

RICE NESHAPs Proposed Rule Summary – Spark Ignited Engines

The current rule for Reciprocating internal combustions Engines (RICE) is the RICE MACT rule which affects new, reconstructed as well as existing Internal Combustion (IC) engines >500 hp at major sources (finalized in 2004).

Major source is defined as a site with the potential to emit a single Hazardous Air Pollutant (HAP) at the rate of 10 tons/yr or a combination of HAPs at a rate of 25 tons/yr.

Current RICE MACT Standards (2004)

For Major Source Areas

Engine Type	Emission Standard [ppmv (dry) @ 15% O ₂]
4SRB > 500 hp	76% reduction of CH ₂ O or <350 ppmvd
2SRB > 500 hp	58% reduction of CO; <12 ppmvd of CH ₂ O
4SRB > 250 hp*	93% reduction of CO; <14 ppmvd of CH ₂ O

*Amended from >500 hp in the proposed Final Rule

Proposed RICE NESAHSP Standards (2009)

Key Details for the Final Rule:

- EPA is proposing National Emissions Standards for Hazardous Air Pollutants (NESHSP).
- EPA deadline for the Final rules is August 10, 2010.
- Compliance will be required by 2013 (three years after the Final Rule).
- The Final Rule will affect small major source engines (≤ 500hp) and all area source engines for existing IC engines.
- Carbon Monoxide (CO) limits for Lean-Burn (LB) and Formaldehyde (CH₂O) limits for Rich-Burn (RB) engines.
- EPA chose to select CH₂O to serve as a surrogate for HAP emissions. CH₂O is the hazardous air pollutant present in the highest concentration from stationary engines.
- Emissions control technology such as Non-Selective Catalytic Reduction (NSCR) also known as 3-way catalyst for RB engines, oxidation catalyst for LB engines can be used to meet the proposed regulations.
- Emissions limits for Start-up, Shutdown, and Malfunction (SSM) were also introduced but are being challenged and asked to be amended in the Final Rule.
- Emissions limits apply under all operating conditions.

Existing Major Source RICE ≤ 500 hp Limits

Engine Type	Emission Standards [ppmv (dry) @ 15% O ₂] (Expect during periods of Startup of malfunction)	Emission Standards [ppmv (dry) @ 15% O ₂] (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

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 4SLB 500 ≥ hp ≤ 500	200 ppmvd CH ₂ O or 90% CH ₂ O reduction	2 ppmvd CH ₂ O
< 50 hp	2 ppmvd CH ₂ O	2 ppmvd CH ₂ O
Landfill/Digester 50 ≥ hp ≤ 500	177 ppmvd CO	177 ppmvd CO
Emergency SI 50 ≥ hp ≤ 500	2 ppmvd CH ₂ O	2 ppmvd CH ₂ O

Existing Area Source RICE Limits

Engine Type	Emission Standards [ppmv (dry) @ 15% O₂] (Expect during periods of Startup of malfunction)	Emission Standards [ppmv (dry) @ 15% O₂] (During periods of Startup or malfunction)
Non-Emergency 2SLB 50 ≥ hp ≤ 249	Management Practice*	Management Practice*
Non-Emergency 2SLB ≥ 250 hp	8 ppmvd CO or 90% CO reduction	85 ppmvd CO
Non-Emergency 4SLB 50 ≥ hp ≤ 249	Management Practice*	Management Practice*
Non-Emergency 4SLB ≥ 250 hp	9 ppmvd CO or 90% CO reduction	95 ppmvd CO
Non-Emergency 4SLB ≥ 50 hp	200 ppmvd CH ₂ O or 90% CH ₂ O reduction	2 ppmvd CH ₂ O
< 50 hp	Management Practice*	Management Practice*
Landfill/Digester 50 ≥ hp ≤ 500	Management Practice*	Management Practice*
Landfill/Digester > 500 hp	177 ppmvd CO	177 ppmvd CO
Emergency SI 50 ≥ hp ≤ 500	Management Practice*	Management Practice*
Emergency SI > 500 hp	2 ppmvd CH ₂ O	2 ppmvd CH ₂ O

*Management Practice – EPA proposed work practice: Change oil & filter every 500 hours, replace spark plugs every 1000 hours, and inspect all hoses and belts every 500 hours and replace as necessary. Time intervals are 200/500 hours for ICEs <500 hp.

Major Source RICE – SSM Limits (>500 hp & 4SLB ≥ 250 hp)

– Rules apply to engines already affected by the major source MACT

Engine Type	Emission Standards [ppmv (dry) @ 15% O ₂] (During periods of Startup of malfunction)
New or reconstructed non-emergency 2SLB > 500 hp	Limit CO to 259 ppmvd or less
New or reconstructed non-emergency 4SLB > 250 hp	Limit CO to 240 ppmvd or less
New or reconstructed non-emergency 4RB > 500 hp	Limit CH ₂ O to 2 ppmvd or less
Existing non-emergency 4SLB > 500 hp	Limit CH ₂ O to 2 ppmvd or less

Requirements for Demonstrating Compliance

Engine Type & Source (major or area)	Compliance Method, Reporting & Record Keeping
All engines equipped with NSCR & Oxidation Catalysts	Pressure drop cannot change by > 2" w.c. Maintain temperature between 450-1350 °F (oxidation) / 750-1250 °F (NSCR)
Existing non-emergency & emergency RICE at major sources < 100 hp	Operate and maintain engine and emission control equipment (if any) according to the manufacturer's emission –related instructions or develop their own maintenance plan. Do not need to conduct any performance testing
Existing non-emergency RICE at major sources 100 ≥ hp ≤ 500 hp	Conduct an initial performance test to demonstrate that the required emission standards are achieved. Must submit initial notification, notification of performance test, and a notification of compliance for each engine to the EPA.
Existing non-emergency RICE at major sources > 500 hp	Conduct an initial performance test and test every 8,760 hours of operation or 3 years, which ever comes first, to demonstrate that the required emission standards are achieved. Must submit initial notification, notification of performance test, and a notification of compliance for each engine to the EPA.
Existing RICE at area sources subject to Management Practices	Must develop a maintenance plan that specifies how the management practices will be met. Do not need to conduct performance testing. Records are to be kept on-site by owners and operators.
Existing RICE at area sources subject to numerical emissions standards	Conduct initial performance test to demonstrate that the required emission standards are achieved. Must submit initial notification, notification of performance test, and a notification of compliance for each engine to the EPA.
Existing non-emergency RICE at area sources > 500 hp	Conduct an initial performance test and test every 8,760 hours of operation or 3 years, which ever comes first, to demonstrate that the required emission standards are achieved. Must submit initial notification, notification of performance test, and a notification of compliance for each engine to the EPA.
Existing non-emergency 2SLB, 4SLB, & 4SRB engines at area sources > 500 hp	Continuously monitor and record the catalyst inlet temperature if an oxidation or NSCR catalyst is being used on the engine. Pressure drop across the catalyst must be measured.
Emergency SI engines	Maintenance and readiness testing are limited to 100 hours/year. No time limit in emergency situations, however, the owner or operator is required to record the length of operation and reason.