

**RULE 69.4.1. STATIONARY RECIPROCATING INTERNAL COMBUSTION ENGINES - BEST AVAILABLE RETROFIT CONTROL TECHNOLOGY (BARCT)** (Adopted & Effective 11/15/00)

(a) **APPLICABILITY**

(1) Except as provided in Section (b), this rule shall apply to stationary internal combustion engines with a brake horsepower (bhp) rating of 50 or greater.

(2) An engine subject to this rule and located at a major stationary source of oxides of nitrogen (NO<sub>x</sub>) is also subject to the applicable requirements of Rule 69.4.

(3) An engine subject to this rule shall not be subject to Rule 68.

(b) **EXEMPTIONS**

(1) This rule shall not apply to the following:

(i) Engines used exclusively in connection with a structure designed for and used as a dwelling for not more than four families.

(ii) Engines used exclusively in agricultural operations for the growing of crops or the raising of fowl or animals.

(iii) Any engine when operated exclusively within a permitted test cell solely for the research, development, or testing of gas turbine engines or their components.

(iv) Any engine when operated exclusively within a permitted test cell solely for the research, development, or testing of reciprocating internal combustion engines or their components.

(v) Any engine used exclusively in conjunction with military tactical support equipment.

(2) The provisions of Subsections (d)(1) through (d)(3), (e)(1), (e)(2), (f)(1), (f)(3), (g)(3), (g)(4), (g)(5) and (i)(1) of this rule shall not apply to the following:

(i) Any existing engine which operates less than 200 hours per calendar year, as determined by a non-resettable meter that measures elapsed operating time.

(ii) Any existing emergency standby engine provided that operation of the engine for non-emergency purposes does not exceed 52 hours per calendar year. Operation for testing or maintenance purposes may be allowed for not more than 100 hours per year, with written authorization from the Air Pollution Control Officer, provided that an owner or operator demonstrates to the satisfaction of the Air Pollution Control Officer that such additional operation is necessary.

(iii) Any existing emergency standby engine at a nuclear power generating station subject to the requirements of the Nuclear Regulatory Commission provided that operation of the engine for non-emergency purposes does not exceed 200 hours per calendar year.

(3) The provisions of Subsections (e)(1), (e)(2), (f)(1), (g)(3), (g)(4), (g)(5) and (i)(1) of this rule shall not apply to:

(i) Any new or replacement emergency standby engine, provided that operation of the engine for non-emergency purposes does not exceed 52 hours per calendar year. Operation for testing or maintenance purposes may be allowed for not more than 100 hours per year, with written authorization from the Air Pollution Control Officer, provided that an owner or operator demonstrates to the satisfaction of the Air Pollution Control Officer that such additional operation is necessary.

(ii) Any new or replacement engine which operates less than 200 hours per calendar year, as determined by a non-resettable meter that measures elapsed operating time.

(4) The provisions of Subsections (d)(1) through (d)(3) of this rule shall not apply to existing low-use diesel engines equipped with any two of the following: turbocharger, aftercooler, or injection timing retard by 4 degrees.

An owner or operator of an engine who is claiming an exemption pursuant to Subsections (b)(2), (b)(3) or (b)(4) shall maintain records in accordance with Subsections (g)(1) and (g)(2) of this rule.

(c) **DEFINITIONS**

For the purposes of this rule, the following definitions shall apply:

(1) **"Add-on Control Equipment"** means any technology that is used to reduce emissions from the exhaust gas stream of an engine and is installed downstream of the engine.

(2) **"Best Available Retrofit Control Technology (BARCT)"** means an emission limitation that is based on the maximum degree of reduction achievable, taking into account environmental, energy, and economic impacts by each class or category of source.

(3) **"Brake Horsepower Rating, (bhp)"** means the maximum continuous brake horsepower rating as specified by the engine manufacturer and listed on the engine nameplate, if available, regardless of any derating.

(4) **"Calendar Year"** means the same as defined in Rule 2.

(5) **"California Diesel Fuel"** means any fuel that is commonly or commercially known, sold or represented as diesel fuel No. 1-D or No. 2-D, and which meets the requirements specified in Sections 2281 and 2282 of Title 13 of the California Code of Regulations.

(6) **"Capacity Factor"** means the ratio, expressed as a percentage, of the annual fuel consumption to the manufacturer's specified maximum annual fuel consumption or manufacturer's specified maximum hourly fuel consumption times 8760 hours, whichever is less.

(7) **"Certified Engine"** means an engine certified to comply with the Tier 1, Tier 2, or Tier 3 emission standards specified in Section 89.112 of the Code of Federal Regulations (40 CFR Part 89) - Control of Emissions of Air Pollution from Non-Road Diesel Engines or with the Tier 1, Tier 2, or Tier 3 emission standards specified in Section 2423 of Title 13 of the California Code of Regulations - California Regulations for New 1996 and Later Off-Road Compression-Ignition Engines.

(8) **"Cyclic Engine"** means an engine, such as gantry cranes, having an external load which varies by approximately 40 percent or more of rated capacity under normal operating conditions during any load cycle.

(9) **"Emergency Standby Engine"** means an engine used exclusively in emergency situations, except as provided in Subsections (b)(2)(ii), (b)(2)(iii) and (b)(3)(i), to drive an electrical generator, an air compressor or a water pump.

(10) **"Emergency Situation"** means any one of the following:

(i) An unforeseen electrical power failure from the serving utility or of on-site electrical transmission equipment.

(ii) An unforeseen flood or fire, or a life-threatening situation.

(iii) Operation of emergency generators for Federal Aviation Administration licensed or military airports for the purpose of providing power in anticipation of a power failure due to severe storm activity.

Emergency situation shall not include operation for purposes of supplying power for distribution to an electrical grid, operation for training purposes, or other foreseeable events.

(11) **"Engine Family"** means a group of engines expected to have similar emission and other characteristics throughout their useful life as specified in Section 89.116, 40 CFR 89.

(12) **"Engine Tampering"** means removing or rendering inoperative any device or design element of the engine or its emission control system; or the manufacturing or installation of a part or a component which objective is to bypass, defeat, or render inoperative a device or design element of the engine or its emission control system.

(13) **"Existing Engine"** means an engine which commenced operation in San Diego County on or before November 15, 2000.

(14) **"Fossil Derived Gaseous Fuel"** means gaseous fuel including, but not limited to, natural gas, methane, ethane, propane, butane, and gases stored as liquids at high pressure such as liquefied petroleum gas, but excluding waste derived gaseous fuel.

(15) **"High-use Engine"** means an engine operating at a capacity factor of greater than 15%.

(16) **"Lean-burn Engine"** means an engine that is designed to operate with an air-to-fuel ratio that is more than 1.1 times the stoichiometric air-to-fuel ratio.

(17) **"Load Cycle"** means the time interval between consecutive commencement of application of external load to an engine.

(18) **"Low-use Engine"** means an engine operating at a capacity factor of 15% or less.

(19) **"Military Tactical Support Equipment"** means the same as defined in Rule 2.

(20) **"New Engine"** means an engine which commenced operation in San Diego County after November 15, 2000.

(21) **"Portable Emission Unit"** means the same as defined in Rule 20.1.

(22) **"Replacement Engine"** means an engine that meets the definition of a replacement emission unit in Rule 20.1.

(23) **"Rich-Burn Engine"** means an engine that is designed to operate with an air-to-fuel ratio less than or equal to 1.1 times the stoichiometric air-to-fuel ratio.

(24) **"Stationary Internal Combustion Engine" or "Engine"** means a spark or compression ignited, reciprocating internal combustion engine which is not a portable emission unit.

(25) **"Stationary Source"** means the same as defined in Rule 2.

(26) **"Stoichiometric Air-to-Fuel Ratio"** means the chemically balanced air-to-fuel ratio at which all fuel and all oxygen in the air and fuel mixture are theoretically consumed by combustion.

(27) **"Uncontrolled NO<sub>x</sub> Emissions"** means NO<sub>x</sub> emissions from an engine before application of add-on control equipment.

(28) **"Volatile Organic Compound (VOC)"** means the same as defined in Rule 2.

(29) **"Waste Derived Gaseous Fuel"** means gaseous fuel including, but not limited to, digester gas and landfill gas, but excluding fossil derived gaseous fuel.

(d) **STANDARDS**

(1) A person shall not operate a stationary internal combustion engine subject to this rule unless:

(i) Uncontrolled NOx emissions from the following engines are reduced with add-on control equipment by not less than the following:

	<u>Weight Percent Engine Category Reduction</u>
Rich-burn engines using fossil derived gaseous fuel or gasoline	96
Lean-burn engines using fossil derived gaseous fuel	90
Engines using exclusively waste derived gaseous fuel	90
Engines using diesel or kerosene fuel	90

or

(ii) The emissions of NOx, in parts per million by volume (ppmv), calculated as nitrogen dioxide at 15% oxygen on a dry basis, or in grams of NOx per brake horsepower-hour, as indicated, are not greater than the following:

<u>Engine Category</u>	<u>Concentration of NOx</u>
Rich-burn engines using fossil derived gaseous fuel or gasoline	25 ppmv
Rich-burn engines using exclusively waste derived gaseous fuel	50 ppmv
Lean-burn engines using gaseous fuel	65 ppmv
Existing low-use engines using diesel or kerosene fuel	9.0 g/bhp-hr or 700 ppmv
Existing cyclic engines using diesel or kerosene fuel	9.0 g/bhp-hr or 700 ppmv
High-use engines using diesel or kerosene fuel	6.9 g/bhp-hr or 535 ppmv
New or replacement low-use engines using diesel or kerosene fuel	6.9 g/bhp-hr or 535 ppmv
New or replacement cyclic engines using diesel or kerosene fuel	6.9 g/bhp-hr or 535 ppmv

(2) For all engines subject to Subsection (d)(1) of this rule, emissions of carbon monoxide (CO), calculated at 15% oxygen on a dry basis, shall not exceed 4,500 ppmv.

(3) For all rich-burn engines subject to Subsection (d)(1) of this rule, emissions of VOC, calculated as methane at 15% oxygen on a dry basis, shall not exceed 250 ppmv.

(4) Any engine subject to this rule and operating on diesel fuel shall use only California Diesel Fuel.

(e) **MONITORING REQUIREMENTS**

(1) An owner or operator of an engine without add-on control equipment, except engines specified in Subsections (b)(2) or (b)(3), shall monitor the operating parameters recommended by the engine manufacturer and any additional operating parameters identified by the Air Pollution Control Officer. Such operating parameters may include, but are not limited to:

- (i) engine air-to-fuel ratio;
- (ii) engine inlet manifold temperature and pressure; and
- (iii) oxygen content of the exhaust gas.

Where the Air Pollution Control Officer determines that it is not feasible to monitor operating parameters of an engine or such monitoring may not be indicative of air contaminant emissions, the requirements of this subsection may be waived provided that periodic inspection and maintenance are conducted as specified in Section (f).

(2) An owner or operator of an engine with add-on control equipment shall install, operate and maintain in calibration, devices that continuously monitor the operational characteristics of the engine and any NO<sub>x</sub> emission reduction system as determined necessary to ensure compliance by the Air Pollution Control Officer. Such operational characteristics may include, but are not limited to:

- (i) engine air-to-fuel ratio;
- (ii) temperature of exhaust gas at the inlet and outlet of the add-on control equipment;
- (iii) oxygen content of exhaust gas at the inlet and outlet of the add-on control equipment; and
- (iv) flow rate of NO<sub>x</sub> reducing agent added to the engine exhaust gas.

(3) An owner or operator of an engine subject to this rule shall install a non-resettable totalizing fuel meter and/or non-resettable meter that measures elapsed operating time as determined appropriate by the Air Pollution Control Officer.

**(f) INSPECTION AND MAINTENANCE REQUIREMENTS**

(1) An owner or operator of an engine subject to this rule, except engines specified in Subsections (b)(2) or (b)(3), shall conduct periodic inspections of the engine and any add-on control equipment, as applicable, to ensure that the engine and control equipment is operated in compliance with the provisions of this rule. Inspections shall be conducted at least once every 4000 hours of operation, or every six months, whichever is less.

(2) An owner or operator of an engine subject to this rule shall conduct periodic maintenance of the engine and any add-on control equipment, as applicable, as recommended by the engine and control equipment manufacturers or as specified by any other maintenance procedure approved in writing by the Air Pollution Control Officer. The periodic maintenance shall be conducted at least once each calendar year.

(3) Notwithstanding the frequencies specified in Subsections (f)(1) and (f)(2), the Air Pollution Control Officer may require an owner or operator of an engine to conduct inspections and/or maintenance of the engine and any associated add-on control equipment more frequently if deemed necessary to assure compliance with this rule.

**(g) RECORDKEEPING REQUIREMENTS**

(1) An owner or operator of an engine subject to this rule shall keep the following records and shall maintain these records on-site for at least the same period of time as the engine to which the records apply is located at the site:

- (i) engine manufacturer name and model number;
- (ii) brake horsepower rating;
- (iii) combustion method (i.e. rich-burn or lean-burn);
- (iv) fuel type;
- (v) California Diesel Fuel certification, if applicable; and
- (vi) a manual of recommended maintenance as provided by the engine manufacturer, or other maintenance procedure as approved in writing by the Air Pollution Control Officer.

Where the information specified in Subsections (g)(1)(i) through (g)(1)(iv) is contained in a District Permit to Operate or Certificate of Registration, and is the most current information, an additional record of this information shall not be required.

(2) An owner or operator of an engine exempt pursuant to Subsections (b)(2) or (b)(3) shall maintain an operating log containing, at a minimum, the following:

- (i) dates and times of engine operation. If applicable, indicate whether the operation was for non-emergency purposes or during an emergency situation and the nature of the emergency, if available;

(ii) total cumulative hours of operation per calendar year, based on actual readings of engine hour or fuel meter; and

(iii) records of periodic engine maintenance, including dates maintenance was performed.

The records specified in Subsection (g)(2)(i) are not required if total engine operations for any purpose, including emergency situations, do not exceed 52 hours in a calendar year.

(3) An owner or operator of an engine subject to this rule, except engines specified in Subsections (b)(2) or (b)(3), shall maintain a log containing at a minimum, the following:

(i) records of engine inspection, including dates an inspection was performed; and

(ii) records of engine maintenance, including dates maintenance was performed and the nature of the maintenance.

(4) An owner or operator of an engine subject to this rule, except engines specified in Subsections (b)(2) or (b)(3), shall measure and record at least once each calendar month the applicable operating parameters identified pursuant to Subsections (e)(1) or (e)(2).

(5) An owner or operator of a low-use engine operating on diesel or kerosene fuel and subject to the requirements of Section (d)(1) shall maintain records of total cumulative hours of operation or total fuel consumption per calendar year, as applicable.

(6) All records required by Subsections (g)(2) through (g)(5) shall be retained on-site for at least three years and made available to the District upon request.

**(h) TEST METHODS**

(1) All testing performed to determine compliance with the emission limits of Subsections (d)(1), (d)(2) and/or (d)(3), except as provided in Subsection (h)(3), shall be conducted in accordance with the following procedures:

(i) Measurement of NO<sub>x</sub>, CO, carbon dioxide (CO<sub>2</sub>) and oxygen content of exhaust gas shall be determined in accordance with the San Diego County Air Pollution Control District Test Method 100, Air Resources Board (ARB) Test Method 100 or equivalent Environmental Protection Agency (EPA) Test Method.

(ii) Measurement of VOC emissions shall be determined in accordance with EPA Test Methods 25A and/or 18.



(iii) NO<sub>x</sub>, VOC, and CO emission concentrations shall be calculated as an average of three subtests. The averaging period to calculate NO<sub>x</sub> and CO emission concentrations and to determine compliance shall be at least 30 minutes and not more than 60 minutes unless otherwise specified in writing by the Air Pollution Control Officer.

(2) Specifications for California Diesel Fuel, if not provided by a vendor, shall be determined by the test methods specified in Sections 2281 and 2282 of Title 13 of the California Code of Regulations.

(3) For an engine operating on diesel or kerosene fuel without add-on control equipment and certified by EPA or ARB at an emission rate equal to or below the applicable emission rate limits of Section (d), measurements of NO<sub>x</sub>, CO, CO<sub>2</sub>, and oxygen content of exhaust gas shall be conducted in accordance with a test method approved by the District and ARB. Until such test method is approved, such engine shall be deemed in compliance with the emission rate limits of Section (d), provided the requirements of Subsection (i)(4) are met.

(4) If a portable emission analyzer is used to provide emission data, the analyzer shall be calibrated and operated in accordance with a protocol approved in writing by the Air Pollution Control Officer.

**(i) SOURCE TEST REQUIREMENTS**

Except as provided in Subsection (i)(4), source tests shall be conducted according to the following:

(1) After initial compliance has been determined, any engine subject to the requirements of Subsections (d)(1), (d)(2) and/or (d)(3), except engines specified in Subsection (b)(3), shall be source tested at least once every 24 months, unless otherwise specified in writing by the Air Pollution Control Officer.

(2) Emissions source testing shall be conducted using the test methods specified in Section (h) and a source test protocol approved in writing by the Air Pollution Control Officer prior to testing.

(3) Emissions source testing shall be performed at no less than 80 percent of the brake horsepower rating. If an owner or operator of an engine demonstrates to the satisfaction of the Air Pollution Control Officer that the engine does not operate at these conditions, then emissions source testing shall be performed at the highest achievable continuous brake horsepower rating, or under the typical duty cycle or operational mode of the engine.

(4) Notwithstanding the requirements of Subsection (i)(1), any engine operating on diesel or kerosene fuel without add-on control and certified by EPA or ARB at emission rates equal to or below the applicable emission rate limits of Section (d) shall not require an initial or periodic source test, until an appropriate test method is approved by the District and ARB, provided the following requirements are met:

(i) The engine family has been tested and certified according to an EPA or ARB approved procedure, and the certification documents are provided to the District.

(ii) The engine family does not participate in the federal ABT program specified in 40 CFR 89, Subpart C and adopted by reference by ARB.

(iii) The engine and its emission control system are maintained as specified in Section (f).

(iv) There is no evidence of engine tampering.

**(j) COMPLIANCE SCHEDULE**

(1) For an engine operating on diesel fuel, comply with the requirements of Subsection (d)(4) by May 15, 2001.

(2) The owner or operator of an existing engine subject to the requirements of this rule shall meet the following increments of progress:

(i) By May 15, 2001, submit to the Air Pollution Control Officer an application to modify conditions on the Permit to Operate or to convert a Certificate of Registration to a Permit to Operate, as necessary to comply with the applicable requirements of this rule. The application shall include the following information for the engine that will be evaluated for compliance with this rule:

(A) The information required by Section (g)(1),

(B) emission rate data and source of such data, and

(C) description of how compliance will be achieved (e.g. retrofit, replacement).

(ii) By November 15, 2002, submit to the Air Pollution Control Officer documentation which demonstrates that the engine is in compliance with the Section (d)(1) through (d)(3) emission limits for NO<sub>x</sub>, CO and VOC, and all other applicable requirements of this rule.

(3) For a new or replacement engine, including a new or replacement engine operating less than 200 hours per calendar year or a new or replacement emergency standby engine, comply with all applicable requirements of this rule upon installation and startup.