

California Environmental Protection Agency



Vapor Recovery Certification Procedure

CP-203

Certification Procedure for
Vapor Recovery Systems of Terminals

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**CP-203
TABLE OF CONTENTS**

1 GENERAL INFORMATION AND APPLICABILITY	1
1.1 Legislative and Regulatory Requirements of Other California State Agencies	1
1.2 Legislative and Regulatory Requirements of Other Agencies	2
2 SUMMARY OF CERTIFICATION PROCESS.....	2
2.1 Summary of Requirements of Certification Procedure	2
2.2 Summary of Time Periods for Review and Processing	3
3 APPLICATION FOR CERTIFICATION	5
3.1 General	5
3.2 Information Required by the ARB Executive Officer.....	6
3.2.1 Evidence of Corporate and Financial Responsibility	6
3.2.2 Installation, Operation, and Maintenance	7
3.2.3 Compatibility.....	7
4 PERFORMANCE STANDARDS, PERFORMANCE SPECIFICATIONS, AND TEST PROCEDURES	7
4.1 Performance Standards and Test Procedures	8
4.1.1 Emission Factor	8
4.1.2 Vapor Vent Valve	8
4.1.3 Leaks.....	9
4.1.4 Static Pressure	9
4.2 Performance Specifications and Test Procedures	9
4.2.1 Emission Factor	10

4.2.2 Incinerators	11
4.3 Performance Standards and Performance Specifications for Novel Systems	11
4.4 Test Procedures for Novel Systems	12
4.4.1 Technical Identification of Need	12
4.4.2 Administrative Requirement for Development	12
4.4.3 Evaluation and Approval	12
5 EVALUATION AND TESTING OF VAPOR RECOVERY EQUIPMENT	13
5.1 General Evaluation and Testing	13
5.2 Alternative Evaluation and Testing	14
5.3 Preliminary Evaluation	14
5.4 Field Testing	15
5.5 Bench Testing	15
5.6 Evaluation	15
6 DOCUMENTATION FOR CERTIFICATION	15
7 CERTIFICATION	16

**California Environmental Protection Agency
Air Resources Board**

Vapor Recovery Certification Procedure

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**Certification Procedure for Vapor Recovery Systems of
Terminals**

1 GENERAL INFORMATION AND APPLICABILITY

This document describes a procedure for certifying equipment which recovers vapors emitted in association with gasoline marketing operations involving supply lines, terminals, delivery lines, and cargo tanks.

Other vapor recovery certification procedures provide instructions for determining performance standards, performance specifications, and test procedures for equipment which recovers vapors emitted in association with gasoline marketing operations involving: dispensing facilities (CP-201); bulk plants and cargo tanks (CP-202); and cargo tanks (CP-204). For novel facilities or systems to which CP-201 through 204 do not apply, CP-205 provides instructions for determining performance standards, performance specifications, and test procedures for equipment which recovers vapors emitted in association with gasoline marketing operations.

Section 41954 of the California Health and Safety Code requires the ARB to adopt procedures for determining the compliance of any system designed for the control of gasoline vapor emissions during gasoline marketing operations, including storage, transport, and transfer operations with performance standards which the Board determines are reasonable and necessary to achieve or maintain any applicable ambient air quality standard.

A set of definitions common to all certification and test procedures is in:

**D-200 Definitions for
Certification Procedures and
Test Procedures for
Vapor Recovery Systems**

1.1 Legislative and Regulatory Requirements of Other California State Agencies

As required, the ARB Executive Officer shall coordinate this certification procedure with:

- (1) Department of Food and Agriculture,
Division of Measurement Standards (DMS)
- (2) State Fire Marshal (SFM)
- (3) Department of Industrial Relations,
Division of Occupational Safety and Health (DOSH)

Certification of a system by the ARB Executive Officer does not exempt the system from compliance with other applicable codes and regulations such as state fire codes, weights and measure regulations, and safety codes and regulations.

1.2 Legislative and Regulatory Requirements of Other Agencies

In addition to California's local Districts, other federal, state, or local agencies may have legal jurisdiction regarding vapor recovery systems. The applicant is solely responsible for:

- (1) compatibility of the applicant's equipment with the application of any other agency's test procedures;
- (2) testing of the applicant's equipment with such test procedures; and
- (3) compliance with performance standards and performance specifications in any other agency's regulations referencing such test procedures.

The ARB Executive Officer is not responsible for items (1) through (3) above.

Terminal facilities may be subject to a pretest leak check and different leak limits as specified by district and/or federal rules (40 CFR Part 63, Subpart R National Emission Standards for Gasoline Distribution Facilities (Bulk Gasoline Terminals and Pipeline Breakout stations)).

2 SUMMARY OF CERTIFICATION PROCESS

2.1 Summary of Requirements of Certification Procedure

This certification procedure has five interacting components which may be applied iteratively in complex cases. For example, review of evaluation and testing may yield additional specifications. The five components are:

2.1.1 Application for Certification (See § 3.)

The applicant must submit all required application information. The ARB Executive Officer shall consult with the applicant, shall review the information,

may require revisions or more information, and shall approve the application after it is determined to be complete.

2.1.2 Standards, Specifications, and Test Procedures (See § 4.)

The ARB Executive Officer shall specify performance standards, performance specifications, and test procedures for vapor recovery equipment in response to a completed application for certification.

2.1.3 Evaluation and Testing of Vapor Recovery Equipment (See § 5.)

The vapor recovery equipment shall be subjected to evaluation and testing according to the performance standards, performance specifications, and test procedures at the applicant's expense. The ARB Executive Officer shall conduct all evaluation and testing unless the ARB Executive Officer determines that the equipment owner or operator shall contract for or conduct specified evaluation and testing on a case-by-case basis.

2.1.4 Documentation for Certification (See § 6.)

A Certification Report shall be prepared, at the applicant's expense, documenting the preceding components:

- (1) Application for Certification;
- (2) Standards, Specifications, and Procedures; and
- (3) Evaluation and Testing of Vapor Recovery Equipment.

The ARB Executive Officer shall consult with the applicant, shall review the report, may require additional work on the components, and shall approve and sign the Certification Report after it is determined that:

- (1) The Certification Report is complete; and
- (2) The Certification Report documents successful performance of the subject vapor recovery equipment according to the required performance standards, performance specifications, and test procedures.

2.1.5 Certification (See § 7.)

Evidence of certification shall be an ARB Executive Order (which shall reference the Certification Report) signed by the ARB Executive Officer.

2.2 Summary of Time Periods for Review and Processing

The following definitions of ARB Executive Officer Actions and Time Periods shall apply to all applications subject to this procedure per CCR, Title 17, § 60030:

"ARB Executive Officer Interim Action #1"

means that the ARB Executive Officer determines that application is deficient per § 3, § 4, § 5, or § 6 and communicates specific deficiencies to the Applicant in writing.

"ARB Executive Officer Interim Action #2"

means that the ARB Executive Officer determines that application is complete per § 3, § 4, § 5, and § 6 and accepted for filing and communicates such determination to Applicant in writing.

"ARB Executive Officer Final Action"

means that the ARB Executive Officer acts to disapprove or approve the application per § 3, § 4, § 5, § 6, and § 7 and communicates such determination to the Applicant in writing.

"Time Periods"

are defined in the table below:

FROM: ACTION BELOW	TIME PERIOD	TO: ACTION BELOW
Applicant files an initial application for certification.	within 30 days	ARB Executive Officer Interim Action #1 or #2
Applicant files an amended application for certification.	within 15 days	ARB Executive Officer Interim Action #1 or #2
ARB Executive Officer Interim Action #2	within 90 days	ARB Executive Officer Final Action

The time periods specified above may be extended by the ARB Executive Officer for good cause per CCR, Title 17, § 60030 (d).

3 APPLICATION FOR CERTIFICATION

Warning: All of the information specified in all of the following subsections must be submitted to the ARB Executive Officer for an application to be considered complete.

Applications which do not completely satisfy the requirements of this section shall be returned to the applicant with an indication of deficiencies.

3.1 General

3.1.1 An application for certification of a vapor recovery system shall be made to the ARB Executive Officer by any owner or operator or authorized representative of a terminal.

3.1.2 The application shall be in writing, signed by the owner or operator or authorized representative, and shall include the following:

- (1) A detailed description of the configuration of the vapor recovery system including but not limited to the following:
 - (a) The piping configuration and specifications (pipe sizes, lengths, fittings, material(s), etc.).
 - (b) Product and vapor recovery hose connectors for mating to the cargo tank.
 - (c) Engineering parameters for pumps and vapor processing units to be used as part of the vapor recovery system.
 - (d) Allowable pressure drops through the systems.
 - (e) Specification of the location of all PV valves on atmospheric vents from the vapor recovery system and the pressure and vacuum relief settings for each vent.
- (2) Evidence demonstrating the vapor recovery reliability of the system or device.
- (3) A description of any test performed to ascertain compliance with the general standards, and the results of such tests.
- (4) A statement of recommended maintenance procedures, equipment performance checkout procedures, and equipment necessary to assure that the vapor recovery system, in operation, conforms to the regulations, plus a description of the program for training personnel for such maintenance.

- (5) One copy of the service and operating manuals for the system.
- (6) A copy of the permit to operate or authority to construct for the facility operation granted by the local district and
 - (a) a copy of any air pollution test reports for the facility,
 - (b) a statement of the date the vapor recovery system was installed, and
 - (c) a statement of the date the vapor recovery system became operational.
- (7) A copy of the warranty or warranties provided with the system.
- (8) If the application is for a system previously tested by the ARB Executive Officer, but not certified, the application shall include identification of the system components which have been changed, including all new physical and operational characteristics, together with any new test results obtained by the applicant.

3.1.3 The applicant shall submit a list of components by manufacturer and model number for the vapor recovery system.

If the ARB Executive Officer determines that such design information is necessary during review of the application, the applicant shall submit engineering drawings for:

- (1) each prototype vapor recovery system and
- (2) all equipment components of each prototype system.

For any component, in lieu of a component drawing, the applicant can submit an affidavit declaring:

- (1) the manufacturer's model number for the component and
- (2) the applicant's commitment to maintain, on file, engineering drawings for such component.

3.2 Information Required by the ARB Executive Officer

3.2.1 Evidence of Corporate and Financial Responsibility

The requirements of this section shall apply with equal stringency both to original manufacturers and to rebuilders of vapor recovery equipment.

A fee not to exceed the actual cost of certification testing may be charged by the ARB Executive Officer or authorized representative to each applicant submitting system(s) for certification. The applicant may be required to demonstrate ability to pay the cost of testing prior to certification testing. The system will not be certified until the test fees, if any, have been paid in full to the ARB Executive Officer.

3.2.2 Installation, Operation, and Maintenance

A system manual which specifies required installation, operation, and maintenance procedures for the vapor recovery system shall be submitted with the application. A required field training program for maintenance personnel shall be specified in the system manual, including performance specifications for personnel and maintenance procedures.

3.2.3 Compatibility

This section specifies vapor recovery system compatibility requirements which, although not specified in terms of vapor recovery effectiveness, form an indispensable basis for proceeding with the application of the appropriate certification and test procedures.

The installation, operation, and maintenance of vapor recovery equipment must be compatible with:

- (1) the application of performance standards, performance specifications, and test procedures and
- (2) the installation, operation, and maintenance of any other equipment associated with such vapor recovery equipment.

4 PERFORMANCE STANDARDS, PERFORMANCE SPECIFICATIONS, AND TEST PROCEDURES

Warning: The installation, operation, maintenance, and inspection of a vapor recovery system must be compatible with:

- (1) the application of specified performance standards, performance specifications, and test procedures and
- (2) the installation, operation, maintenance, and inspection of any other equipment associated with such system.

4.1 Performance Standards and Test Procedures

4.1.1 Emission Factor

4.1.1.1 Performance Standard

A vapor recovery system shall have a maximum emission factor of 0.29 #/E3G to obtain certification by this procedure. However, many facilities may be subject to lower emission limits as specified by local district and/or federal rules.

This performance standard shall also be a performance specification.

Note: For the purpose of comparing emission factors and efficiency values, the emission factor for uncontrolled displacement of gasoline vapors is defined as 8.4 pounds of hydrocarbon vapor displaced per thousand gallons of gasoline liquid dispensed (8.4 #/E3G). Thus, for example, ninety-six-point-five percent (96.5%) control efficiency by weight corresponds to emissions of 0.29 #/E3G.

8.4 #/E3G may not represent an accurate uncontrolled emission factor for vapors displaced during terminal transfer operations. 8.4 #/E3G corresponds to a hydrocarbon concentration of 55% as C3 for displaced vapors. Most terminal tests show lower concentrations of vapors entering the processing unit (20% to 40% as C3 is typical). One reason that the concentrations are lower is due to diesel and switch loading operations. Data on the vapor return line concentration must be collected if an accurate determination of mass efficiency is to be made on a case-by-case basis.

4.1.1.2 Test Procedures

Compliance with the performance standard for emission factor shall be determined per:

TP-203.1

4.1.2 Vapor Vent Valve

4.1.2.1 Performance Standard

The system shall not cause out-breathing to occur from system pressure-vacuum relief valves including valves on any fixed roof tanks, during normal operations of the vapor recovery system.

4.1.2.2 Test Procedures

Compliance with the performance standard for vapor vent valves shall be determined per:

TP-203.1

4.1.3 Leaks

4.1.3.1 Performance Standard

All equipment and connections shall be vapor tight and have no liquid leaks.

This requirement does not apply to vapor emissions from designed system outlets such as pressure relief vents (notwithstanding TP-203.1 §§ 2.3.3) or vapor processors and incinerators provided that such emissions are determined per TP-203.1 during certification testing.

4.1.3.2 Test Procedures

Compliance with the performance standard for leaks shall be determined per:

TP-204.3

4.1.4 Static Pressure

4.1.4.2 Performance Standard

The vapor recovery system shall not cause the pressure in the cargo tanks to exceed 18 inches H₂O gauge, during cargo tank loading.

4.1.4.2 Test Procedures

Compliance with the performance standard for static pressure shall be determined per:

TP-203.1

4.2 Performance Specifications and Test Procedures

Performance specifications may be specified by the applicant in the required application information for each component or configuration of components of the vapor recovery system. Such performance specifications shall be the basis for any testing performed on any component or configuration of components when isolated from the rest of the system.

Other performance specifications shall be added, as appropriate after review of system information by the ARB Executive Officer.

4.2.1 Emission Factor

4.2.1.1 Performance Specification

A vapor recovery system shall have a maximum emission factor of 0.29 #/E3G to obtain certification by this procedure. However, many facilities may be subject to lower emission limits as specified by local district and/or federal rules.

As a performance specification for compliance testing, this standard shall be applied at facility operating conditions which are not altered for or by testing activities.

The facility operating conditions established during testing for the certification criterion shall each be specified as performance specifications subject to subsequent compliance testing.

NOTE: For the purpose of comparing emission factors and efficiency values, the emission factor for uncontrolled displacement of gasoline vapors is defined as 8.4 pounds of hydrocarbon vapor displaced per thousand gallons of gasoline liquid dispensed (8.4 #/E3G). Thus, for example, ninety-six-point-five percent (96.5%) control efficiency by weight corresponds to emissions of 0.29 #/E3G.

8.4 #/E3G may not represent an accurate uncontrolled emission factor for vapors displaced during terminal transfer operations. 8.4 #/E3G corresponds to a hydrocarbon concentration of 55% as C3 for displaced vapors. Most terminal tests show lower concentrations of vapors entering the processing unit (20% to 40% as C3 is typical). One reason that the concentrations are lower is due to diesel and switch loading operations. Data on the vapor return line concentration must be collected if an accurate determination of mass efficiency is to be made on a case-by-case basis.

4.2.1.2 Test Procedures

Compliance with the performance specification for emission factor shall be determined per:

TP-203.1

4.2.2 Incinerators

4.2.2.1 Performance Specification

Any vapor recovery system which, as part of its design and intended function, incinerates vapors shall comply with:

- (1) a performance specification for carbon monoxide (CO) emissions and
- (2) performance specifications for other critical incinerator operating parameters:

The results of evaluation and testing of the system, documented in the certification test report, shall include:

- (1) the identification of such critical system operating parameters,
- (2) the performance specifications for such critical system operating parameters.

Challenge and failure mode testing shall be performed to establish system sensitivity to and performance specifications for the following variables:

- (1) number of loading arms in simultaneous use and
- (2) individual loading arm transfer rates.

The maximum number of loading arms in simultaneous use and the maximum loading arm transfer rates that are demonstrated during certification testing shall define (as certified performance specifications) limits to be placed on subsequent operation of the facility.

4.2.2.2 Test Procedures

Compliance with the performance specification for incinerators shall be determined per:

TP-203.1

4.3 Performance Standards and Performance Specifications for Novel Systems

For novel systems, on a case-by-case basis, additional performance standards and performance specifications shall be required based on evaluation by the ARB Executive Officer and a determination of necessity.

4.4 Test Procedures for Novel Systems

Novel test procedures shall be required for novel systems based on evaluation by the ARB Executive Officer and a determination of necessity.

4.4.1 Technical Identification of Need

The equipment related to any application for certification shall be subject to an engineering evaluation.

The engineering evaluation may result in a technical identification of need for development of special test procedures for novel systems, components, or applications.

4.4.2 Administrative Requirement for Development

Following any such technical identification of need, the applicant shall be responsible for developing test procedures for the applicant's equipment to demonstrate that such equipment can meet any applicable performance standards or specifications.

4.4.3 Evaluation and Approval

Any test procedures identified and developed by the applicant shall be subject to an engineering evaluation which must result in approval by the ARB Executive Officer to meet the requirements of this section.

5 EVALUATION AND TESTING OF VAPOR RECOVERY EQUIPMENT

5.1 General Evaluation and Testing

Vapor recovery systems shall be subjected to evaluation and testing according to the specified performance standards, performance specifications, and test procedures at the applicant's expense.

Note: To avoid the certification of a performance standard or performance specification which can not reasonably be met by all anticipated installations of a certified system, the applicant may specify (a) challenge mode(s) for system testing, subject to approval by the ARB Executive Officer. The ARB Executive Officer shall evaluate each system to determine the need for failure mode testing; and if such need is positively determined the ARB Executive Officer shall specify (a) failure mode(s) for system testing.

"Challenge mode testing" is testing conducted with a system installation intentionally modified so that the performance standard is more difficult to meet. The purpose of challenge mode testing is to provide a basis for determining performance specifications which reasonably can be met by all anticipated installations of a certified system.

"Failure mode testing" is testing conducted with a system installation intentionally modified so that it fails to meet its performance standard. The purpose of failure mode testing is to provide a basis for determining performance specifications which, when met, provide reasonable assurance that an installation of the system is not in the related failure mode.

- (1) The ARB Executive Officer shall conduct all evaluation and testing unless the ARB Executive Officer determines that the equipment owner or operator shall contract for or conduct specified evaluation and testing on a case-by-case basis.
- (2) All test personnel, regardless of their primary employer, shall be responsible solely to the ARB Executive Officer for the conduct of all testing activities required by this certification procedure. Such testing activities include, but are not limited to:
 - (a) collection of data
 - (b) calculation of results
 - (c) reporting of results

- (3) The ARB Executive Officer shall be present to monitor all testing and clarify the application of the procedures in novel circumstances; test data, calculations, and reported results shall be subsequently reviewed and evaluated by the ARB Executive Officer to determine their validity for inclusion in the Certification Report.

5.2 Alternative Evaluation and Testing

Certification procedures, other than specified above, shall only be used if prior written approval is obtained from the ARB Executive Officer. In order to secure the ARB Executive Officer's approval of an alternative certification procedure, the applicant is responsible for demonstrating to the ARB Executive Officer's satisfaction that the alternative certification procedure is equivalent to this certification procedure.

- (1) Such approval shall be granted on a case-by-case basis only. Because of the evolving nature of technology and procedures for vapor recovery systems, such approval shall not be granted in subsequent cases without a new request for approval and a new demonstration of equivalency.
- (2) Documentation of any such approvals, demonstrations, and approvals shall be maintained in the ARB Executive Officer's files and shall be made available upon request.

5.3 Preliminary Evaluation

A preliminary engineering evaluation shall be performed on each subject vapor recovery system to determine the conditions under which field testing, bench testing, and further engineering evaluation shall be performed.

Field testing, bench testing and engineering evaluation of subject vapor recovery systems and components shall be conducted in a manner, determined by the ARB Executive Officer, which shows consideration of the difficulties of actual in-use circumstances in which the systems and components are expected to be employed:

- (1) The ARB Executive Officer shall determine any challenge and failure modes necessary to reflect the matrix of actual in-use circumstances expected for all installations of such systems. If such modes are determined, they shall be specified in writing to the applicant.
- (2) Field testing, bench testing and engineering evaluation shall include any challenge and failure modes for such systems as determined in (1) to provide for performance standards and performance specifications which can be met by the actual use of all installations of such systems.

5.4 Field Testing

The ARB Executive Officer shall require field testing for any performance standard or performance specification if, after its evaluation, field testing is the only acceptable alternative.

5.5 Bench Testing

The ARB Executive Officer shall require bench testing for any performance standard or performance specification if, after its evaluation, bench testing is necessary and a non-testing evaluation alternative is inadequate.

5.6 Evaluation

The ARB Executive Officer shall evaluate the results of testing for any performance standard or performance specification.

The ARB Executive Officer shall conduct a non-testing evaluation, after determining that testing is unnecessary, for any performance standard or performance specification.

6 DOCUMENTATION FOR CERTIFICATION

A Certification Report shall be prepared, at the applicant's expense, documenting the preceding components:

- (1) Application for Certification
- (2) Standards, Specifications, and Test Procedures
- (3) Evaluation and Testing of the Vapor Recovery System

Note: In addition to other required results, vapor recovery system test results shall be reported in units of pounds of hydrocarbon emitted per thousand gallons of fuel transferred for any results which are expressible in such units.

The ARB Executive Officer shall consult with the applicant, shall review the report, may require revisions or more work on the components, and shall approve and sign the Certification Report after it is determined that:

- (1) The Certification Report is complete.
- (2) The Certification Report documents successful performance of the subject vapor recovery system according to the performance standards, performance specifications, and test procedures.

7 CERTIFICATION

The ARB Executive Officer shall not certify any system until after the system's Certification Report is approved and signed.

Evidence of certification shall be an ARB Executive Order (which shall reference the Certification Report) signed by the ARB Executive Officer.

After approval and signature of the ARB Executive Order, Certification Reports shall be maintained in the ARB Executive Officer's files and shall be made available upon request.