

PROPOSED AIR TOXIC STANDARDS FOR RECIPROCATING INTERNAL COMBUSTION ENGINES

Summary of proposed rule

On February 25, 2009 (published in FR on March 5, 2009), EPA proposed revisions to MACT ZZZZ to establish emission standards for Reciprocating Internal Combustion Engines (RICE), both Spark Ignition (SI) and Combustion Ignition (CI), that are not already covered by the rule. In this discussion, all RICE discussed are stationary engines. This proposed rule would cover the following:

- Existing engines located at area HAP sources
- Existing engines rated 500 hp or less located at major HAP sources

In addition, the rule proposes revisions to requirements for the following:

- Existing CI engines rated greater than 500 hp located at major HAP sources

EPA also proposes to amend regulations regarding operation of engines during periods of startup, shutdown and malfunction.

RICE with No Requirements under MACT ZZZZ

According to 40 CFR 63.6590(b)(3), the following RICE will have no requirements under this subpart:

- Existing spark ignition 2 stroke lean burn (2SLB) RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions
- Existing spark ignition 4 stroke lean burn (4SLB) RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions
- Existing emergency RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions
- Existing limited use RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions

- Existing RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions that combusts landfill gas or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis

RICE 500 HP or less at Major Sources (40 CFR 63.6602)

EPA has divided this source category into the following subcategories

- RICE less than 50 HP
- Landfill and digester gas RICE greater than or equal to 50 HP
- CI RICE greater than or equal to 50 HP
 - Emergency
 - Non-emergency
- SI RICE greater than or equal to 50 HP
 - Emergency
 - Non-emergency
 - 2-stroke lean burn (2SLB)
 - <250 hp
 - Greater than or equal to 250 HP
 - 4-stroke lean burn (4SLB)
 - <250 hp
 - Greater than or equal to 250 HP
 - 4-stroke rich burn (4SRB)

The proposed emission standards are shown in the following table (added as Table 2c in the proposed rule language):

Table 1. Emission Standards for Existing RICE Located at Major Sources

Subcategory	Emission Standards at 15 percent O ₂ (parts per million by volume on a dry basis)	
	Except during periods of startup, or malfunction	During periods of startup, or malfunction
Non-Emergency 2SLB 50≥HP≤249	85 ppmvd CO	85 ppmvd CO
Non-Emergency 2SLB 250≥HP≤500	8 ppmvd CO or 90% CO reduction	85 ppmvd CO

Subcategory	Emission Standards at 15 percent O ₂ (parts per million by volume on a dry basis)	
	Except during periods of startup, or malfunction	During periods of startup, or malfunction
Non-Emergency 4SLB 50≥HP≤249	95 ppmvd CO	95 ppmvd CO
Non-Emergency 4SLB 250≥HP≤500	9 ppmvd CO or 90% CO reduction	95 ppmvd CO
Non-Emergency 4SRB 50≥HP≤500	200 ppbvd formaldehyde or 90% formaldehyde reduction	2 ppmvd formaldehyde
All CI 50≥HP≤300	40 ppmvd CO	40 ppmvd CO
Emergency CI 300>HP≤500	40 ppmvd CO	40 ppmvd CO
Non-Emergency CI >300 HP	4 ppmvd CO or 90% CO reduction	40 ppmvd CO
All CI 50≥HP≤300	40 ppmvd CO	40 ppmvd CO
Emergency CI 300>HP≤500	40 ppmvd CO	40 ppmvd CO
Non-Emergency CI >300 HP	4 ppmvd CO or 90% CO reduction	40 ppmvd CO
<50 HP	2 ppmvd formaldehyde	2 ppmvd formaldehyde
Landfill/Digester 50≥HP≤500	177 ppmvd CO	177 ppmvd CO

Subcategory	Emission Standards at 15 percent O ₂ (parts per million by volume on a dry basis)	
	Except during periods of startup, or malfunction	During periods of startup, or malfunction
Emergency SI 50≥HP≤500	2 ppmvd formaldehyde	2 ppmvd formaldehyde

In addition, existing non-emergency diesel fueled CI engines greater than 300 HP with a displacement of less than 30 liters per cylinder must use diesel fuel meeting requirements in 40 CFR 80.510 (b), Ultra Low Sulfur Diesel (ULSD). Maximum fuel sulfur is limited to 5 ppm and either a minimum cetane index of 40 or maximum aromatic content of 35 vol %.

RICE at Area Sources (40 CFR 63.6603)

This category has been subdivided the same as above. The proposed standards or requirements are shown in the following table (added as Table 2d in the proposed rule language):

Table 2. Emission Standards and Requirements for Existing RICE Located at Area Sources

Subcategory	Emission Standards at 15 percent O ₂ (parts per million by volume on a dry basis)	
	Except during periods of startup, or malfunction	During periods of startup, or malfunction
Non-Emergency 2SLB 50≥HP≤249	Change oil and filter every 500 hours; replace spark plugs every 1000 hours; and inspect all hoses and belts every 500 hours and replace as necessary	Change oil and filter every 500 hours; replace spark plugs every 1000 hours; and inspect all hoses and belts every 500 hours and replace as necessary
Non-Emergency 2SLB HP≥250	8 ppmvd CO or 90% CO reduction	85 ppmvd CO
Non-Emergency 4SLB 50≥HP≤249	Change oil and filter every 500 hours; replace spark plugs every 1000 hours; and inspect all hoses and belts every 500 hours and replace as necessary	Change oil and filter every 500 hours; replace spark plugs every 1000 hours; and inspect all hoses and belts every 500 hours and replace as necessary

Subcategory	Emission Standards at 15 percent O ₂ (parts per million by volume on a dry basis)	
	Except during periods of startup, or malfunction	During periods of startup, or malfunction
Non-Emergency 4SLB HP≥250	9 ppmvd CO or 90% CO reduction	95 ppmvd CO
Non-Emergency 4SRB HP≥50	200 ppbvd formaldehyde or 90% formaldehyde reduction	2 ppmvd formaldehyde
Emergency CI 50≥HP≤500	Change oil and filter every 500 hours; inspect air cleaner every 1000 hours, inspect all hoses and belts every 500 hours and replace as necessary	Change oil and filter every 500 hours; inspect air cleaner every 1000 hours, inspect all hoses and belts every 500 hours and replace as necessary
Emergency CI HP>500	40 ppmvd CO	40 ppmvd CO
Non-Emergency CI 50≥HP≤300	Change oil and filter every 500 hours; inspect air cleaner every 1000 hours; and inspect all hoses and belts every 500 hours and replace as necessary	Change oil and filter every 500 hours; replace spark plugs every 1000 hours; and inspect all hoses and belts every 500 hours and replace as necessary
Non-Emergency CI HP>300	4 ppmvd CO or 90% CO reduction	40 ppmvd CO
<50 HP	Change oil and filter every 200 hours; replace spark plugs every 500 hours; and inspect all hoses and belts every 500 hours and replace as necessary	Change oil and filter every 200 hours; replace spark plugs every 500 hours; and inspect all hoses and belts every 500 hours and replace as necessary

Subcategory	Emission Standards at 15 percent O ₂ (parts per million by volume on a dry basis)	
	Except during periods of startup, or malfunction	During periods of startup, or malfunction
Landfill/Digester Gas 50≥HP≤500	Change oil and filter every 500 hours; replace spark plugs every 1000 hours; and inspect all hoses and belts every 500 hours and replace as necessary	Change oil and filter every 500 hours; replace spark plugs every 1000 hours; and inspect all hoses and belts every 500 hours and replace as necessary
Landfill/Digester Gas HP>500	177 ppmvd CO	177 ppmvd CO
Emergency SI 50≥HP≤500	Change oil and filter every 500 hours; replace spark plugs every 1000 hours; and inspect all hoses and belts every 500 hours and replace as necessary	Change oil and filter every 500 hours; replace spark plugs every 1000 hours; and inspect all hoses and belts every 500 hours and replace as necessary
Emergency SI HP>500	2 ppmvd formaldehyde	2 ppmvd formaldehyde

New or Reconstructed RICE >500 HP at Major Sources

The EPA is proposing to amend the existing regulations for many new and reconstructed non-emergency RICE at major sources to establish limits during periods of startup or malfunction. EPA is co-proposing that the same standards apply during both normal operation and periods of startup and malfunction. These requirements are added to Table 2d in the proposed rule language.

Table 3. Emission Standards for New or Reconstructed Non-Emergency RICE >500 HP at Major Sources and Existing Non-Emergency 4SRB RICE >500 HP at Major Sources during Periods of Startup or Malfunction

Subcategory	Emission Standards at 15 percent O ₂
New or reconstructed non-emergency 2SLB >500 HP located at a major source of HAP emissions	Limit concentration of CO in the RICE exhaust to 259 ppmvd or less at 15 percent O ₂ during periods of startup or malfunction.

Subcategory	Emission Standards at 15 percent O ₂
New or reconstructed non-emergency 4SLB ≥ 250 HP located at a major source of HAP emissions	Limit concentration of CO in the RICE exhaust to 420 ppmvd or less at 15 percent O ₂ during periods of startup or malfunction.
Existing non-emergency 4SRB >500 HP located at a major source of HAP emissions; or New or reconstructed non-emergency 4SRB >500 HP located at a major source of HAP emissions	Limit concentration of formaldehyde in the RICE exhaust to 2 ppmvd or less at 15 percent O ₂ during periods of startup or malfunction.
New or reconstructed non-emergency CI >500 HP located at a major source of HAP emissions	Limit concentration of CO in the RICE exhaust to 77 ppmvd or less at 15 percent O ₂ during periods of startup or malfunction.

Operational Limitations, Management Practices, Fuel Requirements

The EPA is proposing operating limitations for engines that are equipped with after treatment to meet the proposed standards. For engines greater than 500 HP and equipped with oxidation catalyst or NSCR, the pressure drop across the catalyst must not change by more than 2 inches of water from that measured during the initial performance test. The inlet temperature to the catalyst must be maintained between 450 and 1350°F for oxidation catalysts and 750 to 1250°F for NSCR. If oxidation catalyst or NSCR are not used, owners and operators must comply with any operating limitations approved by the Administrator.

For smaller engines at area sources, EPA has proposed a number of management practices to ensure the emission control systems are working properly.

For non-emergency CI RICE greater than 300 hp and less than 30 liters per cylinder displacement burning diesel, the use of ULSD fuel is required.

Compliance Demonstration

Existing RICE at Major Sources

Owners and operators of existing non-emergency RICE rated less than 100 HP and emergency RICE must operate and maintain the engines and any control devices in accordance with the manufacturer's emission-related written instructions or develop their own maintenance plan. No performance testing is required.

Existing non-emergency RICE greater than or equal to 100 HP and less than or equal to 500 HP are required to have an initial performance test.

Existing non-emergency RICE greater 500 HP are required to have an initial performance test and must be tested every 8,760 hours of operation or 3 years, whichever comes first.

Owners and operations of non-emergency CI RICE greater than 500 hp and equipped with oxidation catalyst must continuously monitor and record the catalyst inlet temperature, and the pressure drop across the catalyst must be measured monthly. If oxidation catalyst is not being used, the operating parameters approved by the Administrator must be continuously monitored and recorded.

Existing RICE at Area Sources

Existing RICE subject to management practices must develop a maintenance plan that specifies how the management practices will be met. No performance testing is required.

Existing RICE subject to numerical emission standards are required to have an initial performance test.

Existing non-emergency RICE greater 500 HP are required to have an initial performance test and must be tested every 8,760 hours of operation or 3 years, whichever comes first.

Owners and operations of existing non-emergency RICE greater than 500 hp and equipped with oxidation catalyst or NSCR must continuously monitor and record the catalyst inlet temperature, and the pressure drop across the catalyst must be measured monthly. If oxidation catalyst or NSCR is not being used, the operating parameters approved by the Administrator must be continuously monitored and recorded.

Recordkeeping Requirements

Owners and operators of existing emergency RICE that do not meet the requirements of non-emergency RICE must install a non-resettable hour meter to record hours of operation. Maintenance checks and readiness testing of these units are limited to 100 hours per year, and records must be kept to demonstrate this limit is not exceeded. Up to 50 hours of that 100 hours may be used for non-emergency purposes but the owner or operator must not engage in incoming producing activity for those 50 hours of operation. There is no time limit on emergency use, however, the length of operation and reason for operation must be recorded.

For existing RICE subject to management practices, records must be kept to show that the requirements are being met. The records are to be kept on site, and must include, but may not be limited to: oil and filter change dates, oil amounts added and corresponding hour on the hour meter, fuel consumption rates, air filter change dates, records of repairs and other maintenance performed.

Reporting Requirements

Owners and operators of existing RICE other than RICE less than 100 HP, existing emergency RICE and existing RICE that are not subject to numerical emission standards, must submit all the applicable notifications as listed in the NESHAP General Provisions, including an initial notification, notification of performance test, and a notification of compliance statue for each RICE which must comply with the specified emission limitations.