

Monitoring of Emissions to Air from Medium Combustion Plants falling within scope of S.L. 549.122

Methodology for Monitoring

1. Introduction

As stipulated in S.L.549.122, (Limitation of Emissions of Certain Pollutants into the Air from Medium Combustion Plants Regulations) the operator of plants falling within scope of these regulations are required to carry out monitoring of emissions to air. An independent competent expert¹ is to be commissioned and following a site review, shall propose a monitoring procedure for measuring emissions to air emerging from the combustion plant. The Permit Holder shall be required to monitor these emissions to ensure that are kept below emission limit value specified in the environmental permit (EP, IPPC). To ensure that the correct monitoring is being carried out it is essential to have the correct monitoring strategy.

This method statement drawn up by the commissioned service provider for the monitoring of emissions to air shall include the information listed in section 2 below and shall ensure the use of the following good practice:

- EN/ISO standard methods of measurement or equivalent, where available;
- Certified instruments;
- Technically proficient personnel²;
- Reference to laboratories accredited to ISO 17025:2017

¹ As a general guideline, the monitoring expert should be in possession of an MQF level 6 in a relevant science or engineering subject and proven experience in stack monitoring.

² A non-exhaustive list of qualified service providers for the monitoring of emissions to air from point sources may be found on the ERA web page <https://era.org.mt/stack-emissions-monitoring/>.

2. Monitoring of Emissions to Air - Method Statement Content

The monitoring method statement shall include the following details:

- The appointed expert to carry out the test
- A statement confirming that monitoring will be carried out under stable conditions at a representative even load (start-up and shut down periods shall be excluded)
- The type of monitoring to be carried out such as:
 - In-situ monitoring (direct measurement – the on-site measurement of stack gas properties using portable analysers and meters) or
 - laboratory monitoring (sample collection)
 - For larger MCP's measurements using continuous emissions monitoring systems (CEMS) may be used.

In the case of **in-situ monitoring** the following items are to be included:

- The sampling location and sample ports for the monitoring³. The sampling port must be downstream of any abatement equipment.
- A description on how the proposed sample point was selected, photos and schematic diagrams (sketch) may be included to support interpretation. Sampling locations shall meet the requirements of ***EN 15259 – Air Quality – Measurement of stationary source emissions – Requirements for measurement sections and sites and for the measurement objective, plan and report***
- Since emission measurements require defined flow conditions (i.e. an ordered and stable flow profile without vortexing and backflow), the measurement plane shall be in a section of a duct with constant shape and cross-sectional area, and as far downstream and upstream from any disturbance that could affect the flow of the waste gas. The monitoring plane must be such that the waste gas stream is homogeneous across the plane.
- The pollutants to be monitored (CO, NO_x, etc.) as required as per the Second Schedule of S.L. 549.122.
- The type of equipment to be used for each substance monitored. Measurement systems that have been assessed against the requirements of EN 50379-2 are assumed to meet the requirement.

³ Specifications for the sampling point ideally should be tackled at the design stage of the plant and should comply with established standards. Retrofitting suitable sampling locations once the plant has been built can be very expensive and difficult. The operator should ensure that relevant stacks or ducts allow compliance with the sampling standards.

- The limits of detection (LOD) of the monitoring equipment.
- The sampling procedure, for measuring the concentration of each pollutant (CO, NO_x, etc) including information on the combustion plant start up time prior to the commencement of taking readings (so as to ensure stable conditions). The following is a non-exhaustive list of standard reference methods that may be referred to, as relevant. Where appropriate, other recognised standards may be used.
 - **EN 15058 – Stationary source emissions – Determination of the mass concentration of carbon monoxide – Standard reference method: non-dispersive infrared spectrometry.**
 - **EN 14791 – Stationary source emissions. Determination of mass concentration of Sulphur oxides. Standard reference method**
 - **EN 14792 – Stationary source emissions. Determination of mass concentration of nitrogen oxides. Standard reference method. Chemiluminescence**
- A descriptive procedure for the measurement/calculation of the yearly waste gas flow rate.
 - **ISO 16911 – Stationary source emissions – Manual and automatic determination of velocity and volume flow rate in ducts**, may be referred to for the measurement of the waste gas flow rate.
- The number of sample readings to be taken to ensure reliable and repeatable results. A minimum of three readings are to be recorded.
- A declaration certifying that the equipment used shall be calibrated prior to measuring. A copy of the calibration certificate shall be provided with the results.
- A statement to confirm that all results will be standardized to the reporting conditions as per S.L. 549.122 (e.g. Oxygen content of 15%, temperature of 273,15K and a pressure of 101,3 kPa for diesel generators). To note that the oxygen content may vary depending on type of combustion plant and fuel being utilised, as indicated in the Second Schedule of S.L. 549.122.

A site visit carried out by the monitoring service provider prior to the preparation of the monitoring method statement may have practical benefits.

In the case of **laboratory monitoring**, the following items are to be included:

- The standard to be used for obtaining the samples
- Details of the laboratory which shall be used
- The laboratory's accreditation certificate. The laboratory shall be accredited to ISO 17025:2017 for each and every parameter being measured.
- The method which will be used for each parameter.

- A statement to confirm that all results will be standardized to the reporting conditions (e.g. Oxygen content of 15%, temperature of 273.15K and a pressure of 101.3 kPa for diesel generators).

3. Reporting of Results

The following reporting template structure may be used as a guide. The template also lists the minimum details that are required to be included within the report. **The report shall be endorsed and signed by the appointed expert.**

1. General Requirements	
Permit Details	<ol style="list-style-type: none"> 1. ERA Permit Number/Application Number 2. Name and address of installation 3. Date of the monitoring visit
Details of the contracted service provider	<ol style="list-style-type: none"> 1. Report title 2. Name and address of the appointed expert 3. Date of the report 4. Name, CV and designation (if applicable) of the person(s) conducting the monitoring.
2. Executive Summary	
<ol style="list-style-type: none"> 1. Aim of monitoring programme 2. The substances/parameters monitored at each sampling point 3. Emission point reference (Point Source number as per permit/application) 4. Summary of measurements taken during reporting period 5. Summary of non-compliant measurements 6. Maximum exceedance versus permit emission limit value 7. Cause and corrective action 	
3. Monitoring Results	
<p>Measured results:</p> <p>The results are to be expressed as taking consideration or normalizing parameters, including corrections for moisture and oxygen if required.</p>	<p>A table with the following information:</p> <ol style="list-style-type: none"> 1. Emission point; 2. Date of monitoring/sampling; 3. Start and end times for the monitoring; 4. Sampling durations as per method statement; 5. Pollutants monitored; 6. Emission limit values as per permit; 7. Periodic monitoring result; (same units as in permit to be reported) 8. Uncertainty associated with the result at a 95% confidence interval 9. Reference conditions at which the results are expressed 10. Name and reference number of the monitoring method used 11. Accreditation for use of method in case of sampling and lab analysis or a valid calibration certificate of the in-situ measuring equipment 12. Interpretation of results

4.	Operating Conditions
<p>A confirmation of the following:</p> <ol style="list-style-type: none"> 1. At the time of monitoring the operational load of the combustion plant was representative and even 2. Whether the process was continuous or batch process 	
Monitoring Deviations	<ol style="list-style-type: none"> 1. Any deviations from the method statement or the technical procedure(s) including justifications 2. Any other issues relevant to the monitoring results.
5.	Supporting Information
<ol style="list-style-type: none"> 1. The names, functions and qualifications of those persons engaged in the monitoring 2. Evidence of compliance with the relevant standards 3. Uncertainty calculations: <ol style="list-style-type: none"> a. A list of parameters that affect the measurement uncertainty; b. Uncertainty sources c. Combined uncertainty for sources; d. Total uncertainty as a percentage of the total measurement e. Total uncertainty in units of measurement; f. Total uncertainty as a percentage of the ELV (expressed at a 95% confidence interval) <p>All quantitative results must include statements regarding calculated or estimated uncertainty.</p> <p>Additionally, other factors contributing to uncertainty such as those arising from the measurement method used, the design of the sampling locations, the measurement process and composition of the gas are also to be estimated/calculated and included in the report.</p>	