

AIR ENVIRONMENT REGULATIONS

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ENVIRONMENT DEPARTMENT

ENVIRONMENT, HEALTH AND SAFETY (EHS) DIVISION

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1.0 General

A clean air supply is essential to our own health and that of the environment. But since the industrial revolution, the quality of the air we breathe has deteriorated considerably – mainly as a result of human activities. Rising industrial production and the dramatic rise in traffic on our roads all contribute to air pollution in our towns and cities which, in turn, can lead to serious health problems.

Protection of the air environment is by source control for which the Best Practicable Environmental Option (BPEO – see relevant Environment Guideline) must be used, firstly to prevent emissions to air and, secondly, to render harmless and inoffensive what cannot be prevented. When prevention has been used to the practicable limit, a standard is needed to measure the minimum acceptable result. Mass emission is an important parameter, but this is not easy to measure and we fall back on the measurement of concentration of pollutants in the exhaust gases. When measurements cannot be made from emissions, judgment has to be made by the naked eye, when there must be no significant visible emission. This is especially important for dust emissions. When the first part of BPEO has been achieved, i.e. prevention, the residual emission has to be rendered harmless and inoffensive and this is accomplished by use of proper control equipment and dispersion from suitably tall chimneys. Chimney calculations use complicated mathematical formulae, but these have been reduced to a few simple rules as shown where relevant in the text. A single source cannot be allowed to take up the whole of the permitted air quality at ground level, so the methods used by the Authority permit many multi sources to operate in the Free Zone without causing a hazard or nuisance.

2.0 Ambient Air Quality Criteria

The Authority has various objectives for the ambient air quality. A summary of these objectives is shown below in Table 1.1.

Table 1.1 – Ambient Air Quality Standards
(Air Pollutants Limits in the Ambient Air)

Substance	Symbol	Maximum Allowable Limits ($\mu\text{g} / \text{m}^3$)	Average Time
Sulfur Dioxide	SO ₂	350	1 hour
		150	24 hour
		50	1 year
Carbon Monoxide	CO	23 (mg)	1 hour
		10 (mg)	8 hour
Nitrogen Dioxide	NO ₂	290	1 hour
		110	24 hour
Ozone	O ₃	160	1 hour
		120	8 hour
Total Suspended Particles	TSP	230	24 hour
		90	1 year

Particulate Matter	PM ₁₀	300	1 hour
		150	24 hour
Lead	Pb	1	3 months
Benzene	C ₆ H ₆	50	1 hour
Fluoride	HF	3	24 hour
		0.5	3 months

3.0 Air Pollution Source Standards

See Table 1.2 given in following pages. For more pertinent details see relevant Guidelines.

4.0 Special Industries – Major Potential Offenders

There are certain industrial processes with an abnormally high potential for causing harm and distress to the local community, especially during breakdown, start-up and shutdown conditions when emissions to the air are unusually high. If a breakdown on a process results in the emission of black smoke, or of large quantities of inert dust, the result is not serious, although it may be a nuisance. On the other hand, if it results in the massive release of dangerous substances such as hydrogen sulfide, hydrochloric acid, sulfur oxides, nitrogen oxides, fluorides, etc. The resultant damage to health, vegetation, animals and materials of construction could be extremely serious. Therefore, special precautions have to be taken with use of cleaner fuel (having < 0.005% Sulfur Content), the design of the process, operation, maintenance, training of operators, supervision, keeping of spares, duplication of equipment, etc.

In order to take all practicable steps properly to control such processes, special requirements and standards of emissions, including monitoring, have to be specified. Guidelines for a number of selected industries operating under Ports, Customs and Free Zone Corporation (PCFC) / Dubai World (DW) Communities or which may be introduced in the future have been prepared. For example:

- Secondary Aluminum Works
- Cement Works
- Petroleum Works – Refineries
- Iron and Steel Works
- Chlorine and Hydrochloric Acid Works
- Large Boilers and Furnaces
- Chemical Fertilizer Works
- Ammonia Works
- Sulfuric Acid Works
- Lead Works
- Mineral Works
- Iron and Steel Works – Foundries

For more details of specific industry refer to pertinent Guidelines.

Table 1.2 – Source Emission Criteria
General: Stationary Sources
(Air Pollutant Emission Limits for Stationary Sources)

Substance	Symbol	Sources	Maximum Allowable Emission Limits (mg / Nm ³)
Visible Emissions		Combustion Sources Other Sources	Ringlemann 1 or 20% opacity or 250 None
Carbon Monoxide	CO	All sources	500
Nitrogen Oxides (expressed as Nitrogen Dioxide)	NO _x	Combustion Sources Material Producing Industries Other Sources	See Table 1.3 1500 200
Sulfur Dioxide	SO ₂	Combustion Sources Material Producing Industries Other Sources	500 2000 1000
Sulfur Trioxide including Sulfuric Acid Mist (expressed as Sulfur Trioxide)	SO ₃	Material Producing Industries Other Sources	150 50
Total Suspended Particles	TSP	Combustion Sources Cement Industry Other Sources	250 50 150
Ammonia and Ammonium Compounds (expressed as ammonia)	NH ₃	Material Producing Industries Other Sources	50 10
Benzene	C ₆ H ₆	All sources	5
Iron	Fe	Iron and Steel Foundries	100
Zinc and its Compounds (expressed as Zinc)	Zn	Electroplating / Galvanizing Industries	10
Lead and its Compounds (expressed as Lead)	Pb	All sources	5
Antimony and its Compounds (expressed as Antimony)	Sb	Material Producing Industries Other Sources	5 1
Arsenic and its Compounds (expressed as Arsenic)	As	All sources	1
Cadmium and its Compounds (expressed as Cadmium)	Cd	All sources	1
Mercury and its Compounds (expressed as Mercury)	Hg	All sources	0.5
Nickel and its Compounds (expressed as Nickel)	Ni	All sources	1
Copper and its Compounds (expressed as Copper)	Cu	All sources	5

Hydrogen Sulfide	H ₂ S	All sources	5
Chloride	Cl ⁻	Chlorine Works	200
		Other Sources	10
Hydrogen Chloride	HCl	Chlorine works	200
		Other Sources	20
Hydrogen Fluoride	HF	All sources	2
Silicon Fluoride	SiF ₄	All sources	10
Fluoride and its Compounds including HF and SiF ₄ (expressed as Fluoride)	F ⁻	Aluminum Smelters	20
		Other Sources	50
Formaldehyde	CH ₂ O	Material Producing Industries	20
		Other Sources	2
Carbon	C	Odes Production	250
		Waste Incineration	50
Total Volatile Organic Compounds [expressed as total organic carbon (TOC)]	VOC	All sources	20
Dioxins and Furans		All sources	1 (ng TEQ / m ³)

Table 1.3 – Air Pollutants Emission Limits for Stationary Combustion Sources Using Hydrocarbon Fuel

Substance	Symbol	Sources	Maximum Allowable Emission Limits (mg / Nm ³)
Visible Emissions		All sources	250
Nitrogen Oxides [expressed as Nitrogen Dioxide (NO ₂)]	NO _x	Fuel Combustion Units – having a gross heat input above 100,000 MJ excluding glass furnaces:	
		Gas Fuel	350
		Liquid Fuel	500
		Turbine Units:	
		Gas Fuel	70
		Liquid Fuel	150
Sulfur Dioxide	SO ₂	All sources	500
Total Suspended Particles	TSP	All sources	250
Carbon Monoxide	CO	All sources	500

Notes (Tables 1.2 and 1.3):

1. The concentration of any substance specified in the first column emitted from any source specified in the third column shall not at any point before admixture with air, smoke or other gases, exceed the limits specified in the fourth column.
2. “mg” means milligram.
3. “ng” means nanogram.
4. “Nm³” means normal cubic meter, being that amount of gas which when dry, occupies a cubic meter at a temperature of 25 degree Centigrade and at an absolute pressure of 760 millimeters of mercury (1 atmosphere).
5. The limit of “Visible Emission” does not apply to emission of water vapor and a reasonable period for cold start-up, shutdown or emergency operation.
6. The measurement for “Total Suspended Particles (TSP)” emitted from combustion sources should be @ 12% reference CO₂.
7. The total concentration of the heavy metals (Pb, Cd, Ni, Hg, Cu, As & Sb) must not exceed 5 mg/Nm³.
8. VOC limit is for unburned hydrocarbons (uncontrolled).
9. The emission limits for all the substances excluding “Dioxins and Furans” are conducted as a daily average value.
10. TEQ means “Total Equivalent Quantity.” Dioxins and Furans Average values shall be measured over a sample period of a minimum of 6 hours and a maximum of 8 hours. The emission limit value refers to the total concentration of dioxins and furans.
11. With respect to point source standards for waste incinerators refer to DM or FEA relevant standards / regulations.

5.0 Local Control

The industries discharging wastes to the air environment must exercise good control practice to meet maximum emission limits specified in Table 1.2 “General” and “Specific” sections whichever specifies the more stringent standard.

- 5.1 The Authority may prescribe any other control requirements or emission limits for any class of industry in addition to those listed in the relevant guideline.
- 5.2 The industry discharging wastes to the air environment shall ensure that such discharge is via a properly constructed chimney or stack unless the nature of the process prohibits this.
- 5.3 The maximum ground level concentration (1 hour average) of any indicator shall not exceed the acceptable level specified in Table 1.1 or for any other indicator, a level derived by dividing the approved occupational Threshold Limit Value (TLV) by a factor of 30 or the odor threshold of that indicator, which ever is the lower concentration.
- 5.4 The industries shall not use any fuel in new industrial boiler or furnace exceeding 0.005% (50 ppm) by weight sulfur.
- 5.5 The industries using a fuel of sulfur content exceeding 0.005% (50 ppm) by weight in an existing boiler or furnace at the time of approval of this regulation must obtain an approval from the Authority and shall convert gradually to a fuel with sulfur content not exceeding 0.005% (50 ppm) by weight as per the Federal Cabinet decision.
- 5.6 Open burning of any waste is prohibited.
- 5.7 The generator of a large source of emissions to the air environment must hold a permit from the Authority as part of Operation Fitness Certificate (OFC) issuance.
- 5.8 The industries in operation at the time of declaration of this requirement shall be granted twelve (12) months to apply for a permit in accordance with item 5.8.
- 5.9 The permit issues in accordance with item 5.8 must specify as a minimum:
 - a. The permitted wastes emitted from each source;
 - b. The types of fuel and any other substance, which may be used and emitted to the air environment;
 - c. The characteristics of each discharge point;
 - d. The permitted emissions from each discharge point;
 - e. A monitoring program for the emission; and
 - f. Any other management arrangements necessary to protect the beneficial uses of the air environment.

6.0 Odor and Dust Control

- 6.1 The industries shall not generate the emission of substance which as per Authority would be offensive to human beings.
- 6.2 The facilities emitting dust from stockpile, unpaved roads or any other source must control that emission if that dust is, in the opinion of the Authority, detrimental to the beneficial uses of the air environment in neighboring premises.

7.0 Working Areas Control

Exhaust ventilation shall be designed to prevent dispersion into the air of dusts, fumes, mists, vapors and gases in concentrations causing harmful exposure. Such exhaust systems shall be designed in a way that dusts, fumes, mists, vapors or gases are not drawn through the work area of employees.

Trakhees has adopted specific areas maximum allowable limits for air pollutants for inside working areas (See Table 1.4).

Table 1.4 – Maximum Allowable Limits for Air Pollutants inside Working Areas (Dust)

SUBSTANCE	MAXIMUM ALLOWABLE LIMITS (mg/m ³)
Respirable Dust	
Crystallize Silica (quartz)	0.05
Un-crystallize Silica (graphite)	2.5
Asbestos (Crysotile)	0.1 (fiber/cm ³)
Total Dust	
Un-crystallize Silica (graphite)	10
Stone Wool	5
Silica Jell	6
Portland cement	10
Dust from Biological Sources	
Hard Wood Vapors	1
Soft Wood Vapors	5
Inorganic Lead	0.05

8.0 Mobile Sources

- 8.1 All vehicle owners on the road network in PCFC must ensure that their vehicles do not emit visible emissions, unless those emissions occur during a 10-second period while the vehicle is accelerating from rest.
- 8.2 According to the PCFC Free Zone Rules, appropriate sanctions would be imposed on the vehicle owner To Whom It May Concern: remove or modify any pollution control equipment installed on any vehicle by its manufacturer.

9.0 Protecting the Ozone Layer

The ozone layer, a layer of gas in the upper atmosphere, performs the vital role of protecting humans and other living things from the harmful ultraviolet (UV-B) rays of the sun. In the 1970s, scientists discovered that certain man made chemicals could destroy ozone and deplete the ozone layer. Further research found that the growing production and use of chemicals like chlorofluorocarbons (CFCs) in aerosol sprays, refrigeration, insulation and air conditioning was contributing to the accumulation of ozone-depleting substances (ODS) in the atmosphere. Development of an ozone hole was observed above the Antarctic.

The thinning ozone layer leads to a number of serious health risks for human. It causes greater incidences of skin cancer and cataract of the eye. Increased UV-B rays reduce levels of plankton in the oceans and subsequently diminish fish stocks. It can also have adverse effects on plant growth, thus reducing agricultural productivity and there will be reduced lifespan of certain materials.

Consequently, the following rules are to be complied with:

- a. The facilities shall not install any equipment which contains or consumes any controlled substance according to Montreal Protocol (see relevant guideline).
- b. Chlorofluorocarbons (CFC) are to be phased out by January 2010; facilities using CFC shall use safer alternatives such as Hydrochlorofluorocarbon (HCFC), etc.
- c. The facilities shall ensure that all the refrigerants recovered from their premises shall be recycled and are not released into the atmosphere.
- d. Replace halon fire extinguishers with non-ozone depleting substances (non-ODS) alternatives (e.g., carbon dioxide, foam, etc.).
- e. Records of CFC refrigerant consumption shall be maintained.
- f. Usage of refrigerant gas for cleaning shall be prohibited.
- g. All servicing of air-conditioning or refrigeration equipment shall be carried out by properly trained personnel only.

- h. Before a refrigerant will be added to the system, make sure the causes of possible leakage are identified and checked and all leakages are repaired. When a leak is located, isolate the part of the system to minimize the loss of refrigerant. If it is impossible to isolate that part of the system, pump the refrigerant charge to the plant receiver or to a properly designed container.
- i. Use vacuum pump to remove the air and moisture instead of using refrigerant to purge all connecting lines or hoses before charging the system.
- j. Never vent refrigerant to the atmosphere; venting of refrigerant is prohibited. Always recover, recycle and re-use refrigerant during servicing to avoid the discharge to the atmosphere.
- k. Different refrigerant gases should not be mixed in the same container.
- l. Use only non-ozone depleting substances (non-ODS) solvent whenever possible.
- m. If ODS solvent is used, the system should be deep-evacuated to recover the solvent vapor into a container that can be sealed after use. The system should then be pressurized and a thorough leak test carried out before recharging with refrigerant.
- n. The facilities shall not violate Authority, Dubai Municipality (DM), Governmental or Federal Law in their respect.

10.0 Performance Testing

Facilities with new air emission source equipment/s shall be required to conduct performance testing for point sources of air emissions. This would be to ensure compliance with relevant requirements.

11.0 References

- Federal Environment Agency Regulation on Air Pollution 2006
- Dubai Municipality Ambient Air Quality Standards
- Dubai Municipality Environmental Standards and Allowable Limits of Pollutants on Land, Water and Air Environment 2003
- Dubai Municipality Local Order 61 of 1991 Concerning Environment Protection Regulation in the Emirate of Dubai
- Dubai Municipality Technical Guidelines