



GUIDELINES AND CRITERIA FOR REGISTERED CONTINUOUS EMISSION MONITORING SYSTEM (CEMS) TESTER

DEPARTMENT OF ENVIRONMENT MALAYSIA





Assalamualaikum Warahmatullahi Wabarakatuh dan Salam Sejahtera

The Guidelines and Criteria for Registered Continuous Emission Monitoring System (CEMS) Tester is the first Department of Environment's publication that details the requirements for any parties who wish to be registered as CEMS tester.

As stipulated under the Regulation 17 of Environmental Quality (Clean Air) Regulations 2014, premises which are subjected for CEMS installation need to install CEMS system that comply with specification as determined by the DOE. These include the need to conduct CEMS testing (or audit) to determine the accuracy of CEMS data produced as well as to check the performance and completion of the system. These requirements are also addressed in the DOE Volume I: Guidelines for The Installation & Maintenance of Continuous Emission Monitoring System (CEMS) for Industrial Premises/ Facilities, version 7.0, June 2019.

These guidelines are aimed to facilitate the industries to deploy capable and competent third party CEMS tester personnel that follows procedures as required by the DOE.

These guidelines are developed as a reference to the applicant who is interested and capable to fulfill all requirements needed as a CEMS Tester. The procedures, processes, and requirements as a registered third (3rd) party CEMS tester are clearly outlined in this guideline.

I would like to acknowledge the contribution of Department of Environment CEMS Technical Committee members, relevant parties and individuals that provides input, comments and recommendations in the preparation and publication of this guidelines.

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Director General

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1. INTRODUCTION

Department of Environment Malaysia has imposed the requirement of Continuous Emission Monitoring System (CEMS) installation under the Regulation 17, Environmental Quality (Clean Air) Regulations 2014. The industry needs to install a DOE Registered CEMS and to ensure in-lined with all requirements stipulated in the Guidelines for the Installation & Maintenance of Emission Monitoring System (CEMS) for industrial Premises/Facilities

The newly installed CEMS or after undergone significant changes needs to be tested at least within 3 months after it starts commissioning and the subsequent quality assurance programs (QAP) need to be carried out for every 3 years. The QA program shall be conducted by a DOE registered third party CEMS tester.

2. OBJECTIVE

The main objective of this guidelines is to assist competent individual and company to register as CEMS tester based on the requirements of CEMS testing stated in the guidance document.

3. ROLES AND RESPONSIBILITY OF CEMS TESTER

A CEMS tester shall oblige to carry the following roles and responsibilities:

- (a) Register as a third party CEMS tester with DOE;
- (b) Performing the SRM for the QAL2 and AST procedures.
- (c) Reporting the results of the QAL2 and AST to plant operator and DOE;
- (d) When appropriate, cooperating with plant operator and CEMS supplier to conduct functional test;
- (e) Notifying the plant operator on the responsibility to ensure the functional test are performed before each QAL2 and AST. Some plant operators may require CEMS tester to conduct Functional Test; and
- (f) Any other requirements as stipulated in the Guidelines For The Installation & Maintenance Of Emission Monitoring System (CEMS) For industrial Premises/Facilities or as per directive from DOE.

4. REQUIREMENTS FOR REGISTRATION

This registration program is a company and personnel registration based. A company needs to have sufficient technical team members, capacity, and capability to conduct CEMS testing based on the requirements and procedures issued or



published by the DOE Malaysia. This qualification must be sustained throughout the company's registration period as a third party CEMS tester.

Each technical team member must be able to meet the general requisite to qualify for registration under the scheme as follows:

A. Skills and Knowledge

Applicants shall be able to demonstrate a satisfactory understanding level of competence in all the following areas:

- (i) Environmental Quality (Clean Air) Regulations 2014;
- (ii) Continuous Emission Monitoring System Installation and Testing Procedures;
- (iii) Stack Emission Testing Procedures;
- (iv) Audit Procedures, Processes and Techniques; and
- (v) Environmental Science and Technology.

All areas mentioned above are subjected to any current revision or changes by the regulatory or relevant agency.

Note:

- i. To demonstrate the auditing knowledge and skills, the applicants are required to submit evidence such as certificates from the relevant and reputable audit courses or registration bodies.
- ii. The referred certificate as mentioned above may consist of course participation certificate or/and competency certificate whichever is/ are related to this registration requirement.

B. Education and Work Experience

All applicants shall demonstrate qualifications in the following areas as a requirement for registration:

- (i) Education

Applicants shall have at minimum, diploma or first degree in engineering, applied science, environmental technology, or environmental science. Information Technology (IT) knowledge shall be an advantage.

- (ii) Work Experience

All applicants shall have sufficient experience in the stack sampling and CEMS related work and has been involved in technical, management and decision-making aspect related to both.



(iii) Technical and On-Site Experience

All applicants shall demonstrate a minimum number of project or/and year of experience in technical work.

The detail requirements are as in **Table 1**.

Table 1: Criteria for CEMS Tester

PERSONNEL			
CEMS related work experience (Years)		Isokinetic and non-isokinetic stack sampling (Number of project)	CEMS testing/audit (Number of project)
Team Leader	Team Member		
5	2	10	5

Notes:

- (a) The CEMS testing team must at least have a minimum of two (2) members.
- (b) The CEMS testing team must be led by a team leader with a minimum 5 years of experience and each member must have a minimum 2 years of experience in CEMS installation work, stack sampling and CEMS testing/audit.
- (c) Each team member has attended training session including hands-on training on stack sampling and CEMS testing conducted locally or internationally by the relevant agencies. This criterion is subject to the DOE acceptance.
- (d) The isokinetic and non-isokinetic exercises were conducted for different sites.
- (e) Involved in the installation work for DOE registered CEMS system is an advantage.
- (f) CEMS testing/audit is referring to the audit carried out before the implementation of CEMS Guideline Version 7.0, June 2019.
- (g) The company must:
 - Have stack sampling equipment and other related apparatus as required by the sampling procedures. All samples are to be analysed by an accredited laboratory;

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- Have technical team and supports to conduct the stack sampling; and
- Have CEMS testing equipment and other related apparatus as required by the testing procedures. The testing equipment must fulfill the requirement of DOE and be registered.

(iv) On-going Assessment for Registration:

Successful registered applicant will undergo 2 assessment stages. In the early stage of registration, an on-going assessment will be conducted by the DOE based on the followings:

- Assessment on the application document (1st stage)
- Assessment during the 1st on-site CEMS testing and reporting (2nd stage)

All registered tester will be continuously assessed based on the requirements set or if any circumstance that the company can be de-registered.

(v) De-registration

a. The registered CEMS Tester company will be deregistered under the following conditions:

- False declaration of information in the application document;
- Fail to demonstrate a full understanding and the right conduct of CEMS testing procedures during the 1st on-site CEMS testing and reporting;
- Provide false information on the CEMS testing and reporting;
- Unprofessional conduct, including report falsification or representation;
- CEMS testing report is not accepted by the DOE for 3 times in a row due to the inadequate information or poor quality of work;
- Fail to comply with the Code of Conducts;
- Convicted under local or foreign law; and
- Any other reasonable ground.

(vi) Codes of Conduct

- a. All CEMS Tester company is responsible to conduct testing as to determine the capability and the efficiency of the for good and reliable CEMS data.
- b. All CEMS Tester is not allowed to test CEMS that has been installed by their company or any company with the same owner including their subsidiaries. This is to avoid any conflict of interest, bias action and to



avoid any integrity issue on the testing done. Any tester involve in this offence may result in deregistration.

- c. All CEMS Testers company are obliged to uphold the CEMS testing profession by rigorously observe the following Codes of Conduct. Failure to oblige may result in suspension or de-registration. All tester shall:
- Act professionally, accurately and in an unbiased manner;
 - Strive to increase the competence and prestige of the CEMS testing profession;
 - Assist team member or any personnel related to this work in developing their management, professional and testing skills;
 - Not to undertake any job that is beyond tester's competency;
 - Do not have conflict of interest related to the work given by clients;
 - Not to accept any inducement, commission, gift or any other benefit from any interested party or knowingly allow team member to do so;
 - Not to intentionally communicate false and misleading information that may compromise the integrity of any audit;
 - Not developing unhealthy competition or circumstances among the CEMS tester community;
 - Not to act in any way that would bring dispute on the policy, procedure, action, and decision made by the DOE Malaysia pertaining to this registration scheme; and
 - Not to act in any way that would prejudice the reputation of the CEMS Tester Registration Scheme or the CEMS tester registration process and to co-operate fully with any inquiry in the event of any illegal breach of this code.

5. APPLICATION OF REGISTRATION

The Director General of Department of Environment shall appoint the Secretariat of CEMS Technical Committee to carry out the process of registration of the CEMS tester.

The evaluation process shall consist of the followings:

- (i) Submission of registration form

All applicants shall submit CEMS tester registration form and supporting documents as per required in the checklist provided in **Annex 1**.

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SYSTEM (CEMS) TESTER



Application needs to be submitted in a color printed hardcopy document (2 copies) to the:

Director of Air Division,
Department of Environment,
No.4, Persiaran Perdana,
62574 Putrajaya.
(Attn.: Secretariat of CEMS/PEMS Technical Committee)

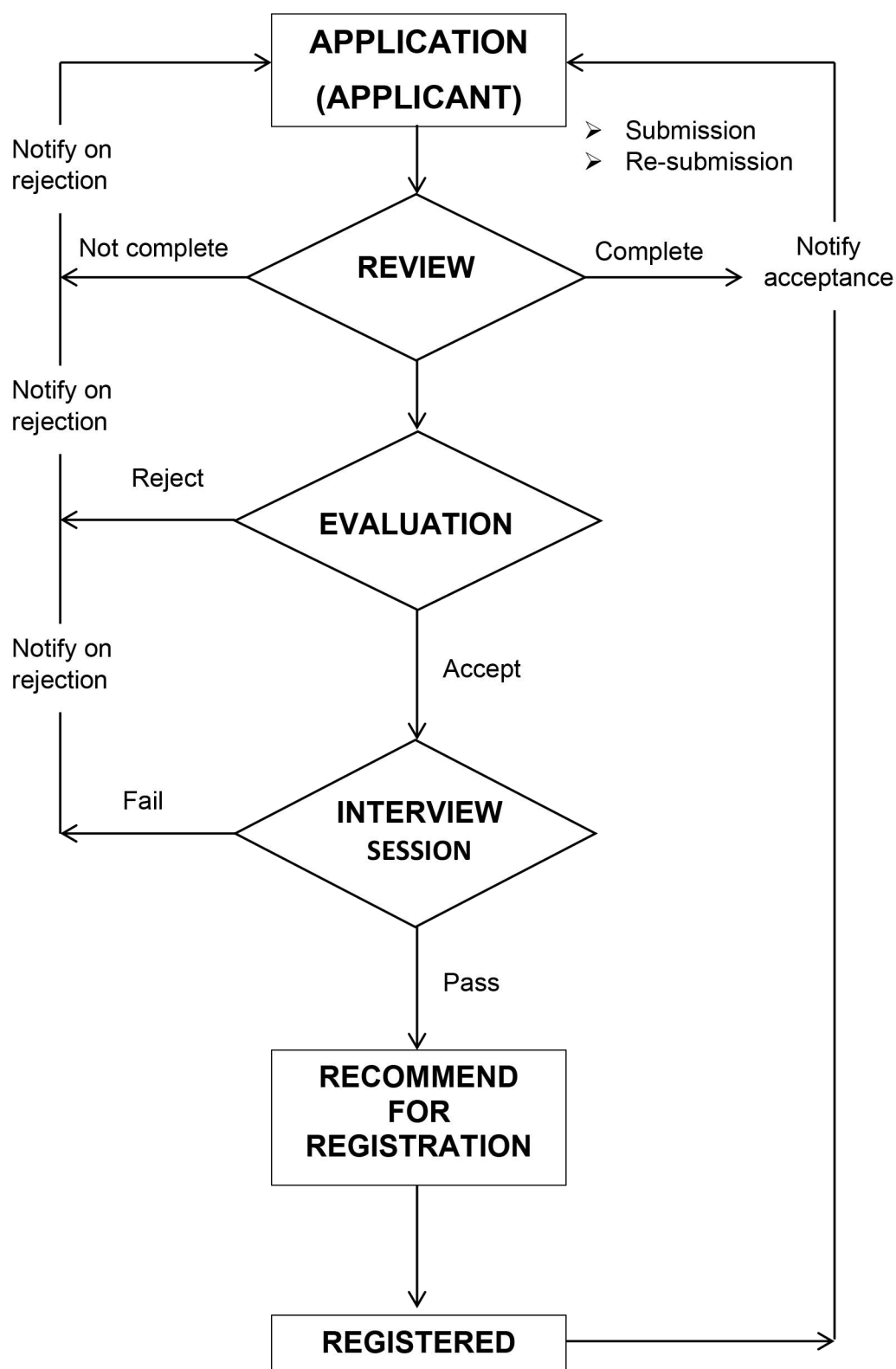
(ii) Professional Interview

All applicants will be invited for interview and presentation session with the expert panel. The panel will assess applicant's understanding and capability in conducting CEMS testing as well as to check sampling equipment that will be used.

(iii) Registration term and period

- a. The CEMS tester who has successfully registered will undergo on-going assessment by the DOE.
- b. The registration has no validity period. However, the DOE has right to change the policy from time to time.
- c. The CEMS Tester Company which has been registered before the establishment of this guideline will undergo re-assessment by the DOE to standardize the standard of this requirement and to achieve the same capability between the registered testers.
 - Those registered companies are given 2 years grace period for making improvement upon receiving re-assessment form from the Secretariat.
 - DOE has right to deregister any existing or newly registered CEMS Tester under the conditions listed in the Item B (v) as well as the obligation to comply with the Code of Conducts as listed in the Item B (vi). These requirements are immediately applicable once the document is come into force or published.

5. Overview of CEMS Tester Registration Process



APPLICATION

- Submission of application by the applicant by using formatted check list.
- Application will be recorded by the secretariat.

REVIEW

- Checking of document completeness by the secretariat.
- Secretariat will distribute documents to the panel.

EVALUATION

- Panel will assess information in the application document and additional information may be requested.
- Secretariat will coordinate an interview session.

INTERVIEW SESSION

- Verifying competence and other criteria set by the department.
- Checking on the CEMS testing equipment.
- Panel may ask additional information if necessary.

REGISTRATION

- Secretariat will seek approval and endorsement from the committee based on the recommendation from panel.
- DOE will issue an acknowledgement letter.
- CEMS tester company will be listed down in the DOE website.

CHECK LIST FOR THE APPLICATION AND REGISTRATION OF CONTINUOUS EMISSION MONITORING SYSTEM (CEMS) TESTER

COMPANY NAME:

NO.	DESCRIPTION	YES / NO	REMARKS
Information of Company			
1	Application Letter		
2	Company Profile		
3	Registration Of Company (ROC)		
Type of CEMS Tester Registration			
4	Please Specify (✓): Dust and/or Opacity CEMS Tester <input type="checkbox"/> Gas CEMS Tester <input type="checkbox"/>		
Information on CEMS Testing Team and Qualified Personnel Information			
5	List Of Qualified Personnel and Role of Each Member. Team Must Be Led by A Team Leader		
6	Information On Education Background and Current Position in The Company		
7	Years and Numbers of Working Experience in CEMS and Isokinetic/Non-Isokinetic Sampling Related Work		
8	List Of Training (Including Hands-On Training) In CEMS Testing by Local And/ Or International Training Providers		
9.	List of Professional Competency Certificates that includes: a) Instrument Competency Training Certificates.		

NO.	DESCRIPTION	YES / NO	REMARKS
	b) Competency Training Certificate for Isokinetic Stack Sampling. c) Related Auditing Competency Certificates. d) Others That Are Related.		
Note	Information For Item 5-9 Can Be Listed Based on A Specified Format as In APPENDIX A.(Table 1)		
Company Working Experience			
10	Number And List of Site Working Experience for CEMS Related Works. A Copy of Minimum 4 Project Summary Reports from The Above-Mentioned Project List Must Be Provided to Show Evidence.		
11	Number And List of Stack Sampling (Isokinetic and Non-Isokinetic) For Different Locations/Premises A Copy of Minimum 4 Test Reports (Minimum 2 Reports for Each Type of Sampling) From the Above-Mentioned Project List Must Be Provided to Show Evidence.		
12	Number And List of CEMS Testing Conducted Before the Implementation of CEMS Guideline Version 7.0. A Copy of Minimum 5 Testing Reports from The Above-Mentioned Project List Must Be Provided to Show Evidence.		
Note	Information For Item 10 - 12 Can Be Listed Based on A Specified Format as In APPENDIX A (Table 2)		
Information of CEMS Testing Equipment			
13	Description of SRM Equipment and Operating Procedure		

NO.	DESCRIPTION	YES / NO	REMARKS
14	Specifications on Analyzer & Equipment-Type/Model, Function, Parameter & Range. Operating manuals must be provided.		
15	Mobile/Portable CEMS Certification Schemes (MCERTS/TUV(QAL1))		
16	Schematic Diagram and SRM Equipment Set-Up for Gas and Dust Sampling		
Note	Information For Item 14 Can Be Listed Based on A Specified Format as In APPENDIX A (Table 3)		
CEMS Testing Audit Procedure			
17	Description Of Audit Procedure for Gas and Dust (Functional Test, QAL2-CVT, AST)		
18	Example For CEMS Audit Test Report (Based on Format Specified in The CEMS Guidelines Version 7.0, June 2019)		

Note:

- (i) Information needed by the panel may not limit to the above-mentioned requirements.
- (ii) All information and supporting documents provided must be related to this application.

List of Abbreviations

- i. SRM : Standard Reference Method
- ii. MCERTS : Environment Agency's Monitoring Scheme
- iii. TUV : German Technical Inspection Team
- iv. QAL 1 : Quality Assurance Level 1
- v. QAL 2 : Quality Assurance Level 2
- vi. CVT : Calibration and Variability Test
- vii. AST : Annual Surveillance Test

FORMAT FOR TABLE 1: INFORMATION ON CEMS TESTING TEAM AND QUALIFIED PERSONNEL INFORMATION

NO.	NAME OF PERSONNEL	ROLE IN TESTING TEAM	ACADEMIC QUALIFICATION	POSITION IN THE COMPANY	YEARS OF EXPERIENCE IN		NUMBERS OF WORK INVOLVED		LIST OF TRAINING AND CERTIFICATE
					CEMS	ISO/NON-ISO	CEMS	ISO/NON-ISO	
Note	i. Please add additional page if required.								

FORMAT FOR TABLE 2: COMPANY WORKING EXPERIENCE

NO.	CEMS RELATED WORK	NAME OF PROJECT	PROJECT SCOPE	YEAR	PERSONNEL INVOLVED
NO.	ISO/NON-ISOKINETIC WORK	NAME OF PROJECT	PROJECT SCOPE	YEAR	PERSONNEL INVOLVED
NO.	CEMS TESTING (AUDIT) WORK	NAME OF PROJECT	PROJECT SCOPE	YEAR	PERSONNEL INVOLVED
Note	i. Personnel involved to be listed in the above table must be amongst the applicants listed in Table 1 . ii. Copy of project reports must be provided based on the quantity mentioned in the checklist. iii. Please add additional page if required.				

FORMAT FOR TABLE 3: INFORMATION OF CEMS TESTING EQUIPMENT

NO.	TYPE OF TESTING EQUIPMENT AND LIST OF COMPONENTS	BRAND AND MODEL	PARAMETERS AND SPECIFIED RANGE	CERTIFICATION OF ANALYZER AND EQUIPMENT	EQUIPMENT MANUAL OR CATALOG	REFERENCE OF APPLICABLE TESTING PROCEDURE
Note	i. Mobile or portable CEMS must be certified with MCERTS/TUV (QAL1) certification. A copy of the MCERT/TUV certificate must be provided. ii. Certified analyzer means any analyzer that has been certified in accordance with EN 15267-3 (certification must be valid at the time the equipment is newly purchased) or EN 15267-4 as appropriate. It is noted that EN 15267-3 covers the certification of Automated Measuring Systems (AMS, also known as CEMS) and EN 15267-4 covers certification of Portable Automated Measuring Systems (P-AMS) for Periodic Measurements. (Source: AG2 Index of Preferred Methods, Version 4, June 2020) iii. The specification of the mobile or portable CEMS must suit with the tested CEMS and considering important aspects such as certification range, measuring range and monitoring technique. iv. The mobile or portable CEMS must be equipped and operated with the components as listed in the MCERT/TUV certificate. Any changes or deviation from this must gain prior approval from the DOE. v. A copy of catalog and operating manual for each equipment must be provided. vi. A copy of reference applicable testing procedure must be provided. vii. Please add additional page if required.					