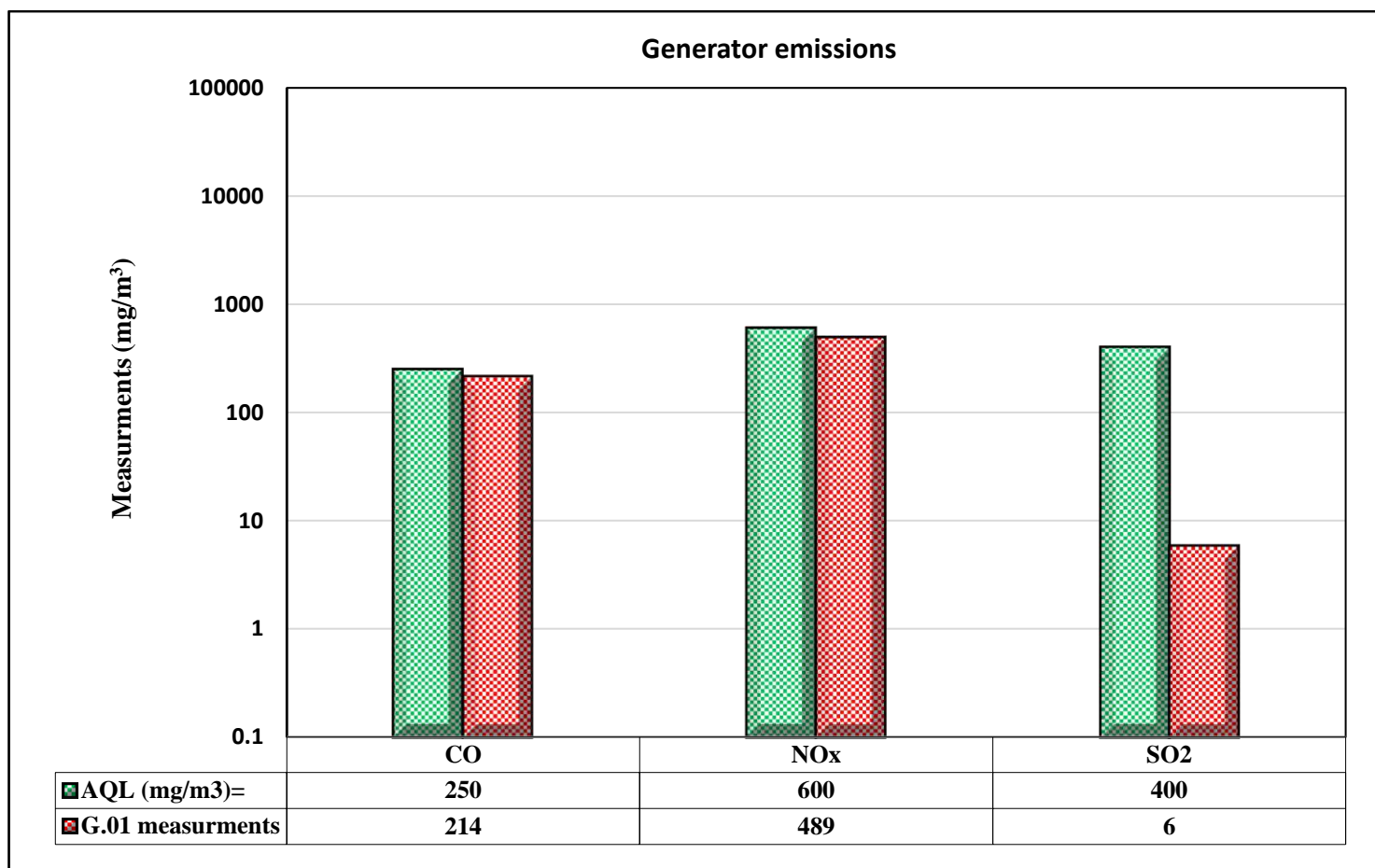


Figure (12): Concentration of different Stack Gas Emissions for Generator inside October 6 University - 6th of October city – Giza Government, October, 2022.

Health & Environmental Effects of Different Pollutants

I) Dust Emissions (TSP & PM ₁₀)	
Health Effects	<p>» Exposure to such particles can affect both your lungs and your heart. Numerous scientific studies have linked particle pollution exposure to a variety of problems, including: premature death in people with heart or lung disease, nonfatal heart attacks, irregular heartbeat, aggravated asthma, decreased lung function, increased respiratory symptoms, such as irritation of the airways, coughing or difficulty breathing.</p> <p>» People with heart or lung diseases, children, and older adults are the most likely to be affected by particle pollution exposure.</p>
Environmental Effects	<p>» Visibility impairment: PM is the main cause of reduced visibility (haze).</p> <p>» Environmental damage: PM can be carried over long distances by wind and then settle on ground or water. Depending on their chemical composition, the effects of this settling June include: making lakes and streams acidic, changing the nutrient balance in coastal waters and large river basins, depleting the nutrients in soil, damaging sensitive forests and farm crops, affecting the diversity of ecosystems, contributing to acid rain effects.</p> <p>» Materials damage: PM can stain and damage stone and other materials, including culturally important objects such as statues and monuments.</p>
II) Noise	
Health Effects	<p>» Headaches and migraines are the most common short-term effect of noise pollution. Constant annoyance of noises can often lead to painful headaches, which can make focusing difficult for some people. In the case of migraines, people June also experience sensitivity to light or nausea as well.</p> <p>» Stress is a potential short- and long-term effect of noise pollution.</p> <p>» Hearing loss: The loss of hearing occurs when structures of the inner ear are damaged, which could occur once noises reach or exceed about 85 decibels.</p> <p>» Loss of sleep (for neighbors of noisy activities): noise pollution above 45 decibels wakes up most people, while light sleepers could be affected by noises at - Lower decibel levels. A loss of sleep can lead to a wide range of health conditions; including exhaustion, irritability, and loss of focus or even a weakened immune system.</p> <p>» Hypertension: Regular exposure to noise pollution has been shown to elevate blood pressure levels. That's could be due to the adrenaline of being annoyed or with stress associated with being interrupted in whatever a person is doing.</p> <p>» Stroke: This was especially more apparent in individuals over the age of 65.</p> <p>» Child development: Studies have shown association between slowed mental and/or physical development in children and living in homes near airports or other especially loud locations.</p>
Environmental Effects	<p>» Anthropogenic noise pollution is affecting a range of animals across multiple habitats.</p> <p>» Animals are altering their natural behaviors or relocating to avoid noisy areas.</p> <p>» Changes in animal behavior can have flow-on effects for whole ecosystems.</p>

III) Low Illumination

Health Effects

» Poor lighting can result in eye strain, fatigue and aching, which in turn is likely to lead to deterioration in performance, particularly if work relies on visual acuity
The most common complaints resulting from poor lighting are: **difficulty seeing document or screen, eyestrain, eye irritation, blurred vision, dry burning eyes, and Headaches.**

IV) Heat stress

Health Effects

» If the body cannot get rid of excess heat, it will store it. When this happens, the body's core temperature rises and the **heart rate increases**. As the body continues to store heat, the person begins to **lose concentration** and has difficulty focusing on a task, June become **irritable** or sick, and often **loses the desire to drink**. The next stage is most often **fainting** and even **death** if the person is not cooled down.

V) TVOCs

Health Effects

» **Health effects June include:** Eye, nose and throat irritation, Headaches, loss of coordination and nausea, Damage to liver, kidney and central nervous system, Some organics can cause cancer in animals; some are suspected or known to cause cancer in humans.
» **Key signs or symptoms associated with exposure to VOCs include:** conjunctival irritation, nose and throat discomfort, headache, allergic skin reaction, dyspnea, declines in serum cholinesterase levels, nausea, emesis, epistaxis, fatigue, dizziness, Eye and respiratory tract irritation, visual disorders and memory impairment.

VI) Stack Gas Emissions

A) Carbon Monoxide

Health Effects

» Breathing air with a high concentration of CO reduces the amount of oxygen that can be transported in the blood stream to critical organs like the heart and brain.
At very high levels, which are possible indoors or in other enclosed environments, CO can cause **dizziness, confusion, unconsciousness and death**.
» Very high levels of CO are not likely to occur outdoors. However, when CO levels are elevated outdoors, they can be of particular concern for people with some types of heart disease. These people already have a reduced ability for getting oxygenated blood to their hearts in situations where the heart needs more oxygen than usual. They are especially vulnerable to the effects of CO when exercising or under increased stress. In these situations, short-term exposure to elevated CO June result in reduced oxygen to the heart accompanied by chest pain also known as angina.

B) Sulfur Dioxide

Health Effects	<p>» Short-term exposures to SO₂ can harm the human respiratory system and make breathing difficult. Children, the elderly, and those who suffer from asthma are particularly sensitive to effects of SO₂.</p> <p>» SO₂ emissions that lead to high concentrations of SO₂ in the air generally also lead to the formation of other sulfur oxides (SO_x). SO_x can react with other compounds in the atmosphere to form small particles. These particles contribute to particulate matter (PM) pollution: particles June penetrate deeply into sensitive parts of the lungs and cause additional health problems.</p>
Environmental Effects	<p>» At high concentrations, gaseous SO_x can harm trees and plants by damaging foliage and decreasing growth.</p> <p>» SO₂ and other SO_x can contribute to acid rain which harms sensitive ecosystems .» SO₂ and other SO_x can react with other compounds in the atmosphere to form fine particles that reduce visibility (haze).</p>

C) Nitrogen Dioxide

Health Effects	<p>» Breathing air with a high concentration of NO₂ can irritate airways in the human respiratory system. Such exposures over short periods can aggravate respiratory diseases, particularly asthma, leading to respiratory symptoms (such as coughing, wheezing or difficulty breathing), hospital admissions and visits to emergency rooms.</p> <p>» Longer exposures to elevated concentrations of NO₂ June contribute to the development of asthma and potentially increase susceptibility to respiratory infections.</p> <p>» People with asthma, as well as children and the elderly are generally at greater risk for the health effects of NO₂.</p> <p>» NO₂ along with other NO_x reacts with other chemicals in the air to form both particulate matter and ozone. Both of these are also harmful when inhaled due to effects on the respiratory system.</p>
Environmental Effects	<p>» NO₂ and other NO_x interact with water, O₂ and other chemicals in the atmosphere to form acid rain which harms sensitive ecosystems.</p> <p>» The nitrate particles that result from NO_x make the air hazy and difficult to see though. This affects the many national parks that we visit for the view.</p> <p>» NO_x in the atmosphere contributes to nutrient pollution in coastal waters.</p>

◆ References:

- <https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm>
<https://www.symptomfind.com/health/causes-of-noise-pollution-and-its-effects-on-health/>
<https://www.science.org.au/curious/earth-environment/noise-pollution-and-environment>
<https://www.osha.gov/SLTC/heatstress/>
<https://www.epa.gov/co-pollution/basic-information-about-carbon-monoxide-co-outdoor-air-pollution#Effects>
<https://www.epa.gov/no2-pollution/basic-information-about-no2#Effects>
<https://www.epa.gov/so2-pollution/sulfur-dioxide-basics#effects>

CONCLUSION

- 1- Concentration of TSP and PM₁₀ recorded levels **lower** than AQL.
- 2- Noise Levels measured in **5** sites, **all** sites within allowable levels **except 3** sites exceeded the maximum allowable levels. Although without students the result would decrease and all sites would be within allowable levels .
- 3- Intensity of Illumination was measured in **3** sites, **all** sites within allowable levels.
- 4- Results of Total Volatile Organic Compounds indicated that **the all** sites **within** acceptable limits.
- 5- Results of Sulfur Dioxide indicated that **the all** sites **within** acceptable limits.
- 6- Results of Nitrogen Dioxide indicated that **the all** sites **within** acceptable limits.
- 7- Results of Carbon Dioxide indicated that **the all** sites **within** acceptable limits.
- 8- Generator emissions measured Concentrations of (NO_x & SO₂ & CO) was **lower** than AQL allowed by Law 4/1994 which modified to Law 9 of 2009.

RECOMMENDATION

- 1- Intensity of Illumination must be increased in all sites didn't reach to acceptable levels or close to it.
- 2- Periodical measurements must be done to ensure the continuation of the same level of performance.

الملخص العربي

قام الفريق البحثي بزيارة جامعة 6 أكتوبر بمدينة السادس من أكتوبر محافظة الجيزة وذلك لإجراء القياسات البيئية والتي شملت قياس الأثرية الكلية العالقة والجسيمات الصخرية الأقل من 10 ميكرون والضوضاء وشدة الاستضاءة وبعض الغازات العضوية المتطايرة وانبعاثات مدخنة المولد وذلك أثناء فترة العمل الصباحية في أكتوبر 2022. حيث انها من متطلبات Green Matrics

تصنيف جامعة UI GreenMetric العالمية هو مبادرة من Universitas Indonesia التي تم إطلاقها في عام 2010. كجزء من استراتيجيتها لرفع مكانتها الدولية ، استضافت الجامعة مؤتمراً دولياً حول تصنيفات الجامعات العالمية في 16 أبريل 2009. ودعت عدداً من خبراء في تصنيف الجامعات العالمية مثل Isidro Aguillo (Webometrics) و Angela Yung-Chi Hou (HEEACT) و Alex Usher (السياسة التعليمية الكندية). كان واضحاً من المناقشات أن المعايير الحالية المستخدمة في تصنيف الجامعات لا تمنح الفضل لأولئك الذين يبذلون جهوداً لتقليل انبعاثات الكربون الخاصة بهم وبالتالي المساعدة في مكافحة تغير المناخ العالمي. كان مؤسسو UI GreenMetric على دراية بأن عدداً من أفضل الجامعات العالمية ، على سبيل المثال هارفارد وشيكاغو وكوبنهاجن ، يتخذون خطوات لإدارة وتحسين استدامتها. هناك أيضاً جهود تعاونية بين مجموعات الجامعات. يوجد نظام الدرجات الذي يتضمن معلومات حول الاستدامة في 300 جامعة تحت عنوان بطاقة التقرير الخضراء للولايات المتحدة. هذا ممتاز ، ومع ذلك ، يتم إعطاء النتائج من حيث الدرجة (A إلى F) بدلاً من الترتيب وعدد الجامعات المدرجة مقيد نسبياً. رأى مؤسسو UI GreenMetric الحاجة إلى نظام موحد من شأنه أن يكون مناسباً لجذب دعم الآلاف من جامعات العالم وحيث تستند النتائج إلى درجة عددية تسمح بالتصنيف بحيث يمكن إجراء مقارنات سريعة بينهم وفقاً للمعايير من التزامهم بمعالجة مشاكل الاستدامة والأثر البيئي.

وقد أوضحت النتائج الآتي:

1. الأثرية الكلية العالقة والجسيمات الصخرية الأقل من 10 ميكرومتر كانت أقل من الحدود المسموح بها في كل أماكن القياس.
2. تم قياس الضوضاء في 5 مواقع كانت الضوضاء أقل من الحدود المسموح بها في كل المواقع **ماعدا 3 مواقع تخطت الحدود** المسموح بها من قبل قانون 4 لسنة 1994 والمعدل بالقانون رقم 9 لسنة 2009 وقانون العمل 12 لسنة 2003. وكانت النتائج خلال عدم وجود الطلاب في الحدود المسموح بها .
3. تم قياس شدة الاستضاءة في 3 مواقع، كانوا في الحدود المسموح بها قبل قانون العمل رقم 12 لسنة 2003.
4. تم قياس الغازات العضوية الكلية المتطايرة في 5 مواقع وكانا أقل من الحدود المسموح بها من قبل قانون 4 لسنة 1994 والمعدل بقانون 9 لسنة 2009.
5. تم قياس غاز ثاني أكسيد الكبريت في 5 مواقع وكانا أقل من الحدود المسموح بها من قبل قانون 4 لسنة 1994 والمعدل بقانون 9 لسنة 2009.
6. تم قياس غاز ثاني أكسيد النيتروجين في 5 مواقع وكانا أقل من الحدود المسموح بها من قبل قانون 4 لسنة 1994 والمعدل بقانون 9 لسنة 2009.
7. تم قياس غاز ثاني أكسيد الكربون في 5 مواقع وكانا أقل من الحدود المسموح بها من قبل قانون 4 لسنة 1994 والمعدل بقانون 9 لسنة 2009.
8. تم قياس انبعاثات مدخنة المولد وكانت النتائج في الحدود المسموح بها طبقاً لقانون 4 لسنة 1994 والمعدل بالقانون رقم 9 لسنة 2009.

ومما سبق نوصي بـ:

1. زيادة مصادر الإضاءة وإصلاح التالف بالمناطق التي لم تصل للحدود المقبولة وفقاً لقانون العمل أو القريبة منها.
2. إجراء القياسات البيئية بشكل دوري للاطمئنان على عدم تعدي الحدود المسموح بها من قبل القانون.

ملحوظة:

المرجعيات الخاصة بالقياسات تمت وفق قانون البيئة المصري رقم 4 لسنة 1994 والمعدل بقانون رقم 9 لسنة 2009 وقرار رئيس الوزراء بتعديل اللاحة التنفيذية رقم 1095 لسنة 2011م وقانون العمل لسنة 2003م.

بناء علي النتائج السابقة نوصي بالآتي:



الإزالة Elimination

- إزالة أي كشافات متهاكة أو مكسورة
- إزالة المولدات في حالة انتهاء عمرها الافتراضي أو لم تستجيب لعملية الصيانة

الاستبدال Substitution

- استبدال الكشافات التالفة بأخرى جديدة (إن وجد).
- استبدال أي ماكينات أو آلات باخرى جديده ولها مواصفات بمعايير لتقليل مستويات الضوضاء والاهتزازات (في حالة تخطى الحدود المسموح بها)
- استبدال المولدات في حالة انتهاء عمرها الافتراضي أو لم تستجيب لعملية الصيانة

الضوابط الهندسية Engineering Controls

- مراعاة توزيع الإضاءة وكذلك الارتفاعات وعمل فتحات للاستفادة من الإضاءة الطبيعية
- عزل وصيانة الماكينات لتقليل الضوضاء الناتجة عنها.

الضوابط الإدارية Administrative Controls

- مراعاة فترة العمل والراحة والتبادل المستمر بين العاملين لتخفيف الاخطار المحتملة من خلال زمن التعرض وعمل مناوبة حسب مواقع وطبيعة العمل.
- القيام بدورات تدريبية لرفع الوعي البيئي.
- صيانة للمولدات

مهمات الحماية الشخصية PPE

- التزام العاملين بارتداء أدوات الحماية الشخصية في حالة تعدي القياسات الحدود المسموح بها كلاً حسب موقعه

Photos



Calibration Certificates



Cert. #: AC1022M005

CALIBRATION CERTIFICATE

Customer Information

Name : AMATEC Consulting Foundation for Environmental & Scientific Assistance
Address : Factories Azza Street Somouha. Tower – High
Class 2 – From 4. Alexandria Egypt.
Email : Ashraf_zahran@amatec-az.com
Tel : 03 5469509
Fax : 03 5469509

Unit Under Test Information:

Nomen. : Dust Detective
Model : Cel – 712
Serial No. : 0840607
Manufacturer : SKC
Range : 0 : 100 mg/m³
Accuracy : ± 2 %
Division : 0.001 mg/m³


Process Information:

Method Used : OP 04-10 TSP
Location : On Site
Temp. : 20 °C
Humidity : 60 %
Cal. Date : 2-10-2022
Due Date : 2-10-2024
Cal. Specialist : Micheal
Signature : 

Standard Used:

Nomenclature	P/N	S/N	Cal. Due
Dust track	DVM401	1982536	8-3-2023

- * This certificate shall not be reproduced except in full, without written approval from Africal.
- * Africal certifies that the above UUT meets or exceeds all specifications (unless otherwise noted).
- * UUT has been calibrated using measurement standards traceable to SI units.
- * The Calibration results are listed in the attached data sheet(s).

APPROVED BY Sign.: 
Eng. Micheal Zaky Khalil
Africal General Manager

DATE : 9-Oct-22



AC AFRICAL

الأفريقية للمعايرة

Cert. #: AC1022SO003

CALIBRATION CERTIFICATE

Customer Information

Name : AMATEC Consulting Foundation for Environmental & Scientific Assistance
Address : 78 Sidi Gabber St.- Cleopatra El Hamamat | Tel : 03 5469509
Email : Ashraf_zahran@amatec-az.com | Fax : 03 5469509

Unit Under Test Information:

Nomen. : Mini Sound Level meter | Manufacturer : UNI - T
Model : UT 353 | Range : 30 : 130 dB
Serial No. : 110400203481X | Accuracy : ± 2 dB
Division : 0.1 dB

Process Information:

Method Used : Comm. Data | Cal. Date : 2-10-2022
Location : Lab. | Due Date : 2-10-2024
Temp. : 20 °C | Cal. Specialist : Sameh
Humidity : 40 % | Signature : 

Standard Used:

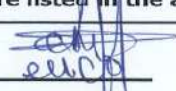
Nomenclature	P/N	S/N	Cal. Due
Environment Meter	DVM401	07043843	25-9-2023

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* Africal certifies that the above UUT meets or exceeds all specifications (unless otherwise noted).

* UUT has been calibrated using measurement standards traceable to SI units.

* The Calibration results are listed in the attached data sheet(s).

APPROVED BY Sign.: 
Eng. Micheal Zaky Khalil
Africal General Manager

DATE : 3-Oct-22



Add: 1045 Zahraa of Nasr city, Cairo

Page 1 of 2

Tel./Fax: 0020224127065

AC AFRICAL

الأفريقية للمعايرة

Cert. #: AC1022LU001

CALIBRATION CERTIFICATE

Customer Information

Name : AMATEC Consulting Foundation for Environmental & Scientific Assistance
Address : Factories Azza Street Somouha. Tower – High
Class 2 – From 4. Alexandria Egypt. Tel : 03 5469509
Email : Ashraf_zahran@amatec-az.com Fax : 03 5469509

Unit Under Test Information:

Nomen. : Digital Lux meter Manufacturer : Total™ meters
Model : 710113 Range : 0 : 20000 Lux
Serial No. : S378886 Accuracy : ± 2 % reading
ID/Code : Division : 1,10, 100 lux

Process Information:

Method Used : Comm. Data Cal. Date : 2-10-2022
Location : On Site Due Date : 2-10-2024
Temp. : 20 °C Cal. Specialist : Sameh
Humidity : 60 % Signature : 

Standard Used:

Nomenclature	P/N	S/N	Cal. Due
Environment Meter	DVM401	07043843	25-9-2023

* This certificate shall not be reproduced except in full, without written approval from Africal.

* Africal certifies that the above UUT meets or exceeds all specifications (unless otherwise noted).

* UUT has been calibrated using measurement standards traceable to SI units.

* The Calibration results are listed in the attached data sheet(s).

APPROVED BY Sign.: 
Eng. Micheal Zaky Khalil
Africal General Manager

DATE : 3-Oct-22



AC AFRICAL

الأفريقية للمعايرة

Cert. #: AC1022M002

CALIBRATION CERTIFICATE

Customer Information

Name : AMATEC Consulting Foundation for Environmental & Scientific Assistance
Address : Factories Azza Street Somouha. Tower – High | Tel : 03 5469509
Email : Ashraf_zahran@amatec-az.com | Fax : 03 5469509

Unit Under Test Information:

Nomen. : Stack Gas Analyzer | Manufacturer : Madur
Model : Sensonic 2000 | Range : See attached page
Serial No. : 31006056 | Accuracy : See attached page
ID/Code : N/A | Division : N/A

Process Information:

Method Used : OP05-01
Location : Lab. | Cal. Date : 2-10-2022
Temp. : 20 °C | Due Date : 2-10-2024
Humidity : 40 % | Cal. Specialist : Sameh
Signature : 

Standard Used:

Nomenclature	P/N	S/N	Cal. Due
Stander Reference material	N/A	N/A	N/A

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- * The Calibration results are listed in the attached data sheet(s).

APPROVED BY Sign.: 
Eng. Micheal Zaky Khalil
Africal General Manager

DATE : 3-Oct-22



AC AFRICAL

الأفريقية للمعايرة

Cert. #: AC1022M003

CALIBRATION CERTIFICATE

Customer Information

Name : AMATEC Consulting Foundation for Environmental & Scientific Assistance
Address : Factories Azza Street Somouha. Tower – High | Tel : 03 5469509
Email : Ashraf_zahran@amatec-az.com | Fax : 03 5469509

Unit Under Test Information:

Nomen. : Tiger | Manufacturer : ION Science ltd
Model : 6000 | Range : See attached page
Serial No. : T-113479 | Accuracy : See attached page
ID/Code : | Division :

Process Information:

Method Used : Comm. Data | Cal. Date : 2-10-2022
Location : Lab. | Due Date : 2-10-2024
Temp. : 20 °C | Cal. Specialist : Micheal
Humidity : 40 % | Signature : 

Standard Used: Gas Analyzer

- * This certificate shall not be reproduced except in full, without written approval from Africal.
- * Africal certifies that the above UUT meets or exceeds all specifications (unless otherwise noted).
- * UUT has been calibrated using measurement standards traceable to SI units.
- * The Calibration results are listed in the attached data sheet(s).

APPROVED BY Sign.:  DATE : 3-Oct-22

Eng. Micheal Zakky Khalil
Africal General Manager



Accreditation certificate

