(**Adopted:** 12/20/93; **Amended:** 10/26/94; **Amended**: 01/22/18)

RULE 1160
Internal Combustion Engines

(A) General

(1) Purpose

(a) The purpose of this rule is to limit the emissions of Oxides of Nitrogen (NO_X), Carbon Monoxide (CO), and Volatile Organic Compounds (VOC) from Internal Combustion Engines that are not subject to District Rule 1160.1 – *Internal Combustion Engines in Agricultural Operations*.

(2) Applicability

(a) This rule applies to any stationary Internal Combustion Engine rated at 50 or more brake horsepower (bhp), when located within the Federal Ozone Non-attainment Area, that does not meet the following:

(i) Any Internal Combustion Engine rated at less than 50 brake horsepower.
(ii) Any Internal Combustion Engine operated less than 100 hours in any rolling twelve (12) month period.
(iii) Any Internal Combustion Engine subject to the *Airborne Toxic Control Measure for Diesel Particulate Matter from Portable Engines rated at 50 Horsepower and Greater*, Title 17 CCR 93116, or otherwise classified as a Portable Internal Combustion Engine.
(iv) Any Internal Combustion Engine that is an Emergency Internal Combustion Engine provided that the Internal Combustion Engine does not operate more than 100 hours for non-emergency use in any rolling twelve (12) month period.
(v) Any Internal Combustion Engine operated on an engine test stand.
(vi) Any Internal Combustion Engine subject to District Rule 1160.1 – *Internal Combustion Engines in Agricultural Operations*.
(vii) Any Internal Combustion Engine located outside the Federal Ozone Non-attainment Area.
(viii) Any Internal Combustion Engine registered with a Statewide Portable Equipment Registration (PERP), provided that the Internal Combustion Engine is operating in compliance with the *Regulation to Establish a Statewide Portable Equipment Registration Program*, Title 13 CCR 2450, and for which the Internal Combustion Engine does not require a local District Permit.

(B) Definitions

The definitions contained in District Rule 102 – *Definition of Terms* shall apply unless the term is otherwise defined herein:

(1) "Baseline Emission Rate" – Emissions under normal operating conditions, prior to Emission Control Equipment being installed, determined by an emissions compliance test conducted in accordance with the requirements specified in Section (F). The Baseline Emission Rate shall be adjusted to reflect any operational limit or Emission Control Equipment installed prior to January 1, 1991.

(2) "Emergency Internal Combustion Engines"– Any Internal Combustion Engines which meets any of the following criteria:

(a) An Internal Combustion Engine driving a generator used at facilities normally serviced with commercial power, where the generators are used exclusively as emergency units during loss of commercial power.

(b) An Internal Combustion Engine driving a generator used at facilities normally serviced with an alternative energy supply including, but not limited to, photovoltaic power, where the generators are used exclusively as emergency units during loss of such alternative energy source but no more than 200 hours total per year.

(c) An Internal Combustion Engine driving a fire pump or deluge pump that is used exclusively during fire emergency or testing.

(d) An Internal Combustion Engine driving an air compressor that is used exclusively during emergency shutdowns and/or to start-up black start engines.

(3) "Emissions Compliance Test" – An emissions compliance test conducted in accordance with a District approved test protocol pursuant to the District's Compliance Test Procedural Manual.

(4) "Emission Control Equipment" – Equipment technologies which control Internal Combustion Engine emissions, including, but not limited to, Selective Catalytic Reduction (SCR); Non-Selective Catalytic Reduction (NSCR); Oxidation Catalyst; and fuel, air, and exhaust modifications. This definition excludes diesel particulate filters or traps.

(5) "Emission Control Plan" – A document which outlines how a Facility will comply with the requirements of this rule.

(6) "Enhanced Emissions Monitoring Device" – Any automated data recording device or system having both data gathering and retrieval capabilities. Such equipment includes, but is not limited to, Continuous Emissions Monitoring Systems (CEMS) and Parametric or Predictive Emissions Monitoring Systems (PEMS).

(7) "Internal Combustion Engine" – A spark- or compression-ignited reciprocating engine featuring intermittent combustion within one or more internal chambers to produce useful work by applying a varying force against a reciprocating piston.

(8) "Lean-burn Engine" – Any Spark-Ignited Internal Combustion Engine that is operated with an exhaust stream oxygen concentration of four (4) percent by volume, or greater prior to any exhaust stream Emission Control Equipment.

(9) "Portable Internal Combustion Engine" – Internal Combustion Engines which are not operated, nor intended to be operated, at one specific site for more than twelve (12) consecutive months, is not permanently affixed to only one location. Indications of Portable Internal Combustion Engines include, but are not limited to, those that are transportable and may be mounted on mobile sources, trailers, skids, or other platforms.

(10) "Regulated Air Pollutant" – Any of the following Air Pollutants:

(a) Any Air Pollutant, and its Precursors, for which an Ambient Air Quality Standard has been promulgated.

(b) Any Air Pollutant that is subject to a standard under 42 U.S.C. §7411, Standards of Performance for New Stationary Sources (Federal Clean Air Act §111) or the regulations promulgated thereunder.

(c) Any substance which has been designated a Class I or Class II substance under 42 U.S.C. §7671a (Federal Clean Air Act §602) or the regulations promulgated thereunder.

(d) Any Air Pollutant subject to a standard or other requirement established pursuant to 42 U.S.C. §7412, Hazardous Air Pollutants (Federal Clean Air Act §112) or the regulations promulgated thereunder.

(11) "Rich-Burn Engine" – Any Spark-Ignited Internal Combustion Engine that is operated with an exhaust stream oxygen concentration of less than four (4) percent by volume prior to any exhaust Emission Control Equipment.

(12) "Spark-Ignited Internal Combustion Engine" – A liquid or Gaseous Fueled engine designed to ignite its air/fuel mixture by a spark across a spark plug.

(C) Requirements

(1) Emissions Limits

(a) NO_X Emissions

(i) Internal Combustion Engines subject to this rule shall not exceed the following emission limits in Table 1, unless compliance is demonstrated using an Alternative Compliance Strategy pursuant to subsection (C)(2).

Table 1
NO_X Emission Limits for Internal Combustion Engines

(ppmv limitations shall be referenced at 15 percent volume stack gas oxygen measured on a dry basis and averaged over 15 consecutive minutes)

Engine Type	NO_X Limit
Spark-Ignited Internal Combustion Engine, Rich Burn	50 ppmv
Spark-Ignited Internal Combustion Engine, Lean Burn	125 ppmv
Compression-Ignited Internal Combustion Engine	80 ppmv

(b) VOC Emissions

(i) Internal Combustion Engine(s) subject to this rule shall not exceed the following emission limits for VOC, as listed in Table 2, unless compliance is demonstrated using an Alternative Compliance Strategy pursuant to subsection (C)(2).

(ii) Internal Combustion Engines located at the Facility of Southern California Gas, Newberry Springs shall not exceed the VOC limit of 255 ppmv, referenced at 15 percent, volume stack gas, oxygen measured on a dry basis and averaged over 15 consecutive minutes.

Table 2
VOC Emission Limits for Internal Combustion Engines

(ppmv limitations shall be referenced at 15 percent, volume stack gas, oxygen measured on a dry basis and averaged over 15 consecutive minutes)

Engine Type	VOC Limit
Spark-Ignited Internal Combustion Engine, Rich Burn	106 ppmv
Spark-Ignited Internal Combustion Engine, Lean Burn	106 ppmv
Compression-Ignited Internal Combustion Engine	106 ppmv

c) CO Emissions

(i) Internal Combustion Engines subject to this rule shall not exceed the following emission limits in Table 3, unless compliance is demonstrated using an Alternative Compliance Strategy pursuant to subsection (C)(2).

Table 3
CO Emission Limits for Internal Combustion Engines

(ppmv limitations shall be referenced at 15 percent volume stack gas oxygen measured on a dry basis and averaged over 15 consecutive minutes)

Engine Type	CO Limit
Spark-Ignited Internal Combustion Engine, Rich Burn	4500 ppmv
Spark-Ignited Internal Combustion Engine, Lean Burn	4500 ppmv
Compression-Ignited Internal Combustion Engine	4500 ppmv

(2) Alternative Compliance Strategies

(a) Demonstrated Engine Efficiency Alternative

(i) In lieu of complying with the emission standards specified in subsection (C)(1), a Facility may request an alternative compliance strategy by demonstrating an engine efficiency greater than 30 percent.

a. Engine efficiency shall be calculated pursuant to subsections (C)(2)(a)(ii)a.
b. A request for demonstrating the engine efficiency alternative shall be made in writing and is subject to District approval.

(ii) For Internal Combustion Engines with a demonstrated efficiency greater than 30 percent, the following procedure may be used to determine the alternative emissions limits:

$$l_a = \frac{(l_x)(e_a)}{e_r}$$

Where:
l_a = Alternative Emission Limit
l_x = Applicable Emission Limit (from subsection (C)(1))
e_a = Actual Engine Efficiency
e_r = Referenced Engine Efficiency (30%)

a. Engine efficiency (e_a) shall be determined by using one of the following two methods, whichever is lower:

Method 1: $$e_a = \frac{(3413\text{BTU/kW-hr})(100)}{(H_a)\ (\text{BTU/kW-hr})}$$

Where:

e_a = Actual Engine Efficiency
H_a = Actual Heat Rate of Fuel at HHV, in BTU/kW-hr

When the demonstrated percent efficiency applies to the engine only (without consideration of any downstream energy recovery), the data and calculation shall be averaged over 15 consecutive minutes and measured within 30 days of the first emissions compliance test. The actual heat rate in Btu/kW-hr (which can be converted to Btu/hp-hr by dividing by 1.34, shall be measured at peak load for each applicable engine.

Method 2: $$e_a = \frac{(e_m)(\text{LHV})}{(HHV)}$$

Where:

e_a = Actual Engine Efficiency
e_m = Manufacture Rated Efficiency
LHV = Lower Heating Value of Fuel
HHV = Higher Heating Value of Fuel

(b) NO_X Emission Reduction Alternative

(i) In lieu of complying with the NO_X emission limits specified in Table 1 of subsection (C)(1), a Facility may request for an alternative compliance strategy of NO_X emission reductions.
   a. A request for demonstrating the NO_X emission reductions alternative shall be made in writing and is subject to District approval.

(ii) For NO_X emissions only, the NO_X emission reduction alternative compliance strategy is a specified minimum percent reduction in NO_X emissions from the Baseline Emissions Rate.

(iii) The VOC and CO emission standards listed in subsection (C)(1) continue to apply when the NO_X emission reduction alternative compliance strategy is used to demonstrate compliance with this rule.

(iv) Internal Combustion Engines opting for the NOX emission reduction alternative compliance strategy, shall achieve at least the following minimum reductions, listed in Table 4:

Table 4 NO_X Emission Reduction Alternative (percent reductions of NO_X from the Baseline Emission Rate)	
Engine Type	NO_X Reduction
Spark-Ignited Internal Combustion Engine, Rich Burn	90 percent
Spark-Ignited Internal Combustion Engine, Lean Burn	80 percent
Compression-Ignited Internal Combustion Engine	90 percent

(v) The percent reduction as measured across the Emission Control Equipment or relative to the Baseline Emission Rate of each Emissions Unit shall be determined on an emission rate basis.

a. A Facility may use Aggregate Emissions to comply with the NO_X Emission Reduction Alternative, upon District approval.

b. A Facility using Aggregate Emissions to comply with the NO_X Emission Reduction Alternative must demonstrate an environmental benefit by increasing the amount of emissions reductions generated by at least ten (10) percent.

1. The environmental benefit must be in addition to the emission reductions required to comply directly with this rule.

2. Violations of any aggregate provision shall be considered a violation for every emissions unit included in the aggregate.

(c) All alternative compliance strategies shall be made on a case-by-case basis by the District in consultation with the Facility.

(d) A Baseline Emission Rate shall be determined for each Internal Combustion Engine opting for an alternative compliance strategy.

(e) Internal Combustion Engines that are utilizing an alternative compliance strategy shall contain specific enforceable operating conditions which will ensure compliance with the selected alternative compliance strategy and subsequent emission limit(s) on the corresponding Internal Combustion Engine's Authority to Construct/Permit to Operate (ATC/PTO) permit.

(f) An Emission Control Plan, pursuant to subsection (C)(3), is required for Facilities utilizing an alternative control strategy.

(3) Emission Control Plan

(a) An Emission Control Plan shall be required for those Facilities that:

(i) Have an Internal Combustion Engine that utilizes an alternative compliance strategy, as listed under subsection (C)(2), to demonstrate compliance with this rule;

(b) All affected Internal Combustion Engines within the Facility shall be addressed within the Emission Control Plan. Each Internal Combustion Engine shall be identified as to which option for emissions compliance applies, i.e. the per Internal Combustion Engine ppmv limit, the per Internal Combustion Engine adjusted ppmv limit, or the per Internal Combustion Engine percent NO_X reduction limit. The specific emission designation shall be recorded onto the corresponding Authority to Construct/Permit to Operate (ATC/PTO permit along with any specific operating limits or emissions limits pertaining to the specific Internal Combustion Engine, as enforceable permit conditions.

(c) The Emission Control Plan shall be approved by the Air Pollution Control Officer (APCO) in writing.

(d) For new Internal Combustion Engines and modifications to existing Internal Combustion Engines, the Emission Control Plan shall be submitted to and approved by the District prior to issuance of the Authority to Construct/Permit to Operate (ATC/PTO) permit.

(e) The owner/operator may petition in writing for a change to the Emission Control Plan at any time.

(f) The Emission Control Plan shall include the following (if applicable):

(i) An explanation of why installation of Emission Control Equipment cannot be achieved by the compliance date; and a schedule that demonstrates compliance with subsections (C)(1) or (C)(2) by the earliest practicable date.

(ii) The manufacturer, model number, unit identification (e.g. serial) number, rated horsepower, fuel-type, and combustion method (i.e., Rich Burn or Lean Burn or Compression-Ignited) of each Internal Combustion Engine;

(iii) A description of the Emission Control Equipment installed on the Internal Combustion Engine (if any), including unit identification (e.g. serial) number, type (e.g., nonselective catalyst, "clean-burn" combustion, etc.) and manufacturer, as well as a description of any ancillary equipment related to the control of emissions (e.g., automatic air/fuel ratio controller, fuel valves, etc.).

a. The operator shall notify the District of any replacement of such Emission Control Equipment and the new serial or identification numbers.

(iv) The Facility, company, Authority to Construct/Permit to Operate numbers and the location of the engine by a schematic of the affected Facilities.

(v) A specific emission inspection procedure for each Internal Combustion Engine to ensure that the engine is operated in strict accordance with the manufacturer's specifications and in continual compliance with the provisions of this rule.

a. The procedure shall include an operator's inspection schedule.

(D) Exemptions

(1) The provisions of this rule shall not apply to:

(a) Any Internal Combustion Engine rated at less than 50 brake horsepower.

(b) Any Internal Combustion Engine operated less than 100 hours in any rolling twelve (12) month period.

(c) Any Internal Combustion Engine subject to the *Airborne Toxic Control Measure for Diesel Particulate Matter from Portable Engines rated at 50 Horsepower and Greater*, Title 17 CCR 93116, or otherwise classified as a Portable Internal Combustion Engine.

(d) Any Internal Combustion Engine that is an Emergency Internal Combustion Engine provided that the Internal Combustion Engine does not operate more than 100 hours for non-emergency use in any rolling twelve (12) month period.

(e) Any Internal Combustion Engine operated on an engine test stand.

(f) Any Internal Combustion Engine subject to District Rule 1160.1 – *Internal Combustion Engines in Agricultural Operations*.

(g) Any Internal Combustion Engine located outside the Federal Ozone Non-attainment Area.

(h) Any Internal Combustion Engine registered with a Statewide Portable Equipment Registration (PERP), provided that the Internal Combustion Engine is operating in compliance with the *Regulation to Establish a Statewide Portable Equipment Registration Program*, Title 13 CCR 2450, and for which the Internal Combustion Engine does not require a local District Permit.

(2) Any Facility claiming any of the above exemptions shall maintain the following records and documentation for compliance determination. These records and documentation must be readily available, and be made available to the District upon request:

(a) Documentation from the manufacturer that documents the rated brake horsepower of the Internal Combustion Engine, such as:

(i) Manufacturer specification documents; and/or,

(ii) Manufacturer nameplate that is affixed to the engine.

(b) Records of the monthly operation in terms of hours.

(i) The hours of operation must be documented from a non-resettable, four-digit (9,999), hour timer that is installed and maintained on the Internal Combustion Engine to indicate elapsed engine operating time.

(ii) The monthly operation records must be retained for a period of at least five (5) years.

(c) Documentation that demonstrates that the Internal Combustion Engine is subject to the *Airborne Toxic Control Measure for Diesel Particulate Matter from Portable Engines rated at 50 Horsepower and Greater*, Title 17 CCR 93116.;or, that the Internal Combustion Engine is otherwise classified as a Portable Internal Combustion Engine, as follows:

(i) A District permit for the Internal Combustion Engine that designates the requirements of the above regulation; and/or, designates the Internal Combustion Engine as a Portable Internal Combustion Engine.

(d) Documentation that demonstrates that the Internal Combustion Engine is an Emergency Internal Combustion Engine, as follows:

(i) A District permit for the Internal Combustion Engine that designates the requirements of emergency use; and, designates the Internal Combustion Engine is an Emergency Internal Combustion Engine.

(e) Documentation that demonstrates that the Internal Combustion Engine operates on an engine test stand as follows:

(i) A District permit for the Internal Combustion Engine that designates the requirements of an engine test stand, and designates the Internal Combustion Engine is an Internal Combustion Engine operating on a test stand.

(f) Documentation that demonstrates that the Internal Combustion Engine is subject to District Rule 1160.1 – *Internal Combustion Engines in Agricultural Operations*, as follows:

(i) A District permit for the Internal Combustion Engine that designates the requirements of District Rule 1160.1 – *Internal Combustion Engines in Agricultural Operations*; or,

(ii) A District agricultural engine registration for the Internal Combustion Engine that designates the requirements of District Rule 1160.1 – *Internal Combustion Engines in Agricultural Operations*.

(g) Documentation that demonstrates the Internal Combustion Engine is located outside the Federal Ozone Non-attainment Area; as follows:

(i) A District permit for the Internal Combustion Engine that designates the address of operation.

(h) Documentation that the Internal Combustion Engine has a Statewide Portable Equipment Registration (PERP), as follows:

(i) A copy of the valid PERP registration; and,
(ii) A valid PERP registration sticker affixed to the Internal Combustion Engine.

(E) Monitoring and Recordkeeping Requirements

(1) Monitoring

(a) The owner or operator of any Internal Combustion Engine subject to this rule must:

(i) Conduct inspections, whichever is the more frequent of, at least once every calendar quarter; or, after every 2,000 hours of engine operation.
a. An inspection includes any testing, maintenance, and/or other procedures that ensure the Internal Combustion Engine is operated in strict accordance with the manufacturer's specifications and in continual compliance with the provisions of this rule. Each inspection must include the following:
1. Date.
2. Records of testing, as applicable.
3 Records of maintenance.

(b) The owner or operator of any Internal Combustion Engine equipped with existing Emission Control Equipment or required to install Emissions Control Equipment to achieve compliance with this rule shall:

(i) Install, operate, and maintain in calibration, the following monitoring equipment, as approved by the APCO:
a. Continuous measurement and recording of Emissions Control System Operating Parameters;
b. Continuous measurement and recording of elapsed time of operation; and,
c. An Enhanced Emissions Monitoring Device.

(ii) Compliance shall be verified at least once in every twelve (12) month period by an emissions compliance test.

a. Testing frequency may be reduced per the following provisions:
   1. If a compliance test demonstrates compliance with the provisions of this rule, the frequency of the compliance test may be extended to once every twenty (24) months.
   2. Failure of a compliance test or failure to complete the compliance test within the required frequency resets the compliance test frequency to at least once in every twelve (12) month period.

b. At a minimum, emissions compliance testing shall be conducted for NO_X, VOC, CO and oxygen (O_2) levels in compliance with the provisions of the District's Compliance Test Procedural Manual.

(c) The owner or operator of any Internal Combustion Engine that is in compliance with this rule, without Emission Control Equipment shall:
   (i) Demonstrate compliance through an emission compliance test. At a minimum, emissions compliance testing shall be conducted for NO_X, VOC, CO and oxygen (O_2) levels in compliance with the provisions of the District's Compliance Test Procedural Manual; or,
   (ii) Demonstrate compliance through certified manufacturer emission rates.

(d) Compliance verification, as specified in subsections (E)(1)(b) and/or (E)(1)(c) shall be satisfied:
   (i) Within 180 days of the date of rule adoption, or
   (ii) Within 180 days of the installation of an Emission Control Equipment; or,
   (iii) Within 180 days of an Internal Combustion Engine becoming subject to this rule, whichever is later.

(2) Recordkeeping Requirements

(a) The owner/operator of any engine subject to the provisions of Section (C) of this rule shall maintain a log for each Internal Combustion Engine containing, at a minimum, the following data:
   (i) District Authority to Construct/Permit to Operate (ATC/PTO) number, unit identification number and Emissions Control Equipment identification number, when applicable.
   (ii) Quarterly fuel use and quarterly hours of operation, on a calendar quarter basis.
   (iii) The date and a summary of any emissions corrective maintenance taken.
   (iv) The Facility's District-approved Emission Control Plan, if applicable.

(b) The owner/operator shall maintain the records, on site, for a period of five (5) years, and shall be readily available, to the District upon request.

(F) Test Methods

Compliance with the requirements of section (C) shall be determined, as required, in accordance with the following test procedures or any other method approved by USEPA and the APCO:

(1) Oxides of nitrogen - EPA Method 7E, or ARB Method 100.

(2) Carbon monoxide - EPA Method 10, or ARB Method 100.

(3) Stack gas oxygen - EPA Method 3 or 3A, or ARB Method 100.

(4) Volatile organic compounds - EPA Method 18, 25A or 25B, or ARB Method 100.

(5) Determination of the exempt compounds, shall be performed in accordance with ASTM Test Method D 4457-85 (Solvents and Coatings) and be consistent with the provisions set forth in the Federal Register (FR, Vol. 56, No. 52, March 18, 1991). Perfluorocarbon compounds shall be assumed to be absent from a product or process unless a manufacturer or facility operator identifies a specific compound or compounds from the broad classes of perfluorocarbons listed in 40 CFR 51.100(s)(1) as being present in the product or process. When such compounds are identified, the facility shall provide the test method to determine the amount(s) of the specific compound(s).

(G) Compliance Schedule

(1) Any Facility and/or owner/operator with Internal Combustion Engines subject to this rule must comply with this rule no later than twelve (12) months from the most recent amendment date of this rule.

See SIP Table at http://www.mdaqmd.ca.gov

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