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Kansas Department of Health and Environment – Bureau of Air
1000 SW Jackson, Suite 310, Topeka, KS 66612
Phone: (785) 296-6024 Fax: (785) 559-4256
Expedited Application for Construction Approval
Emergency Stationary Reciprocating Internal
Combustion Engine

This form is for Emergency Stationary Reciprocating Internal Combustion Engines for which the potential increase in emissions must be below the permit thresholds at K.A.R. 28-19-300(a)(1). The facility shall submit this form, by mail or electronically to KDHE.BOAPermit@ks.gov along with any requested or pertinent additional information. Any required notifications, reports, or documentation shall be submitted to the above address.

The potential-to-emit is based on 500 hours per year usage. Maintenance checks and readiness testing is limited to 100 hours per year, however, there is no time limit on use of units in emergency situations.

NOTE: Emergency generators located at an area source of Hazardous Air Pollutants that are subject to 40 CFR Part 63 Subpart ZZZZ (not subject to 40 CFR Part 60 Subpart JJJJ or IIII) are **not** required to obtain a construction approval as specified in K.A.R. 28-19-300(b)(3), unless the potential to emit (pte) for the engine(s) is above the approval thresholds in K.A.R. 28-19-300(b)(1). [K.A.R. 28-19-300(b)(5)(C)]

Please specify the type of construction document you are applying for:

Approval Response (MACT ZZZZ engines located at an area source of HAP emissions only)

I. Facility Information

Company Name:		Source ID number (N/A if no Source ID#):
NAICS/SIC (primary codes):		
Source Location		
Facility Name:		
Street Address:		County:
City, State, Zip:		Section, Township, Range:
Mailing Address (if different)		
Street Address:		
City, State, Zip:		
Contact Information		
Name:		Telephone Number:
Email:		Fax Number:
Approval Fee Included (Approval Fee \$750): <input type="checkbox"/> Yes <input type="checkbox"/> No		

For KDHE Office Use Only

This application and associated documentation has been reviewed and the listed equipment (or equivalent) is approved and permitted for construction under K.A.R. 28-19-300.

Source ID: _____ Permit Writer: _____

C#: _____ Signature: _____

D.O.: _____ Date: _____

II. Potential Emissions

Potential to emit calculations should be based on 500 hours of operation for emergency generators.¹

Pollutant	Potential-to-emit (lbs/hour)	Potential-to-emit (lbs/24 hour)
NO _x		
CO		
VOC		
SO _x		
PM		
PM ₁₀		

III. Applicable Requirements

Please check all requirements that will be applicable to this engine.

<input type="checkbox"/> 40 CFR Part 63 Subpart ZZZZ (MACT ZZZZ)- National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines <input type="checkbox"/> 40 CFR Part 60 Subpart JJJJ (NSPS JJJJ)- Standards of Performance for Stationary Spark Ignition Internal Combustion Engines <input type="checkbox"/> 40 CFR Part 60 Subpart IIII (NSPS IIII)- Standards of Performance for Stationary Compression Ignition Internal Combustion Engines <input type="checkbox"/> K.A.R. 28-19-650 Opacity Requirements <input type="checkbox"/> Other- _____

¹ Engine PTE calculation tool can be found at <http://www.sbeap.org/tools/potential-to-emit-calculators>. For an emergency generator use 500 hours of operation in the calculation.

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IV. Engine Information

If installing more than one engine, please submit a separate engine/control equipment description for each engine.

Description:

Date of Construction (MM/DD/YY):	Date of Manufacture (MM/DD/YY):
Has the engine been modified ² ? <input type="checkbox"/> Yes <input type="checkbox"/> No	If yes, please provide the date of the modification:
Has the engine been reconstructed ³ ? <input type="checkbox"/> Yes <input type="checkbox"/> No	If yes, please provide the following information
	Date of reconstruction (MM/DD/YY):
Engine Ignition: <input type="checkbox"/> Compression Ignition Displacement: _____ <input type="checkbox"/> Spark Ignition (select one below) <input type="checkbox"/> 2SLB <input type="checkbox"/> 4SRB <input type="checkbox"/> 4SLB	Summary of cost (submit documentation):
	Engine Manufacturer/Model No:
	Maximum Rated Horsepower:
Serial No:	
Will the engine be manufacturer certified? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, please submit the certification along with application.	
Will the engine be used for peak shaving or supply power to the electrical grid? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Will the engine be located at a facility that is a major source of Hazardous Air Pollutants (HAPs)? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Will the engine be located at a residential, commercial, or institutional facility? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Is the engine a National Fire Protection Association certified fire pump? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Owner/Operator's identification number/name for the engine:	
Fuel Type: <input type="checkbox"/> Gasoline <input type="checkbox"/> Natural Gas <input type="checkbox"/> Biodiesel <input type="checkbox"/> Other, _____ <input type="checkbox"/> Diesel <input type="checkbox"/> Dual fuel <input type="checkbox"/> LPG	

² 40 CFR 60.2 defines modification as follows: any physical change in the method of operation of an existing facility which increases the amount of any air pollutant (to which the standard applies) emitted into the atmosphere by that facility or which results in the emission of any air pollutant (to which the standard applies) into the atmosphere not previously emitted.

³ 40 CFR 63.2 defines reconstruction as follows: the fixed capital cost of the new components exceeds 50% of the fixed capital cost that would be required to construct a comparable new source.

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V. Regulatory Requirements for Engines

Comply with all applicable regulatory requirements. Please see <https://www.ecfr.gov> or http://www.kdheks.gov/air-permit/tech_guidance.html for information regarding regulatory requirements. The owner or operator shall comply with 40 CFR Part 60 Subpart A and 40 CFR Part 63 Subpart A, as applicable.

A. K.A.R. 28-19-650 limits opacity to 20% for sources constructed after January 1, 1971.⁴

B. MACT ZZZZ

Use the table below to determine whether the engine is new or existing. Engines are considered new for MACT ZZZZ if they commence construction or reconstruction on or after the applicable date, summarized below. Engines constructed before that date are considered existing.

Source Type	Engine Size	Construction/Reconstruction Commences on or after...
Major	>500 HP	12/19/02
Major	≤ 500 HP	6/12/06
Area	Any	6/12/06

1. The owner or operator shall comply with the requirements of MACT ZZZZ, as applicable.
2. Operation and Maintenance Requirements – 40 CFR 63.6602, 63.6603, 63.6625
 - Existing emergency ICE shall be equipped with a non-resettable hour meter. [40 CFR 63.6625(f)]
 - The owner or operator shall comply with the work practice requirements in Table 2c and 2d, as applicable (summarized below). [40 CFR 63.6602 and 63.6603]
 - The owner or operator may petition the Administrator for alternative work practices.

Engine	Meet the following except during startup:	During periods of startup:
Existing Emergency CI ICE at Major Sources of HAP, and Existing Emergency CI ICE at Area Sources of HAP	a. Change oil and filter every 500 hours of operation or annually* b. Inspect air cleaner every 1,000 hours of operation or annually*, and replace as necessary c. Inspect all hoses and belts every 500 hours of operation or annually*, and replace as necessary.	Minimize the engine’s time spent at idle and minimize the engine’s startup time at startup to a period needed for appropriate and safe loading of the engine, not to exceed 30 minutes, after which time the non-startup emission limitations apply.
Existing Emergency SI ICE ≤ 500 HP at Major Sources of HAP, and Existing Emergency SI ICE at Area Sources of HAP	a. Change oil and filter every 500 hours of operation or annually* b. Inspect spark plugs every 1,000 hours of operation or annually*, and replace as necessary c. Inspect all hoses and belts every 500 hours of operation or annually*, and replace as necessary.	Minimize the engine’s time spent at idle and minimize the engine’s startup time at startup to a period needed for appropriate and safe loading of the engine, not to exceed 30 minutes, after which time the non-startup emission limitations apply.

*Whichever comes first

- The owner or operator may utilize an oil analysis program as described in 40 CFR 63.6625(i) in order to extend the specified oil change requirement.
- Existing emergency ICE shall be operated and maintained according to the manufacturer’s emission-related instructions or an alternative maintenance plan that minimizes emissions. [40 CFR 63.6625(e)]

⁴ Per K.A.R. 28-19-650(b)- Air emissions within Wyandotte County from any processing of materials or other uses of the premises within the county shall not exceed 20 percent opacity.

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- The owner or operator of an emergency CI stationary RICE must meet the fuel requirements as applicable in 40 CFR 63.6604(b)-(c).
3. Recordkeeping Requirements – 40 CFR 63.6655 and 63.6660
 - The owner or operator shall keep records of maintenance conducted on the engine.
 - Existing emergency ICE that do not meet the standards applicable to non-emergency engines shall keep records of engine operation as specified at 40 CFR 63.6655(f).
 - Records shall be maintained per 40 CFR 63.6660.
 4. If performance testing is required by 40 CFR 63.6610, 63.6611, or 63.6612 the testing shall be conducted within 180 days of the compliance date specified in 40 CFR 63.6595. In accordance with 40 CFR 63.7(b), notification of the date for performance testing and a performance testing protocol shall be submitted to KDHE at least 60 days prior to such date.
 5. In order for an engine to be considered an emergency stationary RICE, the owner or operator of an engine must operate that engine according to the requirements in 40 CFR 63.6640(f)(1)-(4) as applicable. [*Please note that on May 1, 2015, the U.S. Court of Appeals for the District of Columbia Circuit issued a decision vacating paragraphs 40 CFR 63.6640(f)(2)(ii)-(iii), which was then mandated by the court to be effective on May 4, 2016 upon EPA request.*]
 - Any operation of an emergency stationary RICE for non-emergency situations as outlined in 63.6640(f)(2)-(4) is limited to 100 hours per year. Non-emergency situations include but are not limited to maintenance checks and readiness testing.
 - There is no time limit on the use of such units in emergency situations. [40 CFR 63.6640(f)(1)]
 - Emergency SI ICE may operate up to 50 hours per year in non-emergency situations. This operating time cannot be used for peak shaving or to generate income for the facility and shall be counted towards the 100 hour limit. [40 CFR 63.6640(f)(3)-(4)]
 6. Any RICE subject to MACT ZZZZ that meets any of the criteria in 40 CFR 63.6590(c)(1)-(7) shall comply with MACT ZZZZ by complying with the requirements of either NSPS JJJJ (SI) or NSPS IIII (CI), as applicable.

B. NSPS JJJJ

1. Applicability – 40 CFR 60.4230, the following stationary Spark Ignition (SI) RICE are subject to NSPS JJJJ: Emergency SI ICE which commence construction after 6/12/2006, were manufactured on or after 1/1/2009, and have a maximum engine power >25 HP; any SI ICE which is modified or reconstructed after 6/12/2006; and any SI ICE that commence construction after 6/12/2006 are subject to 40 CFR 60.4236.
2. Emission Standards – 40 CFR 60.4233
Owners and operators of SI ICE shall comply with the emission standards of 40 CFR 60.4233 as applicable.
3. Fuel Requirements – 40 CFR 60.4235
Owners and operators of SI ICE that use gasoline shall use gasoline that meets the per gallon sulfur limit in 40 CFR 80.195.
4. Monitoring Requirements – 40 CFR 60.4237

Owners or operators of the following SI emergency engines that do not meet the standards applicable to non-emergency engines shall install a non-resettable hour meter:

- Engines \geq 500 HP that were built on or after July 1, 2010
- Engines \geq 130 HP and <500 HP that were built on or after January 1, 2011
- Engines <130 HP built on or after July 1, 2008

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5. Compliance Requirements – 40 CFR 60.4243 [*Please note that on May 1, 2015, the U.S. Court of Appeals for the District of Columbia Circuit issued a decision vacating paragraphs 40 CFR 60.4243(d)(2)(ii)-(iii), which was then mandated by the court to be effective on May 4, 2016 upon EPA request.*]
 - The owner or operator shall meet the compliance requirements at 40 CFR 60.4243 as applicable.
 - Maintenance checks and readiness testing of emergency stationary SI ICE is limited to 100 hours per year. There is no time limit on the use of such units in emergency situations.
 - If Federal, State, or local standards require more than 100 hours of maintenance and testing, the owner or operator shall maintain records of these requirements.
 - Emergency SI ICE may operate up to 50 hours per year in non-emergency situations. This operating time cannot be used for peak shaving or to generate income for the facility and shall be counted towards the 100 hour limit.
 - Owners or operators of natural gas SI engines may use propane as an alternative fuel for up to 100 hours per year during emergency operations as specified in 40 CFR 60.4243(e).

6. Reporting and Recordkeeping Requirements – 40 CFR 60.4245
 - Owners and operators of all SI ICE shall maintain the following records:
 - All notifications submitted to comply with NSPS JJJJ
 - Maintenance conducted on the engine
 - If the engine is a certified engine, documentation from the manufacturer of certification to applicable emission standards
 - If the engine is not a certified engine or is a certified engine operating in a non-certified manner and subject to 40 CFR 60.4243(a)(2), documentation that the engine meets the emission standards.
 - For all Emergency Stationary SI ICE's specified in 40 CFR 60.4245(b) that do not meet the standards applicable to non-emergency engines, the owner or operator must keep records of the hours of operation of the engine that is recorded through the non-resettable hour meter. The owner or operator must document how many hours are in emergency operation, including what classified the operation as emergency and how many hours are spent in non-emergency operation.
 - The owner or operator of an SI ICE ≥ 500 HP that is not certified to meet the emission standards of 40 CFR 60.4231 shall submit an initial notification as specified in 40 CFR 60.4245(c).
 - Emergency Stationary SI ICE with a maximum engine power more than 100 HP that operates or is contractually obligated to be available for more than 15 hours per calendar year for the purposes in 40 CFR 60.4243(d)(3)(i), you must submit an annual report in accordance with 40 CFR 60.4245(e).

7. If performance testing is required by 40 CFR 60.4243(b)(2)(i) or (ii) it shall be conducted within 180 days after initial startup of the engine. In accordance with 40 CFR 60.8(d), notification of the date for performance testing and a performance testing protocol shall be submitted to KDHE Bureau of Air, Compliance and Enforcement Section at least 30 days prior to such date. Performance test results shall be submitted to KDHE within 60 days after the test has been completed as required by 40 CFR 60.4245(d).

C. NSPS IIII

1. Applicability – 40 CFR 60.4200, the following stationary Compression Ignition (CI) RICE are subject to NSPS IIII: RICE that commenced construction after 7/11/2005, were manufactured after 4/1/2006, and are not fire pump engines; RICE that commenced construction after 7/11/2005 and were manufactured as a certified National Fire Protection Association (NFPA) fire pump engine after 7/1/2006; RICE that are modified or reconstructed after 7/11/2005; RICE that commence construction after 7/11/2005 are subject to 40 CFR 60.4208; RICE being tested at a stationary CI ICE test cell/stand are not subject to NSPS IIII; temporary replacement units that meet the stipulations in 40 CFR 60.4200(e) are not required to meet any other provisions of NSPS IIII.

2. Emission Standards – 40 CFR 60.4205

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Owners and operators of emergency stationary CI ICE shall comply with the emission standards of 40 CFR 60.4205 (in the following table) based on model year, engine displacement, and engine power.

Model Year	Displacement (liters/cylinder)	Comply with...
Pre-2007	<10	Table 1 of Subpart III
Pre-2007	≥10 and <30	40 CFR 94.8(a)(1)
≥2007	<30	Nonroad CI engine standards in 40 CFR 60.4202

- Fire pump emergency RICE with a displacement <30 liters/cylinder must comply with the emission standards in Table 4 of Subpart III.
- For emergency RICE with a displacement of ≥30 liters/cylinder, NOx and PM emissions shall be limited as specified in 40 CFR 60.4205(d).
- The owner or operator of an emergency RICE with <30 liters per cylinder who conducts a performance test in-use must meet the NTE standards as indicated in 40 CFR 60.4212 [40 CFR 60.4205(e)]

3. Fuel Requirements – 40 CFR 60.4207
Owners and operators of stationary CI ICE must comply with 40 CFR 60.4207.
4. Monitoring Requirements – 40 CFR 60.4209(a)
Owners or operators of emergency stationary CI ICE that do not meet the standards applicable to non-emergency engines must install a non-resettable hour meter prior to startup of the engine.
5. Compliance Requirements – 40 CFR 60.4211 [*Please note that on May 1, 2015, the U.S. Court of Appeals for the District of Columbia Circuit issued a decision vacating paragraphs 40 CFR 60.4211(f)(2)(ii)-(iii), which was then mandated by the court to be effective on May 4, 2016 upon EPA request.*]
 - Owners and operators of emergency stationary CI ICE shall operate and maintain the engine according to manufacturer’s written instructions, except as provided in 40 CFR 60.4211(g).
 - Pre-2007 model year CI ICE: see 40 CFR 60.4211(b)(1)-(5)
 - 2007 or later model year CI ICE: see 40 CFR 60.4211(c)
 - Maintenance checks and readiness testing of emergency stationary CI ICE is limited to 100 hours per year. There is no time limit on the use of such units in emergency situations.
 - If Federal, State, or local standards require more than 100 hours of maintenance and testing, the owner or operator shall maintain records of these requirements.
 - Emergency CI ICE may operate up to 50 hours per year in non-emergency situations. This operating time cannot be used for peak shaving or to generate income for the facility and shall be counted towards the 100 hour limit.
6. Reporting and Recordkeeping Requirements – 40 CFR 60.4214(b)
 - Owners and operators of emergency stationary CI ICE (that do not meet the standards applicable to non-emergency engines) shall maintain records of the operation of the engine in emergency and non-emergency service that are recorded through the non-resettable hour meter.
 - The owner must record the time of operation of the engine and the reason the engine was in operation during that time.
7. If performance testing is required by 40 CFR 60.4211 it shall be conducted within 180 days of initial startup, or 60 days of reconstruction or modification of the engine. In accordance with 40 CFR 60.8(d), notification of the date for performance testing and a performance testing protocol shall be submitted to KDHE Bureau of Air, Compliance and Enforcement Section at least 30 days prior to such date.

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VI. Facility-wide Notification, Recordkeeping, and Reporting

The owner or operator shall notify the KDHE Air Quality Representative at the appropriate KDHE district or local office within 30 days of initial startup. To determine the contact information for the appropriate district or local office a map can be found at <http://www.kdheks.gov/bar/download/AQDistrictMaps.pdf>.

VII. General Provisions

- A.** This document shall become void if the construction or modification has not commenced within 18 months of the effective date, or if the construction or modification is interrupted for a period of 18 months or longer.
- B.** A construction permit or approval shall be issued by KDHE prior to commencing any construction or modification of equipment or processes which results in PTE increases equal to or greater than the thresholds specified at K.A.R. 28-19-300.
- C.** Upon presentation of credentials and other documents as may be required by law, representatives of the KDHE (including authorized contractors of the KDHE) shall be allowed to:
 - 1. enter upon the premises where a regulated facility or activity is located or conducted or where records must be kept under conditions of this document;
 - 2. have access to and copy, at reasonable times, any records that must be kept under conditions of this document;
 - 3. inspect, at reasonable times, any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this document; and
 - 4. sample or monitor, at reasonable times, for the purposes of assuring compliance with this document or as otherwise authorized by the Secretary of the KDHE, any substances or parameters at any location.
- D.** The emission unit or stationary source which is the subject of this document shall be operated in compliance with all applicable requirements of the Kansas Air Quality Act and the federal Clean Air Act.
- E.** This document is subject to periodic review and amendment as deemed necessary to fulfill the intent and purpose of the Kansas Air Quality Statutes and Regulations.
- F.** This document does not relieve the permittee of the obligation to obtain any approvals, permits, licenses, or documents of sanction which may be required by other federal, state, or local agencies.
- G.** The owner or operator shall comply with all applicable provisions of 40 CFR Part 60 and 40 CFR Part 63. If a conflict exists between references in this document and the regulation, the regulation shall take precedence.
- H.** As applicable, EPA regulations codified in 40 CFR Part 60, 62, and 63 require affected sources to electronically submit performance test reports, notification reports, and periodic reports to EPA through the Compliance and Emissions Data Reporting Interface (CEDRI). CEDRI is accessed through the EPA's **Central Data Exchange (CDX)** (<https://cdx.epa.gov/>). If the reporting form is not available in CEDRI at the time that the report is due, the source must submit the report to the Administrator [address listed in 40 CFR 63.13]:

Kansas Compliance Officer
Air Permitting and Compliance Branch
U.S. EPA, Region 7
11201 Renner Blvd.

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Lenexa, Kansas 66219

A copy of any report submitted through CEDRI is also required to be submitted to KDHE BOA.

Air Compliance and Enforcement Section
Bureau of Air
Kansas Department of Health and Environment
1000 SW Jackson, Suite 310
Topeka, Kansas 66612-1366
(785) 296-6422

CERTIFICATION

I certify that I have read and understand the above requirements and conditions applicable to my source/facility and that the above information and attachments provided in this document are true, accurate, and complete to the best of knowledge.

Signature: _____ Date: _____

Name: _____ Title: _____

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Definitions

Commercial emergency stationary RICE means an emergency stationary RICE used in commercial establishments such as office buildings, hotels, stores, telecommunications facilities, restaurants, financial institutions such as banks, doctor's offices, and sports and performing arts facilities.

Compression ignition means relating to a type of stationary internal combustion engine that is not a spark ignition engine.

Diesel engine means any stationary RICE in which a high boiling point liquid fuel injected into the combustion chamber ignites when the air charge has been compressed to a temperature sufficiently high for auto-ignition. This process is also known as compression ignition.

Dual-fuel engine means any stationary RICE in which a liquid fuel (typically diesel fuel) is used for compression ignition and gaseous fuel (typically natural gas) is used as the primary fuel.

Emergency stationary RICE means any stationary reciprocating internal combustion engine that meets all of the criteria in paragraphs (1) through (3) of this definition. All emergency stationary RICE must comply with the requirements specified in §63.6640(f) [§60.4211(f)] in order to be considered emergency stationary RICE. If the engine does not comply with the requirements specified in §63.6640(f) [§60.4211(f)], then it is not considered to be an emergency stationary RICE under this subpart.

(1) The stationary RICE is operated to provide electrical power or mechanical work during an emergency situation. Examples include stationary RICE used to produce power for critical networks or equipment (including power supplied to portions of a facility) when electric power from the local utility (or the normal power source, if the facility runs on its own power production) is interrupted, or stationary RICE used to pump water in the case of fire or flood, etc.

(2) The stationary RICE is operated under limited circumstances for situations not included in paragraph (1) of this definition, as specified in §63.6640(f) [§60.4211(f)].

(3) The stationary RICE operates as part of a financial arrangement with another entity in situations not included in paragraph (1) of this definition only as allowed in §63.6640(f)(4)(i) or (ii) [§60.4211(f)(3)(i)].

Fire pump engine means an emergency stationary internal combustion engine certified to NFPA requirements that is used to provide power to pump water for fire suppression or protection.

Institutional emergency stationary RICE means an emergency stationary RICE used in institutional establishments such as medical centers, nursing homes, research centers, institutions of higher education, correctional facilities, elementary and secondary schools, libraries, religious establishments, police stations, and fire stations.

Lean burn engine means any two-stroke or four-stroke spark ignited engine that does not meet the definition of a rich burn engine.

Natural gas means a naturally occurring mixture of hydrocarbon and non-hydrocarbon gases found in geologic formations beneath the Earth's surface, of which the principal constituent is methane. Natural gas may be field or pipeline quality.

Peaking unit or engine means any standby engine intended for use during periods of high demand that are not emergencies.

Residential emergency stationary RICE means an emergency stationary RICE used in residential establishments such as homes or apartment buildings.

Rich burn engine means any four-stroke spark ignited engine where the manufacturer's recommended operating air/fuel ratio divided by the stoichiometric air/fuel ratio at full load conditions is less than or equal to 1.1. Engines originally manufactured as rich burn engines but modified prior to December 19, 2002 with passive emission control

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technology for NO_x (such as pre-combustion chambers) will be considered lean burn engines. Also, existing engines where there are no manufacturer's recommendations regarding air/fuel ratio will be considered a rich burn engine if the excess oxygen content of the exhaust at full load conditions is less than or equal to 2 percent.

Spark ignition means relating to either: A gasoline-fueled engine; or any other type of engine with a spark plug (or other sparking device) and with operating characteristics significantly similar to the theoretical Otto combustion cycle. Spark ignition engines usually use a throttle to regulate intake air flow to control power during normal operation. Dual-fuel engines in which a liquid fuel (typically diesel fuel) is used for CI and gaseous fuel (typically natural gas) is used as the primary fuel at an annual average ratio of less than 2 parts diesel fuel to 100 parts total fuel on an energy equivalent basis are spark ignition engines.