



Enhanced Regulatory Outreach Program  
Maricopa County Air Quality Department

## Notice of Stakeholder Workshop

### **Rule 324: Stationary Internal Combustion (IC) Engines**

**Date/Time: Thursday, November 19, 2015 at 8:30 am**

**Location: 1001 North Central Avenue, Floor 5 Classroom\***

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The Maricopa County Air Quality Department (department) will conduct a Stakeholder Workshop to discuss **AQ-2015-004-Rule 324 (Stationary Internal Combustion (IC) Engines)**.

During this workshop, the department will discuss proposed rule revisions since the previous workshop conducted on August 3, 2015. The draft rule is attached to this announcement.

The department will also discuss the questions that were raised at the previous workshop:

- New Source Performance Standards (NSPS) and how they are addressed in the draft rule
- Compliance schedule
- Recordkeeping requirements
- Definitions: "Single Source" and "Ultra-Low Sulfur Fuel"

Additional information about AQ-2015-004-Rule 324 is available on the Enhanced Regulatory Outreach Program (EROP) website ([www.maricopa.gov/regulations/aq/process.aspx](http://www.maricopa.gov/regulations/aq/process.aspx)).

If you would like to remotely attend this workshop, please log-on to <https://global.gotomeeting.com/join/894853765>.

\*If you will be attending this workshop in-person, when you arrive at 1001 North Central Avenue, please check-in in Suite #125 then proceed to the Floor 5 classroom.



**AQ-2015-004-Rule 324**

Stakeholder Workshop: November 19, 2015  
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**The following is a summary of revisions in Draft Rule 324 (STATIONARY INTERNAL COMBUSTION (IC) ENGINES) dated November 19, 2015, since the previous workshop for Draft Rule 324 conducted on August 3, 2015:**

- Section 102; “single source” revised to “source”.
  - The term “source” is more applicable within the context of applicability. “Source” is defined in Rule 100.
- Section 208; The definition of “existing engine” has been revised from “October 22, 2003”, to “[Date of Adoption]”.
- Section 214; “LOW SULFUR OIL” has been deleted.
- Section 221; “ULTRA LOW SULFUR DIESEL FUEL” has been added to replace the previous definition of Low Sulfur Oil.
- Section 301.1; 0.05% sulfur content by weight was replaced with 0.0015% sulfur content by weight.
  - To match the definition of Ultra Low Diesel Fuel.
- Sections 303 & 304; replace “single source” with “stationary reciprocating IC engine subject to the applicability of this rule” to bring clarity.
- Section 304.2:
  - Table 2; Lean Burn NOx emissions Cell revised to remove the term “three-way catalyst” as it is not applicable to spark ignited lean burn engines.
  - Table 3; Two rows were added to Table 1 to include “COMPRESSION (>750 hp) except generator sets” and “Generator Sets”. Associated Limits were also added in an effort to align with NSPS III.
- Section 306; Date change from “October 22, 2003” to “[date of adoption]”.
- Section 307.2; “COMPUTERIZED TRACKING” has been removed from the most recent revision.
  - Computerized tracking and daily record of hours are not necessary. Non-resetting totalizing hour meter is necessary and remains in Section 307.1.
- Section 401; Date change from “October 22, 2003” to “[date of adoption]”.
- Section 501.4; “Low Sulfur Oil” has been revised to “Ultra Low Sulfur Diesel Fuel” to align with revisions in Sections 200 and 301.1.



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## **REGULATION III - CONTROL OF AIR CONTAMINANTS**

### **RULE 324**

#### **STATIONARY INTERNAL COMBUSTION (IC) ENGINES**

#### **INDEX**

##### **SECTION 100 – GENERAL**

- 101 PURPOSE
- 102 APPLICABILITY
- 102 EXEMPTIONS
- 102 PARTIAL EXEMPTIONS FOR EMERGENCY ENGINES
- 102 PARTIAL EXEMPTIONS FOR LOW USAGE ENGINES

##### **SECTION 200 – DEFINITIONS**

- 201 AFTERCOOLER / INTERCOOLER
- 202 COGENERATION UNIT
- 203 COMPRESSION-IGNITION ENGINE
- 204 DIESEL ENGINE
- 205 EMERGENCY ~~GENERATOR~~ ENGINE
- 206 ENGINE FAMILY
- 207 EQUIVALENT REPLACEMENT ENGINE
- 208 EXISTING ENGINE
- 209 IDENTICAL REPLACEMENT ENGINE
- 210 INTERNAL COMBUSTION (IC) ENGINE, PORTABLE
- 211 INTERNAL COMBUSTION (IC) ENGINE, STATIONARY
- 212 LEAN-BURN ENGINE
- 213 LOCATION
- ~~214 LOW SULFUR OIL~~
- 214 NEW ENGINE



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- ~~246~~ 215 PART(S) PER MILLION, DRY VOLUME (ppmdv)
- ~~247~~ 216 PRIME ENGINES
- ~~248~~ 217 RATED BRAKE HORSEPOWER (RATED bhp)
- ~~249~~ 218 RICH-BURN ENGINE
- ~~220~~ 219 SPARK-IGNITION ENGINE
- ~~221~~ 220 SULFUR OXIDES (SO<sub>x</sub>)
- ~~222~~ WASTE DERIVED FUEL GAS
- ~~221~~ ULTRA LOW SULFUR DIESEL FUEL
- ~~222~~ WASTE DERIVED FUEL GAS

**SECTION 300 – STANDARDS**

- 301 LIMITATIONS FOR EXISTING AND NEW STATIONARY IC ENGINES
- 302 ADDITIONAL LIMITATIONS FOR IC ENGINES > 250 RATED bhp
- 303 EQUIVALENT OR IDENTICAL ENGINE REPLACEMENT

**SECTION 400 - ADMINISTRATIVE REQUIREMENTS**

- 401 COMPLIANCE SCHEDULE

**SECTION 500 - MONITORING AND RECORDS**

- 501 COMPLIANCE DETERMINATION
- 502 RECORDKEEPING/RECORDS RETENTION
- 503 TEST METHODS ADOPTED/INCORPORATED BY REFERENCE



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~~Adopted 10/23/03~~

~~Revised 10/17/07~~

Adopted 10/22/2003; Revised 10/17/2007; Revised xx/xx/xxx

**MARICOPA COUNTY**  
**AIR POLLUTION CONTROL REGULATIONS**  
**REGULATION III - CONTROL OF AIR CONTAMINANTS**

**RULE 324**  
**STATIONARY INTERNAL COMBUSTION (IC) ENGINES**

**SECTION 100 – GENERAL**

- 101 PURPOSE:** To limit carbon monoxide (CO), nitrogen oxides (NO<sub>x</sub>), sulfur oxides (SO<sub>x</sub>), volatile organic compounds (VOCs), and particulate matter (PM) emissions from stationary internal combustion (IC) engines.
- 102 APPLICABILITY:** ~~The provisions of this rule apply~~ This rule applies to any single existing or new stationary spark or compression-ignited reciprocating IC engine including stationary IC engines used in cogeneration, with a rating of greater than 250 brake horsepower (bhp). ~~The provisions of this rule also apply~~ This rule also applies to a combination of IC engines each with a rated brake horsepower greater than 50 bhp used at a ~~single~~ source, whose maximum aggregate rated brake horsepower is greater than 250 bhp.
- 103 EXEMPTIONS:** The following types of stationary IC engines are exempt from all of the requirements of this rule but shall comply with Rule 300 (Visible Emissions) of these rules:
- 103.1** Any rotary engine, including gas turbines, jet engines.
  - 103.2** An IC engine operated as a non-road engine.
  - 103.3** A laboratory IC engine used directly and exclusively for engine research including engine development, and subsequent engine performance verification for the purpose of either engine emission control techniques or engine efficiency improvements.
  - 103.4** A prime engine when it is operated for purposes of performance verification and testing by the owner ~~or~~ and/or operator or by a manufacturer or distributor of such equipment for the purpose of performance verification and testing at the production facility.



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- 103.5** A compressed gas IC engine used for solar testing and research programs.
- 103.6** An IC engine operated as an emergency ~~generator~~ engine or other equipment at a nuclear power plant that must run for safety reasons and/or operational tests to meet requirements imposed by the Nuclear Regulatory Commission.
- 103.7** An IC engine test stand used for evaluating engine performance; and
- 103.8** An IC engine used for training purposes as long as the total number of hours of the operation does not exceed 100 hours per calendar year per engine.
- 104 PARTIAL EXEMPTIONS FOR EMERGENCY ENGINES:** Any stationary IC engine operated as an emergency engine for any of the following reasons is exempt from all of the provisions of this rule, except for the provisions in Sections 301, 303, ~~and subsections~~ 502.1 and 502.4 of this rule:
- 104.1** Used only for power when normal power service fails from the serving utility or if onsite electrical transmission or onsite power generation equipment fails.
- 104.2** Used only for the emergency pumping of water resulting from a flood, fire, lightning strikes, police action or for any other essential public services which affect the public health and safety.
- 104.3** Used for lighting airport runways.
- 104.4** Used for sewage overflow mitigation and/or prevention.
- 104.5** Used for reliability-related activities such as engine readiness, calibration, or maintenance or to prevent the occurrence of an unsafe condition during electrical system maintenance, as long as the total number of hours of the operation does not exceed 100 hours per calendar year per engine as evidenced by an installed non-resettable hour meter.
- 104.6** Used as the prime engine when the prime engine has failed, but only for such time as is needed to repair the prime engine; or
- 104.7** Used to operate standby emergency water pumps for fire control that activate when sensors detect low water pressure.
- 105 PARTIAL EXEMPTIONS FOR NON-EMERGENCY LOW USAGE PRIME ENGINES:** The following non-emergency, low usage, prime engines are exempt from all of the provisions of this rule except for the provisions in Sections 301, 303, ~~and subsections~~ 502.1 and 502.4 of this rule:



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**105.1** Each engine rated at or below 1000 bhp that operates less than 200 hours in any 12-consecutive-calendar-month period as evidenced by an installed non-resettable hour meter.

**105.2** Each engine rated above 1000 bhp that operates less than 100 hours in any 12-consecutive-calendar-month period as evidenced by an installed non-resettable hour meter.

**SECTION 200 – DEFINITIONS:** For the purpose of this rule, the following definitions shall apply, in addition to those definitions found in Rule 100 (General Provisions and Definitions) of these rules. In the event of any inconsistency between any of the Maricopa County air pollution control rules, the definitions in this rule take precedence. See Rule 100 (General Provisions And Definitions) of these rules for definitions of terms that are used but not specifically defined in this rule.

**201 AFTERCOOLER / INTERCOOLER**– A system that cools the engine intake air or air/fuel mixture after the air exits the turbocharger and prior to the introduction into the cylinder, thereby lowering NOx emissions.

**202 COGENERATION UNIT**– Internal combustion engine unit that burns fuel to simultaneously produce electricity and heat in a single thermodynamic process and is usually located in close proximity to the equipment requiring the heat energy.

**203 COMPRESSION - IGNITION ENGINE** – A reciprocating internal combustion engine with operating characteristics wherein the principal mechanism of igniting the fuel and air mixture in the cylinders is the compression of air in the cylinder until it is so hot that any fuel injected into the air or mixed with the air ignites. In this type of engine, a separate ignition source, such as a spark plug, is not used.

**204 DIESEL ENGINE** – A type of compression- ignited IC engine.

**205 EMERGENCY ENGINE**– Any stationary standby IC engine whose sole function is to provide back-up power when electric power from the local utility is interrupted or when operated solely for any of the reasons listed in Section 104 of this rule. An emergency engine, for the purposes of this rule, shall not be used to supply standby power due to a voluntary reduction in power by a utility or power company, supply power for distribution or sale to the grid, or supply power at a source in order to avoid peak demand charges or high electric energy prices during on-peak price periods and shall not exceed 500 hours of operation including the 100 hours listed in ~~subsection~~ Section 104.5 of this rule.

**206 ENGINE FAMILY** - A group of engines with similar design features such as fuel type, cooling medium, method of air aspiration, combustion chamber design including cylinder bore and stroke, exhaust after treatment (if any), method of fuel admission, and method of control. These engines are also expected to have similar emission and operating characteristics throughout their useful lives.



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- 207 EQUIVALENT REPLACEMENT ENGINE** - An engine that is substituted for a stationary IC engine that is intended to perform the same or similar function as the original engine and where all of the following conditions exist:
- 207.1** The replacement engine results in equal or lower air contaminant emissions than the existing engine; and
  - 207.2** The replacement engine meets the emission control technology standards contained in either Table 1 or Table 2 of this rule; and
  - 207.3** The rated bhp of the replacement engine does not exceed the rated bhp of the existing engine (or sum of existing engines) by more than 20 percent. For every percentage point increase of the rated brake horsepower, there shall be an associated decrease in emissions of nitrogen oxides, expressed as a mass per unit time, equal to or exceeding two percentage points.
- 208 EXISTING ENGINE** - An engine that commenced operation prior to ~~October 22, 2003~~ [Date of Adoption] or an engine on which the construction or modification has commenced prior to ~~October 22, 2003~~ [Date of Adoption], including the contractual obligation to undertake and complete an order for an engine.
- 209 IDENTICAL REPLACEMENT ENGINE** - An engine that is substituted for an existing stationary IC engine that has the same manufacturer type, model number, manufacturer's maximum rated capacity, bhp, and that is intended to perform the same or similar function as the original stationary IC engine that it replaces and has equal or lower emissions or meets the emission control technology requirements in Section 304, Table 1, 2, or 3 of this rule.
- 210 INTERNAL COMBUSTION (IC) ENGINE, NONROAD**
- 210.1** Any IC engine:
    - a.** In or on a piece of equipment that is self-propelled or serves a dual purpose by both propelling itself and performing another function (such as garden tractors, off-highway mobile cranes and bulldozers); or
    - b.** In or on a piece of equipment that is intended to be propelled while performing its function (such as lawnmowers and string trimmers); or
    - c.** That, by itself or in or on a piece of equipment, is portable or transportable, meaning designed to be and capable of being carried or moved from one location to another. Indicia of transportability include but are not limited to, wheels, skids, carrying handles, dollies, trailers, or platforms.



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**210.2** An internal combustion engine is not a nonroad engine if:

- a. The engine is used to propel a motor vehicle or a vehicle used solely for competition, or is subject to standards promulgated under Section 202 of the Clean Air Act; or
- b. The engine is regulated by a federal New Source Performance Standard promulgated under Section 111 of the Clean Air Act; or
- c. The engine otherwise included in paragraph (c) above of this definition remains or will remain at a location for more than 12 consecutive months or a shorter period of time for an engine located at a seasonal source. A location is any single site at a building, structure, facility, or installation. Any engine (or engines) that ~~replaces~~ replace an engine at a location and that is intended to perform the same or similar function as the engine replaced will be included in calculating the consecutive time period. An engine located at a seasonal source is an engine that remains at a seasonal source during the full annual operating period of the seasonal source. A seasonal source is a stationary source that remains in a single location on a permanent basis (i.e. at least two years) and that operates at that single location approximately three months (or more) each year. This paragraph does not apply to an engine after the engine is removed from the location.

**211 INTERNAL COMBUSTION (IC) ENGINE, STATIONARY** - Any reciprocating, piston-driven IC engine that is operated or intended to be operated at one specific location for more than 12 consecutive months or that is attached to a foundation at the location. Any engine that replaces an engine at a location and is intended to perform the same or similar function as the engine being replaced will be included in calculating the consecutive time period. A stationary IC engine is not a non-road engine.

**212 LEAN-BURN ENGINE** – A spark-ignited engine with an air-to-fuel operating range that has more air present than is needed to burn the fuel present and cannot be adjusted to operate with an exhaust oxygen concentration of less than or equal to 2 %.

**213 LOCATION** – Any single site at a building, structure, facility or installation.

**214 LOW SULFUR OIL** – ~~Fuel oil containing less than or equal to 0.05 % sulfur by weight.~~

~~215~~ **214 NEW ENGINE** -An engine that is not an existing engine.

~~216~~ **215 PART(S) PER MILLION, DRY VOLUME (ppmdv)** – A unit of proportion equal to  $10^{-6}$  that is measured on a dry basis (minus water) at 15% oxygen.



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- ~~217~~ 216     **PRIME ENGINE** – A principal or main use engine that is dedicated to a process or processes for the purpose of supplying primary mechanical or electrical power as opposed to an emergency engine.
- ~~218~~ 217     **RATED BRAKE HORSEPOWER** - The maximum brake horsepower (bhp) specified by the engine manufacturer for the engine application, usually listed on the nameplate of the engine. If the engine has been altered so that the maximum brake horsepower is different than the rated brake horsepower on the nameplate, then the maximum brake horsepower shall be considered the rated brake horsepower.
- ~~219~~ 218     **RICH-BURN ENGINE** - Any spark-ignited IC engine that is not a lean-burn engine.
- ~~220~~ 219     **SPARK-IGNITION ENGINE** – An IC engine wherein the fuel is usually mixed with intake air before introduction into the combustion chamber resulting in a relatively homogeneous air/fuel mixture in the combustion chamber, at which time a spark plug then ignites the air/fuel mixture.
- ~~221~~ 220     **SULFUR OXIDES (SO<sub>x</sub>)** – Oxides of sulfur calculated as equivalent sulfur dioxide.
- ~~222~~     ~~WASTE DERIVED FUEL GAS~~ – ~~Any gaseous fuel that is generated from the biodegradation of solid or liquid waste including, but not limited to, sewage sludge, digester gas, and landfill gas.~~
- 221     ULTRA LOW SULFUR DIESEL FUEL - Fuel oil containing less than or equal to 0.0015 % sulfur by weight.
- 223     WASTE DERIVED FUEL GAS - Any gaseous fuel that is generated from the biodegradation of solid or liquid waste including, but not limited to, sewage sludge, digester gas, and landfill gas.

**SECTION 300 – STANDARDS:**

- 301     LIMITATIONS FOR NEW AND EXISTING STATIONARY IC ENGINES:** An owner ~~or~~ and/or operator of any engine that meets the criteria listed in Section 102 of this rule shall comply with either of the following:
- 301.1**     Use any fuel that contains no more than ~~0.05%~~ 0.0015% sulfur by weight, alone or in combination with other fuels.
- 301.2**     Use any waste derived fuel gas that contains no more than 0.08% sulfur by weight, alone or in combination with other fuels.
- 302     GOOD COMBUSTION PRACTICES / TUNING PROCEDURE:** An owner ~~or~~ and/or operator shall conduct preventative maintenance or tuning procedures recommended by the engine manufacturer to ensure good combustion practices to minimize NO<sub>x</sub> emissions. A handheld monitor may be used if so



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desired by the owner ~~or~~ and/or operator for measurement of NOx, CO, and concentrations in the effluent stream after each adjustment is made. This may assist in determining that the proper adjustment has been made to ensure NOx and CO minimization. In lieu of a manufacturer's procedure, a ~~different~~ alternative procedure specified by any other maintenance guideline may be used as a default procedure. ~~The~~ When using an alternative tuning procedure, it shall include all of the following, if so equipped, and appropriate to the type of engine:

- 302.1** Lubricating Oil and Filter: change once every three months or after no more than 300 hours of operation, whichever occurs last.
  - 302.2** Inlet Air Filter: clean once every three months or after no more than 300 hours of operation and replace every 1,000 hours of operation or every year, whichever occurs last;
  - 302.3** Fuel Filter: clean once every year or replace (if cartridge type) once every 1,000 hours of operation, whichever occurs last.
  - 302.4** Check and adjust the following once every year or after no more than 1,000 hours of operation, whichever occurs last:
    - a. intake and exhaust valves
    - b. spark plugs (if so equipped)
    - c. spark timing and dwell or fuel injection timing (if adjustable), and
    - d. carburetor mixture (if adjustable).
  - 302.5** Spark Plugs and Ignition Points: replace after 3,000 hours of operation or every year whichever occurs last
  - 302.6** Coolant: change after 3,000 hours of operation or every year whichever occurs last.
  - 302.7** Exhaust System: check for leaks and/or restrictions after 3,000 hours of operation or every year whichever occurs last.
- 303** **LIMITATIONS – OPACITY:** ~~No~~ An owner ~~or~~ and/or operator shall not discharge into the ambient air from any ~~single source~~ stationary reciprocating IC engine source that is subject to the applicability of this rule, of emissions any air contaminant emissions, other than uncombined water, in excess of 20% opacity.
- 304** **ADDITIONAL LIMITATIONS FOR PRIME ENGINES** ~~→ 250 RATED bhp:~~ In addition to meeting the standards in Sections 301, 302, and 303 of this rule, each existing or new prime engine greater than 250 rated bhp and a combination of IC engines with a rated brake horsepower greater than 50 bhp used at a stationary reciprocating IC engine subject to the applicability of this rule, , whose maximum aggregate



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rated brake horsepower is greater than 250 bhp that is not listed in Sections 103, 104, or 105 of this rule, shall comply with the emission limits or control technology requirements listed in Section 304, Table 1, 2, or 3 of this rule, dependent upon the type of engine. An owner and/or operator of a stationary internal combustion engine subject to this rule shall comply with either section 304.1 or 304.2:

**304.1** 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>
<u>Rich-burn engines using fossil derived gaseous fuel or gasoline</u>	<u>90</u>
<u>Lean-burn engines using fossil derived gaseous fuel</u>	<u>90</u>
<u>Engines using diesel or kerosene fuel</u>	<u>90</u>

**304.2** 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:

**NO<sub>x</sub> EMISSION LIMITS OR CONTROL TECHNOLOGY REQUIREMENTS FOR EXISTING  
 COMPRESSION-IGNITION ENGINES > 250 bhp**

**TABLE 1**

<b>RATED BRAKE HORSEPOWER (bhp)</b>	<b>ENGINE REQUIREMENTS</b>
250-399 > 250	770 530 ppmv or 10 6.9 g/bhp-hr. NOx or turbocharger with aftercooler/intercooler or 4-degree injection timing retard
400 plus	550 ppmv or 7.2 g/bhp-hr. NOx or turbocharger with aftercooler/intercooler or 4 degree injection timing retard

**EMISSION LIMITS OR CONTROL TECHNOLOGY REQUIREMENTS FOR EXISTING APPLICABLE  
 SPARK- IGNITION ENGINES > 250 RATED bhp**

**TABLE 2**

<b>OXIDES OF NITROGEN (NO<sub>x</sub>)</b>	<b>VOLATILE ORGANIC COMPOUND (VOC)</b>	<b>CARBON MONOXIDE (CO)</b>
280 ppmv or 4.0 b/bhp hr or three way catalyst*	800 ppmv or 5.0 g/bhp hr or three way catalyst*	4,500 ppmv or three way catalyst*



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	<u><b>OXIDES OF NITROGEN (NO<sub>x</sub>)</b></u>	<u><b>VOLATILE ORGANIC COMPOUND (VOC)</b></u>	<u><b>CARBON MONOXIDE (CO)</b></u>
<u><b>RICH-BURN</b></u>	<u>25 ppmdv or .35 g/bhp-hr or three-way catalyst*</u>	<u>800 ppmdv or 5.0 g/bhp-hr or three-way catalyst*</u>	<u>4,500 ppmdv or three-way catalyst*</u>
<u><b>LEAN-BURN</b></u>	<u>65 ppmdv or .9 g/bhp-hr</u>	<u>800 ppmdv or 5.0 g/bhp-hr or three-way catalyst*</u>	<u>4,500 ppmdv or three-way catalyst*</u>

\* The three-way catalyst shall provide a minimum of 80% control efficiency for NO<sub>x</sub> and CO for those engines fueled with natural gas, propane or gasoline. In addition the three-way catalyst shall also provide a minimum of at least 50% control efficiency for VOC for those engines fueled by gasoline.

**EMISSION LIMITS FOR NEW SPARK OR COMPRESSION-IGNITION ENGINES > 250 bhp**

**TABLE 3**

<b>ENGINE TYPE</b>	<b>NO<sub>x</sub></b>	<b>PM*</b>	<b>CO</b>
LEAN BURN (SPARK)	<del>440</del> <u>65 ppmdv or 1.5-9 g/bhp-hr.</u>	Not Applicable	4,500 ppmdv
RICH BURN (SPARK)	20 ppmdv or 0.30 g/bhp-hr.	Not Applicable	4,500 ppmdv
COMPRESSION ( <u>250 &lt; hp ≤ 750</u> )	<del>530 ppmdv or 6.9 g/bhp-hr.</del> <u>20 ppmdv or 0.3 g/bhp-hr</u>	<del>0.40 g/bhp-hr</del> 0.03 g/bhp-hr	<del>1,000 ppmdv</del> <u>2.6 g/bhp-hr</u>
<u>COMPRESSION (&gt;750 hp) except gen-sets</u>	<u>175 ppmdv or 2.6 g/bhp-hr</u>	<u>0.03 g/bhp-hr</u>	<u>2.6 g/bhp-hr</u>
GEN-SETS	<u>35 ppmdv or 0.5 g/bhp-hr</u>	<u>0.022 g/bhp-hr</u>	<u>2.6 g/bhp-hr</u>

\* A backhalf analysis shall be performed using reference Method 202 (referenced in ~~subsection~~ Section 504.6 of this rule) each time a compliance test for particulate matter emissions to meet the limitations listed in Table 3 is performed using Method 5. The results of the Method 202 testing shall be used for emissions inventory purposes.

**305 EFFICIENCY ALLOWANCE:**

Each emission limit expressed in Tables 1, 2 or 3 may be multiplied by X, where X equals the engine efficiency (E) divided by a reference efficiency of 30 percent. Engine efficiency shall be determined by one of the following methods whichever is higher:

a.  $E = (\text{Engine Output}) \times (100) \div (\text{Energy Input})$

where energy input is determined by a fuel measuring device accurate to +/- 5 % and is based upon the higher heating value (HHV) of the fuel. Percent efficiency (E) shall be averaged over 15 consecutive minutes and measured at peak load for the applicable engine.



**AQ-2015-004-Rule 324**  
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- b.  $E = (\text{Manufacturers Rated Efficiency [Continuous] at (LHV) X (LHV)} \div (\text{HHV}))$  where LHV = the lower heating value of the fuel Engine efficiency (E) shall not be less than 30 percent; an engine with an efficiency lower than 30 percent shall be assigned an efficiency of 30 percent for the purposes of this rule.

**306 EQUIVALENT OR IDENTICAL ENGINE REPLACEMENT:** An equivalent or identical replacement engine that replaces an existing engine shall be treated as an existing engine for the purposes of compliance with this rule, unless the engine commenced operation or was constructed or modified after ~~October 22, 2003~~ [Date of Adoption], including the contractual obligation to undertake and complete an order for an engine and then it will be considered a new engine for purposes of meeting the standards for a new engine in this rule.

**307 EQUIPMENT REQUIREMENT:** The owner and/or operator of any stationary internal combustion engine, except for those engines being removed from service under Section 401.5 401 of this rule, subject to any provision of this rule shall install one of the following:

**307.1 HOUR METER:** A non-resetting totalizing hour meter on each engine by (12 months after date of adoption).

## **SECTION 400 - ADMINISTRATIVE REQUIREMENTS**

### **401 COMPLIANCE SCHEDULE:**

An owner ~~or~~ and/or operator of an existing stationary IC engine that must be replaced with a new engine to meet emission limits listed in Section 300 of this rule shall be in compliance with the emission limits listed in Section 304, Table 3 of this rule by ~~October 22, 2007~~ prior to operation [date of adoption].

## **SECTION 500 - MONITORING AND RECORDS**

### **501 COMPLIANCE DETERMINATION:**

**501.1 Existing Engines:** Existing IC engines or engine families shall demonstrate compliance with Section 300 of this rule by recordkeeping according to Section 502 of this rule. Emission testing using the applicable test methods listed in Section 503 of this rule shall be performed if the Control Officer requests.

**501.2 Existing Engine Families at a Source:** When testing an engine family at one source, the number of engines tested should be the greater of either one engine or one third of all identical engines in the group. If any of the representative engines exceed the emission limits, each engine in the group shall demonstrate compliance by emissions testing.



**AQ-2015-004-Rule 324**

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- 501.3 New Engines / New Engine Families:** Compliance with the limitations listed in Section 304, Table 3 of this rule shall be demonstrated by either:
- a. A statement from the manufacturer that the engine meets the most stringent emissions standards found in this rule, or 40 CFR Part 89 or 90-89, 90, and 1039 applicable to the engine and its model year at the time of manufacture or
  - b. Performance of emission testing using the test methods listed in Section 503 of this rule.
- 501.4 ~~Low Sulfur Oil~~ Ultra Low Diesel Fuel Verification:** If the Control Officer requests proof of the sulfur content, the owner ~~or~~ and/or operator shall submit fuel receipts, contract specifications, pipeline meter tickets, Material Safety Data Sheets (MSDS), fuel supplier information or purchase records, if applicable, from the fuel supplier, indicating the sulfur content of the fuel oil. In lieu of these, testing of the fuel oil for sulfur content to meet the ~~0.05%~~ 0.0015% limit shall be permitted if so desired by the owner ~~or~~ and/or operator for evidence of compliance.
- 501.5 Waste - Derived Fuel Sulfur Verification:** The owner ~~or~~ and/or operator shall submit documentation of the concentration of the sulfur level of the waste- derived fuel to the Control Officer.
- 501.6 Test Method Conditions:** The owner ~~or~~ and/or operator shall use the test methods listed in Section 503 of this rule to determine compliance with the limitations in Section 304 of this rule, Tables 1-3. Testing for stationary IC engines shall be completed under steady state conditions at either the maximum operating load or no less than 80% of the rated brake horsepower rating. If the owner ~~or~~ and/or operator of an engine demonstrates to the Control Officer that the engine cannot 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 typical operational mode of the engine.
- 502 RECORDKEEPING / RECORDS RETENTION:** The owner ~~or~~ and/or operator of any stationary IC engine subject to this rule shall comply with the following requirements and keep records for a period of 5 years:
- 502.1** An owner ~~or~~ and/or operator of any IC engine, including emergency engines, prime engines and low usage engines, shall keep a record that includes an initial one time entry that lists the particular engine combustion type (compression or spark-ignition or rich or lean burn); manufacturer; model designation, rated brake horsepower, serial number and where the engine is located on the site.
  - 502.2** An owner ~~or~~ and/or operator of a prime engine shall maintain a monthly record for prime engines which shall include:



**AQ-2015-004-Rule 324**

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- a. Hours of operation;
- b. Type of fuel used, and
- c. Documentation verifying compliance with sulfur fuel content according to ~~subsection~~ Section 301.1 of this rule.

**502.3** An owner ~~or~~ and/or operator of a prime engine shall maintain an annual record of good combustion procedures according to Section 302 of this rule.

**502.4** An owner ~~or~~ and/or operator of an emergency engine and a non-emergency low-usage engine that meets the exemptions listed in Sections 104 and 105 of this rule shall keep an engine record that includes:

- a. Monthly rolling twelve month total of hours of operation, including hours of operation for testing, reliability and maintenance;
- b. Fuel type and sulfur content of fuel; and
- c. Explanation for the use of the engine if it is used as an emergency engine.

**503** **TEST METHODS INCORPORATED BY REFERENCE:** The Environmental Protection Agency (EPA) test methods as they exist in the Code of Federal Regulations (CFR) (July 1, 2004) and the American Society of Testing Materials International Methods as listed below, are incorporated by reference in Appendix G of the Maricopa County Rules and Regulations. ~~The~~ When more than one test method is permitted for the same determination, as listed in ~~subsections~~ Sections 503.12, 503.13, 503.14, or 503.15 of this rule, an exceedance of the limits established in this rule determined by any of the applicable test methods constitutes a violation. Copies of test methods referenced in this Section, of this rule, are available at the Maricopa County ~~Environmental Services Department~~ Air Quality Department, 1001 North Central Avenue, Suite ~~204~~125, Phoenix, Arizona, 85004 -1942.

**503.1** EPA Reference Methods 1 (“Sample and Velocity Traverses for Stationary Sources”) and 1A (“Sample and Velocity Traverses for Stationary Sources with Small Stacks and Ducts”) (40 CFR 60, Appendix A).

**503.2** EPA Reference Methods 2 (“Determination of Stack Gas Velocity and Volumetric Flow Rate”), 2A (“Direct Measurement of Gas Volume Through Pipes and Small Ducts”), 2C (“Determination of Stack Gas Velocity and Volumetric Flow Rate in Small Stacks or Ducts”), and 2D (“Measurement of Gas Volumetric Flow Rates in Small Pipes and Ducts”) (40 CFR 60, Appendix A).



**AQ-2015-004-Rule 324**

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- 503.3** EPA Reference Methods 3 (“Gas Analysis for the Determination of Dry Molecular Weight”), 3A (“Determination of Oxygen and Carbon Dioxide Concentrations in Emissions from Stationary Sources (Instrumental Analyzer Procedure)”), 3B (“Gas Analysis for the Determination of Emission Rate Correction Factor of Excess Air”), and 3C (“Determination of Carbon Dioxide, Methane, Nitrogen and Oxygen from Stationary Sources”) (40 CFR 60, Appendix A).
- 503.4** EPA Reference Method 4 (“Determination of Moisture Content in Stack Gases”) (40 CFR 60, Appendix A).
- 503.5** EPA Reference Method 5 (“Determination of Particulate Emissions from Stationary Sources”) (40 CFR 60, Appendix A)
- 503.6** EPA Reference Method 202 (“Determination of Condensable Particulate Emissions from Stationary Sources”) (40 CFR 51, Appendix M).
- 503.7** EPA Reference Methods 7 (“Determination of Nitrogen Oxide Emissions from Stationary Sources”), 7A (“Determination of Nitrogen Oxide Emissions from Stationary Sources - Ion chromatographic method”), 7B (“Determination of Nitrogen Oxide Emissions from Stationary Sources – Ultraviolet Spectrometry”), 7C (“Determination of Nitrogen Oxide Emissions from Stationary Sources – Alkaline-Permanganate Colorimetric Method”), 7D (“Determination of Nitrogen Oxide Emissions from Stationary Sources – Alkaline – Permanganate Chromatographic Method”), and 7E (“Determination of Nitrogen Oxide Emissions from Stationary Sources – Instrumental Analyzer Method”), (40 CFR 60, Appendix A).
- 503.8** EPA Reference Method 9 (“Visual Determination of the Opacity of Emissions from Stationary Sources”) (40 CFR 60, Appendix A).
- 503.9** EPA Reference Method 10 (“Determination of Carbon Monoxide from Stationary Sources”) (40 CFR 60, Appendix A).
- 503.10** EPA Reference Method 18 (“Measurement of Gaseous Organic Compound Emissions by Gas Chromatography”) (40 CFR 60, Appendix A).
- 503.11** EPA Reference Method 25A (“Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer”) (40 CFR 60, Appendix A).
- 503.12** ~~American Society of Testing Materials International, ASTM Method D1266-98 (1998) (“Standard Test Method for Sulfur in Petroleum Products (Lamp Method)”)~~, 1998. “Standard Test Method for Sulfur in Petroleum Products (Lamp Method)”.
- 503.13** ~~American Society of Testing Materials International, ASTM Method D2622-98 (1998)~~ (“Standard Test Method for Sulfur in Petroleum Products by Wavelength Dispersive X-Ray Fluorescence



**AQ-2015-004-Rule 324**

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Spectrometry”), 1998. “Standard Test Method for Sulfur in Petroleum Products by Wavelength Dispersive X-Ray Fluorescence Spectrometry”).

- 503.14** ~~American Society of Testing Materials International, ASTM Method D2880-71, 78 or 96 (1971, 1978, or 1996) (“Standard Specification for Gas Turbine Fuel Oils”), 1971 or 1978 or 1996. “Standard Specification for Gas Turbine Fuel Oils”~~).
- 503.15** ~~American Society of Testing Materials International, ASTM Method D4294-98 (1998) (“Standard Test Method for Sulfur in Petroleum Products by Energy Dispersive X-Ray Fluorescence Spectroscopy”) 1990 or 1998. “Standard Test Method for Sulfur in Petroleum Products by Energy-Dispersive X-Ray Fluorescence Spectroscopy”~~).
- 503.16** ~~American Society of Testing Materials International, ASTM Method D5504-01 (2006) (“Standard Test Method for Determination of Sulfur Compounds in Natural Gas and Gaseous Fuels by Gas Chromatography and Chemiluminescence”), 2006. “Standard Test Method for Determination of Sulfur Compounds in Natural Gas and Gaseous Fuels by Gas Chromatography and Chemiluminescence”~~).