

**DEPARTMENT OF ENVIRONMENTAL AFFAIRS
DEPARTEMENT VAN OMGEWINGSAKE**

No. 831

1 November 2013

**NATIONAL ENVIRONMENTAL MANAGEMENT ACT: AIR QUALITY ACT, 2004
(ACT NO. 39 OF 2004)**

**DECLARATION OF A SMALL BOILER AS A CONTROLLED EMITTER AND
ESTABLISHMENT OF EMISSION STANDARDS**

I, Bomo Edith Edna Molewa, Minister of Water and Environmental Affairs, hereby declare a small boiler as a controlled emitter in terms of section 23(1) of the National Environmental Management: Air Quality Act, 2004, and hereby also establish emission standards for the small boiler in terms of section 24 of the National Environmental Management: Air Quality Act, 2004 set out in the Schedule hereto.



**BOMO EDITH EDNA MOLEWA
MINISTER OF WATER AND ENVIRONMENTAL AFFAIRS**

DATE *2013/09/17*

SCHEDULE

Part 1: Definitions

Definitions

In this Notice a word or expression to which a meaning has been assigned in the Act has that meaning and, unless the context otherwise indicates—

'biomass' means non-fossilized and biodegradable organic material originating from plants, animals and micro-organisms excluding—

- (a) sewage; and
- (b) treated or coated wood waste which may contain halogenated organic compounds or heavy metals;

'black smoke' means a smoke as dark or darker than Shade 4 of the Ringelmann chart, which refers to an equivalent of 80% black as contemplated in Annexure B to this Notice;

'boiler' means a combustion appliance designed to heat water;

'dark smoke' means a smoke as dark or darker than Shade 2 of the Ringelmann chart, which refers to an equivalent of 40% black as contemplated in Annexure B to this Notice;

'existing small boiler' means any small boiler that was manufactured before the date on which this Notice takes effect;

'new small boiler' means any small boiler manufactured after the date on which this Notice takes effect;

'operator' means a person who owns, manages, or controls a small boiler;

'small boiler' means any boiler with a design capacity equal to 10MW but less than 50MW net heat input per unit, based on the lower calorific value used;

'soot blowing' means a method of cleaning deposited carbon from the internal surfaces of a boiler, which usually includes the use of a jet of air or steam onto heat exchange surfaces to clean deposits.

Part 2: General**Application**

1. This Notice shall apply to any small boiler under normal operating conditions subject to the provisions for start-up, soot-blowing and incidences of abnormal conditions.

Provisions for start-up, soot- blowing and incidences of abnormal conditions

2. During small boiler start-up, black smoke shall be limited to a period of twenty (20) minutes.
3. During soot blowing of a small boiler and abnormal conditions, dark smoke shall be limited to the following periods:

| Number of small boilers per shared stack | Permitted emissions of dark smoke in any period of 8 hours | |
|--|--|--------------|
| | Abnormal conditions | Soot blowing |
| One (1) | 10 minutes | 14 minutes |
| Two (2) | 18 minutes | 25 minutes |
| Three (3) | 24 minutes | 34 minutes |
| Four or more (4 +) | 29 minutes | 41 minutes |

Implementation

4. An air quality officer shall be responsible for co-ordinating implementation matters pertaining to this Notice.

Compliance timeframes

5. A new small boiler must comply with the new small boiler emission standards as contained in Part 3 on the date of publication of this Notice in the *Gazette*.
6. An existing small boiler must comply with the existing small boiler emission standards as contained in Part 3 within 5 years from the date of publication of this Notice in the *Gazette*.

Emission measurements

7. The concentration or mass of pollutant for which emissions standards have been set in this Notice shall be reported as the average of at least three (3) measurements; measured over a minimum sample period of 60 minutes, under normal operating conditions to obtain a representative sample.
8. The manner in which measurements shall be carried out must be in accordance with the standard sampling and analysis methods listed in Annexure A to this Notice.
9. Methods other than those contained in Annexure A to this Notice may be used with the written consent of the National Air Quality Officer.
10. In seeking the written consent referred to in paragraph 9 above, an applicant must provide the National Air Quality Officer with any information that supports the equivalence of the method other than those listed in Annexure A to this Notice.

Reporting requirements

11. The operator of a small boiler must—
 - (1) submit at least one (1) emissions report per annum to the relevant air quality officer in the format set out in Annexure C to this Notice;
 - (2) submit the first emissions report to the relevant air quality officer within 12 months from the date on which this Notice takes effect;
 - (3) provide any additional emission reports as requested by an air quality officer, for the implementation of this Notice;
 - (4) record all measurement results and keep a copy of this record for at least five (5) years after obtaining the results; or
 - (5) produce the record of the measurement results for inspection if requested to do so by an air quality officer.
12. For reporting requirements, emissions shall be measured by stack emission measurement and may be supplemented by means of mass balances or engineering calculations.

Part 3: Emission Standards**Emission Standards**

A small boiler must comply with the emission and requirements as scheduled in the tables below. All limit values are expressed on daily averages, at specified reference conditions.

(1) Solid fuel-fired small boiler

| | | | |
|---|--|----------------------------|---|
| Description | Small boilers fueled with solid fuels. | | |
| Application | All small boilers fueled with hydrocarbon based solid fuel, excluding biomass. | | |
| Substance or mixture of substances | | Small boiler status | Limit value (dry mg/ Nm³ at 273K; 101.3kPa and 10% O₂) |
| Common name | Chemical/ Commonly-used symbol | | |
| Particulate matter | PM | New | 120 |
| | | Existing | 250 |
| Sulphur dioxide | SO ₂ | New | 2800 |
| | | Existing | 2800 |

(2) Liquid fuel-fired small boiler

| | | | |
|---|---|----------------------------|--|
| Description | Small boilers fueled with liquid fuels. | | |
| Application | All liquid fuel-fired small boilers | | |
| Substance or mixture of substances | | Small boiler status | Limit value (dry mg/ Nm³ at 273K; 101.3kPa and 3% O₂) |
| Common name | Chemical/ Commonly-used symbol | | |
| Particulate matter | PM | New | 100 |
| | | Existing | 150 |
| Sulphur dioxide | SO ₂ | New | 500 |
| | | Existing | 3500 |

(3) Gaseous fuel-fired small boiler (using natural gas and liquefied petroleum gas)

| | | | |
|---|---|----------------------------|---|
| Description | Small boilers fueled with gaseous fuels. | | |
| Application | All small boilers fueled with low particulate matter content gaseous fuels. | | |
| Substance or mixture of substances | | Small boiler status | Limit value (dry mg/Nm³ at 273K; 101.3kPa and 3% O₂) |
| Common name | Chemical/ Commonly-used symbol | | |
| Particulate matter | PM | New | 10 |
| | | Existing | 20 |
| Sulphur dioxide | SO ₂ | New | 35 |
| | | Existing | 100 |

(4) Gaseous fuel-fired small boiler (using process gas)

| | | | |
|---|--|----------------------------|---|
| Description | Small boilers fueled with gaseous fuels. | | |
| Application | All small boilers fueled with gaseous fuels generated by industrial processes. | | |
| Substance or mixture of substances | | Small boiler status | Limit value (dry mg/Nm³ at 273K; 101.3kPa and 3% O₂) |
| Common name | Chemical/ Commonly-used symbol | | |
| Particulate matter | PM | New | 90 |
| | | Existing | 130 |
| Sulphur dioxide | SO ₂ | New | 1000 |
| | | Existing | 3500 |

(5) Solid biomass fuel-fired small boiler

| | | | |
|---|---|----------------------------|--|
| Description | Small boilers fueled with solid biomass fuels | | |
| Application | All small boilers fueled with biomass fuels | | |
| Substance or mixture of substances | | Small boiler status | Limit value (dry mg/Nm³ at 273K; 101.3kPa and 10% O₂) |
| Common name | Chemical/ Commonly-used symbol | | |
| Particulate matter | PM | New | 120 |
| | | Existing | 250 |
| Sulphur dioxide | SO ₂ | New | 1000 |
| | | Existing | 1000 |

(6) Co-feeding

Where a small boiler is fired simultaneously with two or more fuels, the emission standards for the main fuel shall be applicable.

ANNEXURE A: EMISSION MEASUREMENT METHODS AND ANALYSIS

The following referenced documents are indispensable for the application of the Notice. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies. Information on currently valid national and international standards can be obtained from Standards South Africa.

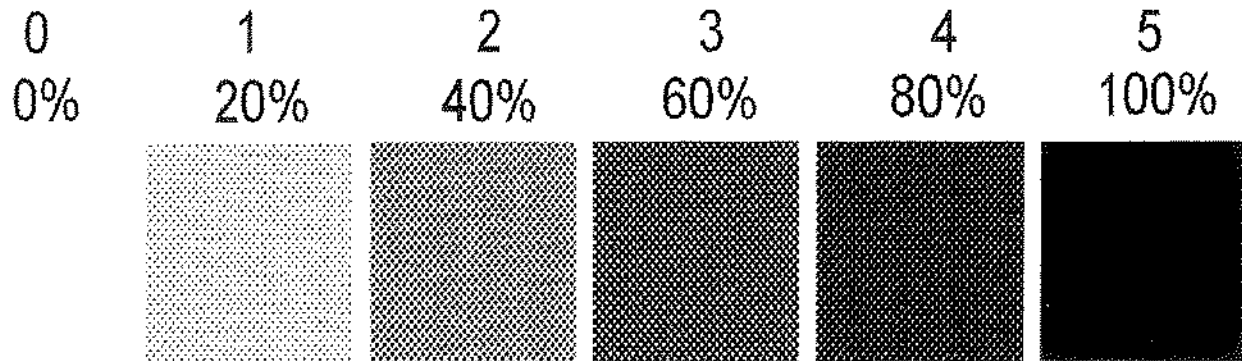
(1) ISO Standards

- (a) ISO 7934:1989 Stationary source emissions – Determination of the mass concentration of sulphur dioxide - Hydrogen peroxide/barium perchlorate/Thorin method.
- (b) ISO 7934:1989/Amd 1:1998.
- (c) ISO 7935: Stationary source emissions – Determination of the mass concentration of sulphur dioxide – Performance characteristics of automated measuring method.
- (d) ISO 9096: Stationary source emissions – Manual Determination of mass concentration of particulate matter.
- (e) ISO 10155: Stationary source emissions – Automated monitoring of mass concentrations of particles – Performance characteristics, test methods and specifications.
- (f) ISO 10396: Stationary source emissions – Sampling for the automated determination of gas emissions concentrations for permanently-installed monitoring systems.
- (g) ISO 10780: Stationary source emissions – Measurement of velocity volume flow rate of gas streams in ducts.
- (h) ISO 11632: Stationary source emissions – Determination of mass concentration of sulphur dioxide – Iron chromatography method.
- (i) ISO 12141: Stationary source emissions – Determination of mass concentration of particulate matter (dust) at low concentrations- Manual gravimetric method.
- (j) ISO 14164: Stationary source emissions – Determination of the volume flow-rate of gas streams in ducts - Automated method.

- (2) EPA methods
- (a) Method 1 – Traverse Points.
 - (b) Method 1A – Small Ducts.
 - (c) Method 2 – Velocity - S-type Pitot.
 - (d) Method 2A – Volume Meters.
 - (e) Method 2B – Exhaust Volume Flow Rate.
 - (f) Method 2C – Standard Pitot.
 - (g) Method 2D – Rate Meters.
 - (h) Method 2F – Flow Rate Measurement with 3-D Probe.
 - (i) Method 2G – Flow Rate Measurement with 2-D Probe.
 - (j) Method 2H – Flow Rate Measurement with Velocity Decay Near Stack Walls.
 - (k) Memo – New Test Procedures of Stack Gas Flow Rate in Place of Method 2.
 - (l) Method 3 – Molecular Weight.
 - (m) Method 3A – CO₂, O₂ by instrumental methods.
 - (n) Method 3B – CO₂, O₂ by Orsat apparatus.
 - (o) Method 3C – CO₂, CH₄, N₂, O₂ by determined by thermal conductivity.
 - (p) Method 4 – Moisture Content.
 - (q) Method 5 – Particulate Matter (PM).
 - (r) Method 5D – PM Baghouses (Particulate Matter).
 - (s) Method 5I – Determination of Low Level Particulate Matter Emissions.
 - (t) Method 6 – Sulphur Dioxide (SO₂).
 - (u) Method 6A – SO₂, CO₂.
 - (v) Method 6B – SO₂, CO₂ - Long Term Integrated.
 - (w) Method 6C – SO₂ – Instrumental.
 - (x) Method 6C – Figures SO₂
 - (y) Method 8 – Sulfuric Acid Mist.
 - (z) Method 9 – Visual Opacity.

- (aa) Method 17 – In-Stack Particulate (PM).
 - (bb) Method 19 – SO₂ Removal & PM, SO₂, NO_x Rates from Electric Utility Steam Generators.
 - (cc) Method 22 – Fugitive Opacity.
 - (dd) Method 28A – Air to Fuel Ratio, Burn Rate - Wood-fired Appliances.
 - (ee) Methods 203A, B, and C – Opacity Determination for Time-Averaged Regulations.
- (3) British standards
- (a) BS 3405:1983 Method for measurement of particulate emission including grit and dust (simplified method).
 - (b) BS EN 14181:2004 Stationary source emissions. Quality assurance of automated measuring systems.
 - (c) BS EN 15259: Air quality. Measurement of stationary source emissions. Measurement strategy, measurement planning, reporting and design of measurement sites.
 - (d) BS EN 15267-1: Air quality. Certification of automated measuring systems. General principles.
 - (e) BS EN 15267-2: Air quality. Certification of automated measuring systems. Initial assessment of the AMS manufacturer's quality management system and post certification surveillance for the manufacturing process.
 - (f) BS EN 15267-3: Air quality. Certification of automated measuring systems. Performance criteria and test procedures for automated measuring systems for monitoring emissions from stationary sources.

ANNEXURE B: RINGELMANN SMOKE CHART



ANNEXURE C: TEMPLATE FOR REPORTING EMISSIONS

Emission Measurements Report for a Small Boiler

Name of Enterprise: _____

Declaration of accuracy of information provided:

I, _____, declare that the information provided in this report is in all respects factually true and correct.

Signed at _____ on this _____ day of _____

SIGNATURE

CAPACITY OF SIGNATORY

1. Enterprise Details

| | |
|---|--|
| Enterprise Name | |
| Trading as | |
| Postal Address | |
| Telephone Number (General) | |
| Fax Number (General) | |
| Industry Type? Nature of Trade | |
| Land Use Zoning as per Town Planning Scheme | |
| Land Use Rights if outside Town Planning Scheme | |

2. Contact details

| | |
|-------------------------|--|
| Responsible Person Name | |
| Telephone Number | |
| Cell Phone Number | |
| Fax Number | |
| E-mail address | |

3. Serial number, product name and model of the small boiler

| Serial Number | Product Name | Product Model | Net Heat Input (MW) |
|---------------|--------------|---------------|---------------------|
| | | | |
| | | | |
| | | | |

4. Energy used

| Energy source | Sulphur content of fuel (%) (if applicable) | Ash content of fuel (%) (if applicable) | Design consumption rate (volume) | Actual consumption rate (volume) | Units (quantity /period) |
|---------------|---|---|----------------------------------|----------------------------------|--------------------------|
| | | | | | |
| | | | | | |
| | | | | | |

5. Point source parameters

| Unique stack ID | Point source name | Height of release above ground | Height above nearby building [m] | Diameter at stack tip / vent exit [m] | Actual gas exit temperature | Actual gas volumetric flow | Actual gas exit velocity [m/s] |
|-----------------|-------------------|--------------------------------|----------------------------------|---------------------------------------|-----------------------------|----------------------------|--------------------------------|
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

6. Point source emissions

| Unique stack ID | Pollutant name | Daily Average Values | | | Emission hours [e.g. 07H00 – 17H00] | Type of emission [continuous/ intermittent] |
|-----------------|----------------|----------------------|--|--|--|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |
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