

**INTERIM SOURCE EMISSION REGULATIONS
CENTRAL ENVIRONMENTAL AUTHORITY**

1. These Regulations may be cited as the National Environmental (Stationary Sources Emission Control) Regulation No. of 2015
2. Any person who manages or is in control of any stationary source specified in Schedule I hereto which emanates stack emissions, shall construct such stationary source in conformity with the standards specified in Schedule II hereto.
3. All emissions from stationary sources which are not specified in Schedule I, shall comply with the standards specified in Part I and II of the Schedule III hereto.
4. All fugitive emissions emanating from any industrial process shall be measured and controlled according to the methods and standards specified in Schedules IV, V, VI, and VII hereto.
5. The methods approved by the Central Environmental Authority shall be used in the measurement of emissions.
6. The concentration of any stationary source emission measured shall be converted into dry condition. The following equation shall be used for such conversion:-

$$DRY GAS CONCENTRATION = \frac{MEASURED CONCENTRATION}{[100 - (MOISTURE PERCENTAGE)]} \times 100$$

7. The stationary source emission concentration converted into dry condition under Regulation 6, shall be converted into normal condition. The following equation shall be used for such conversion:-

$$C_n (mg / Nm^3) = C_s (mg / m^3) \times \frac{(P_n \cdot T_s)}{(P_s \cdot T_n)}$$

where C_n = Emission concentration at normal conditions

C_s = Measured dry emission concentration

P_n = Standard pressure 760mmHg

P_s = Stack pressure in mmHg

T_n = Standard temperature 273 Kelvin

T_s = Stack temperature in Kelvin.

8. The stationary source emission concentration converted into normal condition under Regulation 7 shall be converted for relevant reference oxygen level specified in Schedule VIII hereto. The following equation shall be used for such conversion:-

$$E_r \left(mg / Nm^3 \right) = E_m \left(mg / Nm^3 \right) \left[\frac{20.9 - O_2 \%_{ref}}{20.9 - O_2 \%_m} \right]$$

where E_r = Emission concentration at fuel specific reference oxygen level

E_m = Normalized emission concentration

$O_2\%_{ref}$ = Fuel specific reference oxygen level in Schedule VIII

$O_2\%_m$ = Measured volume percentage of oxygen level on dry basis.

9. Where the fuel type is not specified in Schedule VIII, the reference oxygen level shall be six percent (6%): Provided that, where there is a mixed-fuel usage, the major fuel type based on energy input shall be considered. reference oxygen level shall be 10% for incinerators.

10. In the case of multi-fuel usage, for each fuel, the standards specified in Schedule II hereto shall be applied.

11. Minimum stack height of any combustion point source shall be determined by the following equation.

$$C(m) = H(m) + 0.6U(m)$$

where H = The height in meters of the tallest building within 5U radius of the stack.

C = Minimum stack height in meters.

U in meters(m) shall be determined by following equation

$$U(m) = 1.36Q^{0.6}$$

where Q = Gross heat input in Mega Watt (MW).

i. This rule shall be applied for the combustion sources with gross heat input greater than 0.620MW.

ii. In any case, stack height shall not be less than 20 meters except for the combustion sources with gross heat input less than 0.620MW.

12. In relation to thermal power plants and to any other combustion source, air pollution caused by Sulfur Dioxide(SO₂) emission shall be controlled by fuel quality, stack height and/ or Sulfur Dioxide emission control devices to maintain the ambient air quality standards stipulated in the extraordinary gazette No.1562/22 dated 15th of August, 2008. Minimum stack height shall be determined by accepted air quality modeling tool. With the permission of the Authority, following equation shall also be applied to determine the minimum stack height in meters.

$$\text{Minimum stack height } H(m) = 14 Q^{0.25}$$

where Q is SO₂ emission rate kg/hour.

13. Emissions from Crematoriums shall be controlled by emission reduction devices incorporated into the stack of the crematorium.

14. Dioxin and Furan emissions from incinerators shall be controlled by maintaining temperature between t 1000 °C and 1250 °C and 2-3 seconds retention time in secondary chamber.

15. Unless otherwise specified in these regulations, no person shall emit or discharge any pollutant to atmosphere exceeding the pollutant based emission limits specified in Schedule III hereto.

16. Any person who fails to comply with the regulations above shall be liable to an offence under section 23K of the National Environmental Act, No. 47 of 1980.

17. In these regulations-

“Authority” means the Central Environmental Authority established under the National Environmental Act, No. 47 of 1980;

“PM” means Particulate Matter.

“ppm” means parts per million.

“Nm³” means cubic meter of air at standard conditions of 0 °C temperature and 760 mmHg Pressure.

“Nitrogen Oxides(NO_x)” means total concentration of Nitric Oxide (NO) and Nitrogen Dioxide(NO₂) gas emissions from a stack.

SCHEDULE I

(Regulation 2)

1. Thermal Power Plants
2. Standby Generators
3. Boilers
4. Thermic Fluid Heaters
5. Incinerators
6. Cupolas, Blast Furnaces, Coke Ovens, Basic Oxygen Furnaces, Electric induction & arc furnaces
7. Cement Kilns

SCHEDULE II
Instrument/Equipment Based Standards
Part I

(Regulation 2)

Thermal Power Plants

Fuel	Rated Output Capacity (C)	Type of Pollutant	Emission Limit
Oil	C<1 MW	Particulate Matter(PM), Sulfur Dioxide(SO ₂), Nitrogen Oxides(NO _x)	Shall be controlled by fuel quality and stack height as defined in Regulation 11 and 12
		Smoke	20% Opacity
	1≤C<3MW	Sulfur Dioxide(SO ₂)	Shall be controlled by fuel quality and stack height as defined in Regulation 12.
		Nitrogen Oxides(NO _x)	650mg/Nm ³ for steam turbine
			550mg/Nm ³ for gas turbine/combine cycle
			850mg/Nm ³ for internal combustion engines
		Particulate Matter(PM)	200mg/Nm ³
	Smoke	20% Opacity	
	3≤C<25 MW	Sulfur Dioxide(SO ₂)	Shall be controlled by fuel quality and stack height as defined in Regulation 12
		Nitrogen Oxides(NO _x)	600mg/Nm ³ for steam turbine
			500mg/Nm ³ for gas turbine/combine cycle
			850mg/Nm ³ for internal combustion engines
		Particulate Matter(PM)	150mg/Nm ³
	Smoke	20% Opacity	
	25≤C<100 MW	Sulfur Dioxide(SO ₂)	Shall be controlled by fuel quality and stack height as defined in Regulation 12
		Nitrogen Oxides(NO _x)	550mg/Nm ³ for steam turbine
			450mg/Nm ³ for gas turbine/combine cycle
			700mg/Nm ³ for internal combustion engines
		Particulate Matter(PM)	150mg/Nm ³
	Smoke	20% Opacity	
	C≥ 100 MW	Sulfur Dioxide(SO ₂)	1. 850mg/Nm ³ for new power plants with maximum 28kg SO ₂ per day per MW subject to maximum 14 metric tons of SO ₂ /day for first 500MW plus 10kg SO ₂ per day per MW for each additional MW. 2. Shall be controlled by fuel quality for existing power plants.
		Nitrogen Oxides(NO _x)	500mg/Nm ³ for steam turbine
			450mg/Nm ³ for gas turbine/combine cycle
			650mg/Nm ³ for internal combustion engines
Particulate Matter(PM)		150mg/Nm ³	
Smoke	20% Opacity		

Schedule II
Part I Cont ...

Fuel	Rated Output Capacity (C)	Type of Pollutant	Emission Limit	
Biomass	C<0.5 MW	Particulate Matter(PM), Nitrogen Oxides (NO _x)	Shall be controlled by stack height as defined in Regulation 11	
		Smoke	25% Opacity	
	0.5≤C<3MW	Nitrogen Oxides (NO _x)	500mg/Nm ³	
		Particulate Matter(PM)	250mg/Nm ³	
		Smoke	25% Opacity	
	C≥3 MW	Nitrogen Oxides (NO _x)	450mg/Nm ³	
		Particulate Matter(PM)	200mg/Nm ³	
		Smoke	20% Opacity	
	Coal	C<50 MW	Sulfur Dioxide (SO ₂)	1600mg/Nm ³
Nitrogen Oxides (NO _x)			750mg/Nm ³	
Particulate Matter(PM)			200mg/Nm ³	
Smoke			20% Opacity	
C≥ 50 MW		Sulfur Dioxide (SO ₂)	1. 850mg/Nm ³ for new power plants with maximum 50kg SO ₂ per day per MW subject to maximum 30 metric tons of SO ₂ /day for first 500MW plus 25kg SO ₂ per day per MW for each additional MW. 2. Shall be controlled by fuel quality for existing power plants.	
		Nitrogen Oxides (NO _x)	650mg/Nm ³	
		Particulate Matter(PM)	150mg/Nm ³	
		Smoke	15% Opacity	
Natural Gas		C<50 MW	Sulfur Dioxide (SO ₂)	75mg/Nm ³
			Nitrogen Oxides (NO _x)	350mg/Nm ³ for steam turbine
	250mg/Nm ³ for gas turbine/combine cycle 400mg/Nm ³ for internal combustion engines			
	Particulate Matter(PM)	100mg/Nm ³		
	C≥50 MW	Sulfur Dioxide (SO ₂)	75mg/Nm ³	
		Nitrogen Oxides (NO _x)	300mg/Nm ³ for steam turbine	
			200mg/Nm ³ for gas turbine/combine cycle	
			350mg/Nm ³ for internal combustion engines	
Particulate Matter(PM)	75mg/Nm ³			

**Schedule II
Part I Cont ...**

Fuel	Rated Output Capacity (C)	Type of Pollutant	Emission Limit
Naphtha	Any	Sulfur Dioxide(SO ₂)	75mg/Nm ³
		Nitrogen Oxides(NO _x)	350mg/Nm ³ for steam turbine
			250mg/Nm ³ for gas turbine/combine cycle
			400mg/Nm ³ for internal combustion engines
Particulate Matter(PM)	75mg/Nm ³		
Municipal Solid Waste	Any	Sulfur Dioxide (SO ₂)	70mg/Nm ³
		Nitrogen Oxides(NO _x)	400mg/Nm ³
		Particulate Matter(PM)	150mg/Nm ³
		Smoke	20% Opacity
		Carbon Monoxide(CO)	50mg/Nm ³
		Hydrogen Chloride(HCl)	20mg/Nm ³
		Mercury (Hg)	0.001mg/Nm ³
		Lead(Pb)	0.01mg/Nm ³

**SCHEDULE II
Instrument/Equipment Based Standards
Part II
Standby Generators**

(Regulation 2)

Fuel	Rated Output Capacity	Type of Pollutant	Emission Limit
Gasoline, kerosene, diesel or heavy oil	Any	Particulate Matter(PM), Sulfur Dioxide (SO ₂), Nitrogen Oxides(NO _x)	Shall be controlled by stack height and fuel quality as defined in Regulation 11 and 12
		Smoke	10% Opacity

SCHEDULE II

(Regulation 2)

Instrument/Equipment Based Standards

**Part III
Boilers**

Fuel	Rated Output Capacity (C)	Type of Pollutant	Emission limit
oil	C<2 metric tons of steam /hour	Particulate Matter(PM), Sulfur Dioxide (SO ₂), Nitrogen Oxides (NO _x)	Shall be controlled by fuel quality and stack height as defined in Regulation 11 and 12.
		Smoke	20% Opacity
	C≥2 metric tons of steam/hour	Sulfur Dioxide (SO ₂), Nitrogen Oxides (NO _x),	Shall be controlled by fuel quality and stack height as defined in Regulation 11 and 12.
		Smoke	15% Opacity
		Particulate Matter(PM)	100mg/Nm ³
	Bio-mass	C<2 metric tons of steam /hour	Particulate Matter(PM), Nitrogen Oxides (NO _x)
Smoke			20% Opacity
C≥2 metric tons of steam /hour		Nitrogen Oxides (NO _x)	Shall be controlled by stack height as defined in Regulation 11.
		Smoke	15% Opacity
		Particulate Matter(PM)	200mg/Nm ³
Coal		C<2 metric tons of steam /hour	Particulate Matter(PM), Sulfur Dioxide (SO ₂), Nitrogen Oxides (NO _x)
	Smoke		20% Opacity
	C≥2 metric tons of steam /hour	Nitrogen Oxides (NO _x)	500mg/Nm ³
		Sulfur Dioxide (SO ₂)	850mg/Nm ³
		Smoke	20% Opacity
		Particulate Matter(PM)	150mg/Nm ³

SCHEDULE II

(Regulation 2)

Instrument/Equipment Based Standards

**Part IV
Thermic Fluid Heaters**

Fuel	Rated Output Capacity (C)	Type of Pollutant	Emission limit
Oil	C<5000 MJ/hour	Particulate Matter(PM), Sulfur Dioxide (SO ₂), Nitrogen Oxides(NO _x)	Shall be controlled by fuel quality and stack height as defined in Regulation 11 and 12.
		Smoke	20% Opacity
	C≥ 5000MJ/hour	Sulfur Dioxide(SO ₂), Nitrogen Oxides(NO _x)	Shall be controlled by fuel quality and stack height as defined in Regulation 11 and 12.
		Smoke	15% Opacity
		Particulate Matter(PM)	100mg/Nm ³
	Bio-mass	C<5000 MJ/hour	Particulate Matter(PM), Nitrogen Oxides (NO _x)
Smoke			20% Opacity
C≥ 5000MJ/hour		Nitrogen Oxides(NO _x)	Shall be controlled by stack height as defined in Regulation 11
		Smoke	15% Opacity
		Particulate Matter(PM)	200mg/Nm ³
Coal		C<5000 MJ/hour	Particulate Matter(PM), Sulfur Dioxide(SO ₂), Nitrogen Oxides(NO _x)
	Smoke		20% Opacity
	C≥ 5000MJ/hour	Nitrogen Oxides(NO _x)	500mg/Nm ³
		Sulfur Dioxide (SO ₂)	800mg/Nm ³
		Smoke	20% Opacity
		Particulate Matter(PM)	150mg/Nm ³

SCHEDULE II

(Regulation 2)

Instrument/Equipment Based Standards

**Part V
Incinerators**

Rated Output Capacity (C)	Type of Pollutant	Emission limit
C < 1 Metric Ton /Hour	Sulfur Dioxide(SO ₂)	70mg/Nm ³
	Nitrogen Oxides(NO _x)	400mg/Nm ³
	Particulate Matter(PM)	150mg/Nm ³
	Smoke	20% Opacity
	Carbon Monoxide(CO)	50mg/Nm ³
	Hydrogen Chloride(HCl)	20mg/Nm ³
	Mercury (Hg)	0.01mg/Nm ³
	Lead(Pb)	0.05mg/Nm ³
	Dioxin and Furans	Shall be controlled by temperature and retention time as defined in Regulation 14.
C ≥ 1 Metric ton/hour	Sulfur Dioxide(SO ₂)	70mg/Nm ³
	Nitrogen Oxides(NO _x)	300mg/Nm ³
	Particulate Matter(PM)	100mg/Nm ³
	Smoke	10 % Opacity
	Carbon Monoxide(CO)	50mg/Nm ³
	Hydrogen Chloride(HCl)	15mg/Nm ³
	Mercury(Hg)	0.001mg/Nm ³
	Lead(Pb)	0.01mg/Nm ³
	Dioxin and Furans	Shall be controlled by temperature and retention time as defined in Regulation 14.
Any Infected waste incinerators	Sulfur Dioxide(SO ₂)	70mg/Nm ³
	Nitrogen Oxides(NO _x)	300mg/Nm ³
	Particulate Matter(PM)	100mg/Nm ³
	Smoke	10% Opacity
	Carbon Monoxide(CO)	50mg/Nm ³
	Hydrogen Chloride(HCl)	15mg/Nm ³
	Mercury (Hg)	0.001mg/Nm ³
	Lead(Pb)	0.01mg/Nm ³
	Dioxin/Furan	Shall be controlled by temperature and retention time as defined in Regulation 14.

SCHEDULE II**(Regulation 2)****Instrument/Equipment Based Standards****Part VI****Cupolas, Blast furnaces, Coke ovens, Basic oxygen furnaces, Electric (induction & arc) furnaces**

Rated Output Capacity (C)	Type of Pollutant	Emission limit
Any	Particulate Matter(PM)	150mg/Nm ³
	Sulfur Dioxide(SO ₂)	800mg/Nm ³
	Nitrogen Oxides(NO _x)	500mg/Nm ³
	Smoke	20% Opacity

SCHEDULE II**(Regulation 2)****Instrument/Equipment Based Standards****Part VII****Cement Kilns**

Rated Output Capacity (C)	Type of Pollutant	Emission limit	
		Existing *	New **
Any	Particulate Matter(PM)	400mg/Nm ³	200mg/Nm ³
	Sulfur Dioxide(SO ₂)	540mg/Nm ³	270mg/Nm ³
	Nitrogen Oxides(NO _x)	1250mg/Nm ³	1000mg/Nm ³
	Smoke	20% Opacity	20% Opacity

***Cement kilns in existence prior to the date of operation of these regulations.**

****Cement kilns which commence operation after the date of operation of these regulations.**

SCHEDULE III
Pollutant Based Standards
Part I

Pollutant	Process/Source	Emission Limit Combustion	Emission Limit Non-Combustion
Particulate Matter(PM)	Any	150mg/Nm ³	100mg/Nm ³
Smoke	Any	25% Opacity	25% Opacity
Carbon Monoxide(CO)	Any	900mg/Nm ³	1100mg/Nm ³
Sulfur Dioxide(SO ₂)	Sulfuric acid manufacturing plants	2kg/Metric ton of Sulfuric acid production	
	Any Other	1000mg/Nm ³	800mg/Nm ³
Nitrogen Oxides(NO _x)	Nitric acid manufacturing plants	1.5 kg/Metric ton of Nitric acid production.	
	Any Other	500mg/Nm ³	-
Total Volatile Organic Compounds(TVOC)	Any	20ppm	10ppm

SCHEDULE III (Regulation 3 Regulation 15)
Pollutant Based Standards
Part II

Pollutant	Process/Source	Emission Limits/ Combustion or Non-Combustion
Chlorine(Cl ₂)	Any	Chlorine 35mg/Nm ³
Hydrogen Chloride(HCl)	Hydrochloric acid manufacturing plants	0.8 kg per Metric ton of Hydrochloric acid production
	Any other	Hydrogen Chloride 50mg/Nm ³
Fluorine(F ₂)	Any	Fluorine 20mg/Nm ³
Fluoride(F) (Hydrogen or Silicon)	Phosphate Industry	0.18kg/ Metric ton of raw material feed
	Any other	Hydrogen Fluoride 2mg/Nm ³
Hydrogen Sulfide(H ₂ S)	Any	1mg/Nm ³
Cadmium or its compounds	Any	1mg/Nm ³ as Cd
Lead or its compounds	Lead Smelting	0.2mg/Nm ³ as Pb
	Any other	0.2mg/Nm ³ as Pb
Antimony or its compounds	Any	0.5mg/Nm ³ as Sb
Arsenic or its compounds	Any	0.1mg/Nm ³ as As
Copper or its compounds	Copper smelting	1mg/Nm ³ as Cu
	Any other	1mg/Nm ³ as Cu
Zinc or its compounds	Any	1mg/Nm ³ as Zn
Mercury or its compounds	Any	0.01mg/Nm ³ as Hg
Dioxin/Furan	Any	2ng/ Nm ³
Ammonia	Any	10mg/Nm ³

SCHEDULE IV

(Regulation 4)

Fugitive Dust Emission Standards

The difference between two simultaneous 3 hour Total Suspended Particulate Matter (TSPM) measurements (gravimetric) carried out on up-wind and down-wind basis from any process area or emission area shall not be greater than $450\mu\text{g}/\text{m}^3$.

- a. Measurement location shall be within 10 meters from any process equipment or emission area towards up-wind and down-wind directions.
- b. The wind direction shall be the most predominant wind direction during the time period of measurement.
- c. Any method approved by the Central Environmental Authority shall be used for the TSPM measurement.

SCHEDULE V

(Regulation 4)

Fugitive Non-Methane Volatile Organic Compounds (NMVOC) Emission Standards

The difference between two simultaneous Non-Methane Volatile Organic Compound measurements carried out on up-wind and down-wind basis from any process area or emission area shall not be greater than 5ppm.

- a. The measurement location shall be within 5 meters from any process equipment or emission area towards up-wind and down-wind directions.
- b. The wind direction shall be the most predominant wind direction during the time period of measurement.
- c. Any method approved by the Central Environmental Authority shall be used for the determination of Non-Methane Volatile Organic Compounds.

SCHEDULE VI

(Regulation 4)

Fugitive Acid Mist and Ammonia Emission Standards

Fugitive acid mists or fugitive ammonia mist emissions from any process area shall not be greater than 20ppm. The measurement location shall be within 5meters down-wind from the process area. Sampling time period shall be 3 hours at the sampling flow rate of 1 liter/min. Any method approved by the Central Environmental Authority shall be used for the determination of fugitive acid mist and ammonia mist emission levels.

SCHEDULE VII

(Regulation 4)

Asbestos Fiber Emission Standards

Ambient asbestos fiber concentrations in process area shall not be greater than $1\text{fiber}/\text{m}^3$. The measurement location shall be within 20 meters down-wind from the process area. Any method approved by the Central Environmental Authority shall be used for the determination of asbestos fiber concentration.

SCHEDULE VIII

(Regulation 8)

Reference Oxygen Levels

Fuel Type	Reference Oxygen Level
Oil and gaseous fuels	03%
Solid fuels	06%