



# Engine Emission Solutions



25 Years of Experience in the Power-Gen, Off-Highway, Industrial, and Marine Industries





## Contact Information

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Local Sales Representative / Distributor:

For additional information or ordering contact 952-440-9200 or [SilencerSales@phillipsandtemro.com](mailto:SilencerSales@phillipsandtemro.com)



## Serving Your Complete System Needs

Let the knowledgeable team at Phillips & Temro Industries meet your emissions needs with cost effective designs optimized for your specific requirements and application. Don't be fooled by companies who will sell you a standard off the shelf assembly. PTI optimizes and designs each catalyst and combination (catalyst & silencer) unit for emissions reduction, back-pressure, size and sound attenuation. Don't make an expensive mistake trying to use a generically sized system, instead let PTI make it easy for you with quick turn around times and the expertise needed to meet your application.

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## Emissions Overview

With rising concern on pollutants being emitted into the environment, cleaner more environmentally friendly alternatives for current processes and products are continuously being considered. In the engine industry, one such effort to reduce harmful emissions is accomplished using catalyst material in the exhaust stream. The catalysts convert harmful pollutants into benign exhaust emissions through either reduction or oxidation reactions and are completed using a variety of technologies including oxidation catalysts, 3-way catalysts, selective reduction catalysts (SCR) as well as particulate filters which remove soot from the exhaust stream. Implementation of these technologies into new and existing on-road and non-road vehicles and engines greatly reduces hazardous emissions.



Depending on the specific application, there are appropriate control technologies to meet the desired emission reduction. The primary control technologies currently available for on and off-road applications include; oxidation catalysts, 3-way catalysts, SCR catalysts and particulate filters. Oxidation catalysts are ideal for lean spark ignition (SI) and compression ignition (CI) applications while 3-way catalysts are appropriate for rich burning SI situations. SCR catalysts can be applied to both SI and CI engines and are used to reduce NO<sub>x</sub> emissions. Particulate filters, often referred to as diesel particulate filters (DPF) do not react with exhaust gases but filter out particulates within the exhaust stream in CI applications.

### Regulations

The Environmental Protection Agency (EPA) and the California Air Resource Board (CARB) are the primary regulators and enforcers of the increasingly stringent regulations being placed on emissions. More information regarding the EPA, CARB and regulations in your area can be found online at:

EPA: [www.epa.gov](http://www.epa.gov)  
CARB: [www.arb.ca.gov](http://www.arb.ca.gov)

As part of EPA rulings, a new national emission standards for hazardous air pollutants (NESHAP) was adopted in 2010. The new regulations apply to existing stationary compression ignition (CI) and spark ignition (SI) reciprocating internal combustion engines (RICE) at area and major sources of hazardous air pollutants (HAPs). The new regulations are often referred to as RICE NESHAP. Compliance to the new standards is required by May 3, 2013 and October 19, 2013 respectively. For more information see the RICE NESHAP Applicability Guide on page 12.

To begin sizing of your catalyst or combination catalyst / silencer unit complete the attached quote request sheet and submit to a Phillips & Temro Industries representative.





### Catalyst Sizing

- The sizing of the catalyst is an important factor in the effectiveness of the system. The volume of the catalyst must be calculated correctly for a given exhaust flow rate in order to satisfy RICE NESHAP or other specific pollutant reduction requirements. Undersizing the catalyst will not allow the desired reduction to be met while oversizing the catalyst adds unnecessary cost to the system.
- **For all catalyst applications** the following information is required to adequately determine catalyst requirements:
  - Rated power of engine
  - Engine displacement
  - Maximum allowable back-pressure of engine
  - Fuel type
  - Exhaust flow rate
  - Exhaust temperature at desired catalyst location
  - Emission requirements
- **For RICE NESHAP applications** the following additional information is required to determine if an engine meets RICE NESHAP regulations.
  - Horsepower of the engine.
  - Annual hours of operation.
  - Annual hours of operation for non-emergency purposes.
  - Annual hours of operation for maintenance checks and readiness purposes.





### Back-pressure

- When retrofitting a catalyst to an existing system, exhaust system back-pressure must be considered. The addition of a catalyst into a system can add back-pressure of 5 to 10 in-H<sub>2</sub>O which is capable of exceeding the back-pressure limits of the engine.

### Catalyst Placement



- Placement of the catalyst within the exhaust system significantly influences the effectiveness of the catalyst in reducing emissions from the engine as most catalysts require temperatures in excess of 450°F to operate efficiently. In general, higher temperature exhaust gas produces a more efficient catalytic reaction. Therefore, placement of the catalyst further down stream of the engine, which results in a lower temperature exhaust gas to react with the catalyst, will generally yield lower reaction efficiencies. In cases where the catalyst must be located further down the exhaust stream, insulation around the exhaust system may be required to maintain a temperature suitable for an effective catalytic reaction. Colder

climates may also require insulation of the exhaust system to maintain performance. Exhaust temperatures at the catalyst are critical to proper catalyst selection.

- To assure system performance the catalyst must be mounted upstream of any silencer incorporated into the exhaust system. This ensures no migration of silencer packing material into the catalyst structure decreasing catalytic efficiency.

### Support Structure

- Before installation of the catalyst system, the support system needs to be evaluated. Larger systems require additional supports as the connecting pipe may not be able to support the weight of the catalyst. A steel ladder support system may be required and is recommended to be pre-fabricated to reduce service time of the system.

### Compliance Testing and Monitoring

- For all catalyst applications, compliance testing may be required. Specifically for RICE NESHAP, emission levels are tested before and after the addition of a catalytic reaction to ensure the required emission reduction is met. In general testing must be performed every 8,760 hours or every 3 years, whichever comes first. See page 9 for more information.

### Service Requirements

- Habitually catalysts require servicing every 8,700 hours of operation. To facilitate service requirements the catalyst system needs to be placed where it is easily accessible. This will allow for easy access and removal of the catalyst without special equipment. The easier and quicker the catalyst can be replaced the less down time experienced in the system.

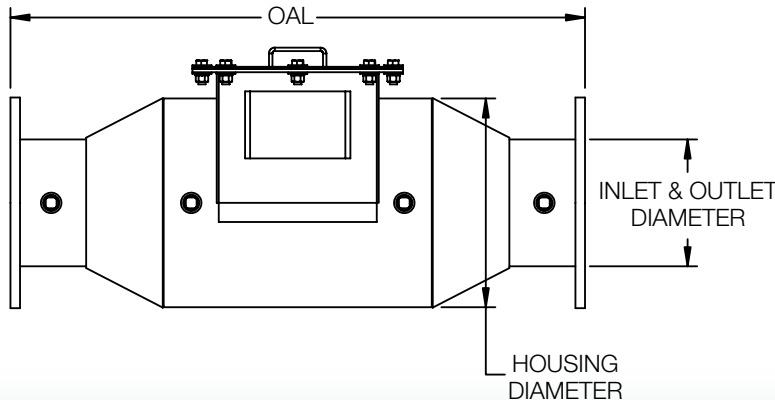
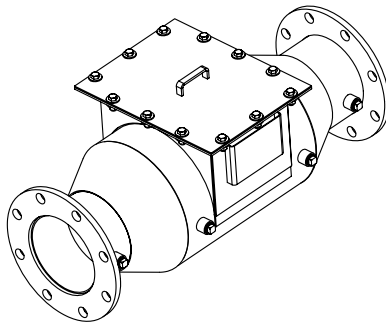




## Catalytic Housing

Stand-alone catalytic housings are a great bolt on solution to add to an existing silencer system.

- Housings feature heavy duty, all welded construction throughout to optimize the performance of the catalytic converter while protecting it from the harsh environment.
- An easy access hatch type design is incorporated to retain and protect up to two catalyst elements.
- Continuously welded containment rings and a full perimeter gasket around the catalyst create a “zero leakage” seal around the catalyst to prevent exhaust blow-by.
- A perforated diffuser plate and transition cones enhance even exhaust flow distribution across the catalyst for maximum efficiency and conversion of exhaust gases.
- An internal support structure further enhances strength and robustness of the design and helps to prevent damage to the catalyst from engine back-fires.
- Housings are available in standard sizes from 2” inlet up to 24” inlet.
- Special order & custom designs can be offered to meet your specific requirements.



**Emissions Reductions:** RICE CO: 70%  
 NESHAP:  
 Other Applications: Must specify reduction target

**Housing Material:** Painted carbon steel using high temperature paint. Optional stainless steel also available. Stainless steel standard on applications over 1,000°F

**Sensor Ports:** Inlet: (2) 1/2” female 14 NPT located on inlet nozzle  
 Outlet: (2) 1/2” female 14 NPT located on outlet nozzle

Final dimensions will vary upon emission requirements. Following are the standard size ranges:

- Overall length (OAL): 26” to 52”
- Inlet/Outlet diameter: 2” to 24”
- Housing diameter: 6” to 48”

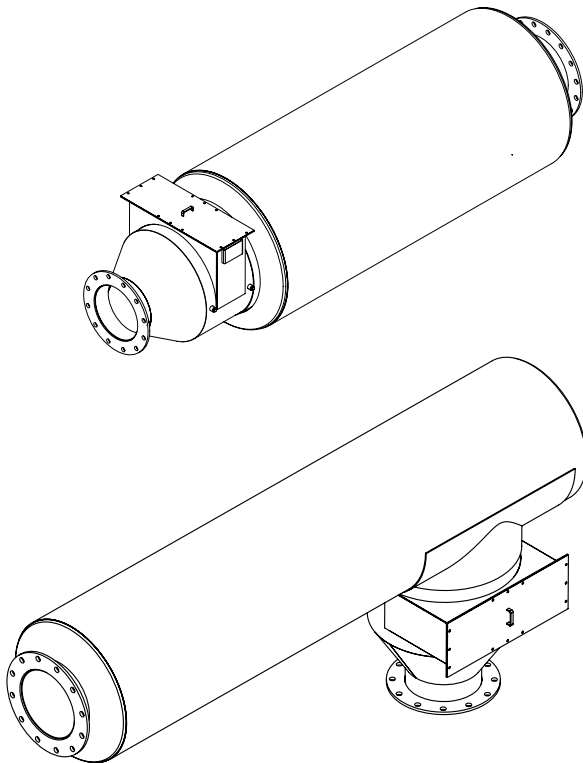
For custom sizes contact a Phillips & Temro representative.



## Catalytic Combination Unit

Combo units combine the best of both worlds by incorporating catalytic solutions and silencing into a single system.

- Heavy duty construction
- Optional stainless steel body
- Easy access hatch to retain and protect up to two elements
- Continuously welded containment rings
- “Zero leakage” perimeter gasket
- Perforated diffuser plate and transition cones to enhance even exhaust flow distribution across the catalyst.
- Housings are available in standard sizes from 2” inlet up to 24”.
- Special orders & custom designs can be offered to meet your specific requirements.\*



**Emissions Reductions:** RICE CO: 70%  
 NESHAP:  
 Other Applications: Must specify reduction target

**Housing Material:** Painted carbon steel using high temperature paint. Optional stainless steel also available. Stainless steel standard on applications over 1,000°F

**Sensor Ports:** Inlet: (2) 1/2” female 14 NPT located on inlet nozzle  
 Outlet: (2) 1/2” female 14 NPT located on outlet nozzle

Silencer Grade	Typical Reduction (dB)
Industrial	12-18
Residential	18-25
Critical	25-34
Hospital	35-40

For additional information refer to EM Products® Silencer Catalog.

\* For sizing and configuration information refer to EM Products® Silencer Catalog.

For additional information or ordering contact 952-440-9200 or SilencerSales@phillipsandtemro.com



## Catalyst Monitoring System

- Programmable Logic Controller (PLC) which is easy to use with the given tactile keyboard and display screen.
- Normal operating temperature, pressure drop and tolerances for warning lights set by user providing versatility to each application.
- Amber warning light to indicate an exhaust inlet temperature or differential pressure which is not yet out of tolerance but should be evaluated as soon as possible. The EPA recommends an inlet temperature between 450° and 1,350°F and a pressure drop of less than 2 in-H<sub>2</sub>O due to clogging of catalyst from use.
- Red warning light to indicate an exhaust inlet temperature or differential pressure which exceeds the maximum or minimum allowable value and should be addressed immediately.
- High-temperature thermocouple capable of maintaining a minimum tolerance of 5°F (2.8°C).
- Option of mounting differential pressure transmitter on left or right side of enclosure for convenient application to existing or new systems.
- 2 GB microSD memory card capable of recording years of logged data.
- Customizable recording interval based on application requirements. For RICE NESHAP applications, 15 minute interval between recordings is required which is far surpassed by default settings.

**Monitor:**

Dimensions: 14.75 x 14.50 x 8.00 in  
Nema 4 rated enclosure  
85-264 VAC power supply

**Environmental Requirements:**

LCD must be protected from UV degradation.  
Enclosures must be located in an operating environment between 0° and 50°C (32° to 122°F).

**Weight:**

16.5 Pounds

**Test Ports:**

Differential Pressure: (2) 1/8" NPT  
Inlet Temperature: (1) 1/2" NPT



## How to Order

To ensure the highest quality product and proper fit for each specific engine all sizing of catalyst units is done with the assistance of a Phillips & Temro representative.

### 1. Required Information

- Engine Source Classification (Area or Major Source)  
(RICE NESHAP)
- Rated Power of Engine
- Engine Displacement
- Maximum Allowable Back-pressure of Engine
- Fuel Type
- Exhaust Flow Rate (ACFM)
- Exhaust Temperature at Desired Catalyst Location
- Emission Requirements

### 2. Determined Inlet/Outlet Configuration and Attenuation Loss (If Combo Unit)

### 3. Complete & Submit Attached Quote Request Specification Sheet to a Phillips & Temro Representative

### Contact Information

#### EM Products

5380 Cottonwood Lane  
Prior Lake, MN 55372

E-Mail: [SilencerSales@phillipsandtemro.com](mailto:SilencerSales@phillipsandtemro.com)

Phone: (952)440-9200

Fax: (952) 440-3400





# Emission Product Quote Request Sheet

Name: \_\_\_\_\_ Engine Manufacturer: \_\_\_\_\_  
 Phone: \_\_\_\_\_ Engine Model: \_\_\_\_\_  
 Company: \_\_\_\_\_ Date Sent: \_\_\_\_\_  
 E-mail: \_\_\_\_\_ Date Needed: \_\_\_\_\_

Engine Rating (KW, BHP): \_\_\_\_\_  
 Engine Displacement (IN<sup>3</sup>): \_\_\_\_\_  
 Exhaust temperature at silencer/catalyst location (°F): \_\_\_\_\_  
 Maximum exhaust gas flow rate (ACFM): \_\_\_\_\_  
 Exhaust system back-pressure limitations (W.C.): \_\_\_\_\_

### Catalyst:

RICE NESHAP Application? Yes  No  Monitoring system needed? Yes  No

If yes, is it a Major source of Area source of Hazardous Air Pollutants (HAP)? Major  Area

### Type of engine:

\* Diesel  Rich-burn natural gas  Lean-burn natural gas  Natural gas

\* If it is a diesel engine please specify which diesel fuel is being used.

<15 ppm Sulfur (ULSD)  <15 ppm Sulfur  Other  \_\_\_\_\_

\* Catalyst Housing Material: Carbon Steel  304 Stainless Steel  Other  \_\_\_\_\_

\* 304 Stainless Steel is required for exhaust temperatures over 1,000°F

Pollutants (g/bhp)	Raw Emissions	Desired Emissions	Other Emissions
NOx	_____	_____	_____
CO	_____	_____	_____
NMHC	_____	_____	_____
CH20	_____	_____	_____

### Connection Type:

Flanged  \_\_\_\_\_  
 Pipe Stub  \_\_\_\_\_  
 Other  \_\_\_\_\_

Size limitations, if any: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Catalyst/Silencer Combination Needed? If Yes, Please Continue: Yes  No

Sound Specification: Silenced DBA \_\_\_\_\_ @ \_\_\_\_\_ FT

Design: Side-in  End-in

### Housing Style

Cylinder (J-type)   
 Disk   
 Spark Arrestor: Yes  No

### Required dBA reduction:

12-17 dBA: Industrial   
 18-24 dBA: Residential   
 25-34 dBA: Critical   
 35-40 dBA: Hospital

Mounting: Specify desired mounting options: \_\_\_\_\_  
 \_\_\_\_\_

Size limitations, if any: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



# RICE NESHAP Applicability Guide

## Existing Area Sources of HAP Emission (Compression Ignition)

Area sources of HAP emissions are sources which are not major sources.

	Emergency	Non-Emergency			
	All HP	<100 HP	100≤HP≤300	300≤HP≤500	>500 HP
Emission Levels (Except start-up periods)	N/A			49 ppmvd CO at 15% O <sub>2</sub> or 70% CO reduction	23 ppmvd CO at 15% O <sub>2</sub> or 70% CO reduction
Low Sulfur Diesel Required?	N/A	No		Yes, if cylinder displacement is less than 30 liters per cylinder	
Work Practice Standard	1. Change oil and filter every 500 hours of operation, or annually, whichever comes first. 2. Inspect air cleaner every 1,000 hours of operation or annually. 3. Inspect all hoses and belts every 500 hours of operation or annually, whichever comes first, replace as necessary.			N/A	N/A
Metallic HAP Reduction	N/A			If not equipped with a closed crankcase ventilation system: a. Install a closed ventilation system that prevents crankcase emissions from being emitted to the atmosphere. OR b. Install an open crankcase filtration emission control system that reduces emissions from the crankcase by filtering the exhaust stream to remove oil mist, particulates and metals.	
Operating Limitations	N/A			Follow the manufacturer's specified maintenance requirements for operating and maintaining the open or closed crankcase ventilation systems and replacing the crankcase filters.	1. Must maintain the oxidation catalyst so that the pressure drop across the catalyst does not change by more than 2 inches of water from the pressure drop across the catalyst that was measured during the initial performance test. 2. Must maintain the temperature of the stationary RICE exhaust so that the catalyst inlet temperature is between 450° and 1350° F. 3. Follow the manufacturer's specified maintenance requirements for operating and maintaining the open or closed crankcase ventilation systems and replacing the crankcase filters.

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# RICE NESHAP Applicability Guide

	Emergency	Non-Emergency			
	All HP	<100 HP	100≤HP≤300	300≤HP≤500	>500 HP
Start-up Requirements	Minimize idle time and engine's start-up to a period needed for appropriate and safe loading of the engine, not to exceed 30 minutes.				
Demonstrating Compliance	Must maintain the stationary RICE and after treatment control device (if any) according to the manufacturer's emission-related written instructions or develop their own maintenance plan. No performance testing needs to be conducted.	N/A	Must conduct an initial performance test to demonstrate that the unit achieves the required emission standards.	<ol style="list-style-type: none"> <li>1. Must conduct an initial performance test</li> <li>2. Must test every 8,760 hours of operation or 3 years (5 years for limited use), whichever comes first, to demonstrate that the unit achieves the required emission standards.</li> <li>3. Must continuously monitor and record the catalyst inlet temperature if an oxidation catalyst is being used on the engine. The pressure drop across the catalyst must also be measured monthly.</li> <li>4. If an oxidation catalyst is not being used on the engine, the owner or operator must continuously monitor and record the operating parameters (if any) approved by the Administrator. (Currently there are no performance specifications for the continuous parametric monitoring systems (CPMS) that are required for continuously monitoring the catalyst inlet temperature, this will be in August 2010 ruling).</li> </ol>	

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# RICE NESHAP Applicability Guide

	Emergency	Non-Emergency			
	All HP	<100 HP	100≤HP≤300	300≤HP≤500	>500 HP
Reporting Requirements	<ol style="list-style-type: none"> <li>1. Keep records of hours of operation.</li> <li>2. Install a non-resettable hour meter.</li> <li>3. Maintenance checks and readiness testing are limited to 100 hours per year.</li> <li>4. Keep documentation for reason for emergency use, so it won't count toward maintenance and readiness testing hours.</li> <li>5. May operate for non-emergency purposes for 50 hours per year, but counts towards 100 hours for operation other than true emergencies.</li> <li>6. Non-emergency purpose operating can not be for generating income, for example to supply power to an electric grid or supply power as part of a financial arrangement to another entity.</li> <li>7. May operate the emergency engine for a maximum of 15 hours per year as part of a demand response program if the regional transmission organization or equivalent balancing authority and transmission operator has determined there are emergency conditions that could lead to a potential electrical blackout.</li> <li>8. The above 15 hours of operation counts toward the 50 hours of non-emergency use.</li> </ol>	N/A	<p>Must submit all of the applicable notifications as listed in the NESHAP General provisions, including an initial notification, notification of performance test, and a notification of compliance for each stationary RICE which must comply with the specified emission limitations.</p>	<ol style="list-style-type: none"> <li>1. Keep records that show that management practices that are required are being met, including oil and filter change dates and corresponding hour on the hour meter; inspection and replacement dates for air cleaners, hoses, and belts, and records of other emission-related repairs and maintenance performed.</li> <li>2. Keep records of the manufacturer's recommended maintenance procedures for the closed crankcase ventilation system or open crankcase filtration system and records of the maintenance performed on the system.</li> <li>3. Must submit all of the applicable notifications as listed in the NESHAP General provisions, including an initial notification, notification of performance test, and a notification of compliance for each stationary RICE which must comply with the specified emission limitations.</li> </ol>	

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## Existing Major Sources of HAP Emission (Compression Ignition)

*A major source of HAP emissions is a stationary source that emits or has the potential to emit any single HAP at a rate of 10 tons per year or any combination of HAP at a rate of 25 tons per year.*

	Emergency	Non-Emergency			
	All HP	<100 HP	100≤HP≤300	300≤HP≤500	>500 HP
Emission Levels (Except start-up periods)	N/A		230 ppmvd CO at 15% O <sub>2</sub>	49 ppmvd CO at 15% O <sub>2</sub> or 70% CO reduction	23 ppmvd CO at 15% O <sub>2</sub> or 70% CO reduction
Low Sulfur Diesel Required?	N/A	No		Yes, if cylinder displacement is less than 30 liters per cylinder	
Work Practice Standard	1. Change oil and filter every 500 hours of operation, or annually, whichever comes first. 2. Inspect air cleaner every 1,000 hours of operation or annually. 3. Inspect all hoses and belts every 500 hours of operation or annually, whichever comes first, replace as necessary.			N/A	
Metallic HAP Reduction	N/A			If not equipped with a closed crankcase ventilation system: a. Install a closed ventilation system that prevents crankcase emissions from being emitted to the atmosphere. OR b. Install an open crankcase filtration emission control system that reduces emissions from the crankcase by filtering the exhaust stream to remove oil mist, particulates and metals.	
Operating Limitations	N/A			1. Must maintain the oxidation catalyst so that the pressure drop across the catalyst does not change by more than 2 inches of water from the pressure drop across the catalyst that was measured during the initial performance test. 2. Must maintain the temperature of the stationary RICE exhaust so that the catalyst inlet temperature is between 450° and 1350° F. 3. Follow the manufacturer's specified maintenance requirements for operating and maintaining the open or closed crankcase ventilation systems and replacing the crankcase filters.	
Start-up Requirements	Minimize idle time and engine's start-up to a period needed for appropriate and safe loading of the engine, not to exceed 30 minutes.				



# RICE NESHAP Applicability Guide

	Emergency		Non-Emergency		
	All HP	<100 HP	100≤HP≤300	300≤HP≤500	>500 HP
Demonstrating Compliance	Must maintain the stationary RICE and after treatment control device (if any) according to the manufacturer's emission-related written instructions or develop their own maintenance plan. No performance testing needs to be conducted.		Must conduct an initial performance test to demonstrate that the unit achieves the required emission standards.		<ol style="list-style-type: none"> <li>1. Must conduct an initial performance test</li> <li>2. Must test every 8,760 hours of operation or 3 years, whichever comes first, to demonstrate that the unit achieves the required emission standards.</li> <li>3. Must continuously monitor and record the catalyst inlet temperature if an oxidation catalyst is being used on the engine. The pressure drop across the catalyst must also be measured monthly.</li> <li>4. If an oxidation catalyst is not being used on the engine, the owner or operator must continuously monitor and record the operating parameters (if any) approved by the Administrator.</li> </ol>
Reporting Requirements	<ol style="list-style-type: none"> <li>1. Keep records of hours of operation.</li> <li>2. Install a non-resettable hour meter.</li> <li>3. Maintenance checks and readiness testing are limited to 100 hours per year.</li> <li>4. Keep documentation for reason for emergency use, so it won't count toward maintenance and readiness testing hours.</li> <li>5. May operate for non-emergency purposes for 50 hours per year, but counts towards 100 hours for operation other than true emergencies.</li> <li>6. Non-emergency purpose operating can not be for generating income, for example to supply power to an electric grid or supply power as part of a financial arrangement to another entity.</li> <li>7. May operate the emergency engine for a maximum of 15 hours per year as part of a demand response program if the regional transmission organization or equivalent balancing authority and transmission operator has determined there are emergency conditions that could lead to a potential electrical blackout.</li> <li>8. The above 15 hours of operation counts toward the 50 hours non-emergency use.</li> </ol>	N/A	Must submit all of the applicable notifications as listed in the NESHAP General provisions, including an initial notification, notification of performance test, and a notification of compliance for each stationary RICE which must comply with the specified emission limitations.	<ol style="list-style-type: none"> <li>1. Keep records of the manufacturer's recommended maintenance procedures for the closed crankcase ventilation system or open crankcase filtration system and records of the maintenance performed on the system.</li> <li>2. Must submit all of the applicable notifications as listed in the NESHAP General provisions, including an initial notification, notification of performance test, and a notification of compliance for each stationary RICE which must comply with the specified emission limitations.</li> </ol>	

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# RICE NESHAP Applicability Guide

## Existing Area Sources of HAP Emission (Spark Ignition)

Area sources of HAP emissions are sources which are not major sources.

	Emergency	Non-Emergency	Non-Emergency	Non-Emergency	Non-Emergency	Non-Emergency
		2SLB / Landfill / Digester Gas	4SLB / 4SRB	4SLB / 4SRB	4SLB	4SRB
	All HP	All HP	<500 HP	>500HP <24hr/yr	>500HP >24hr/yr	>500HP >24hr/yr
Emission Levels (Except start-up periods)	N/A				47 ppmvd CO at 15% O <sub>2</sub> or 93% CO reduction	2.7 ppmvd CO at 15% O <sub>2</sub> or 76% formaldehyde reduction
Low Sulfur Diesel Required?	N/A					
Work Practice Standard	<ol style="list-style-type: none"> <li>1. Change oil and filter every 500 hours of operation, or annually, whichever comes first.</li> <li>2. Inspect air cleaner every 1,000 hours of operation or annually.</li> <li>3. Inspect all hoses and belts every 500 hours of operation or annually, whichever comes first, replace as necessary.</li> </ol>				N/A	
Metallic HAP Reduction	N/A					
Operating Limitations	N/A				<ol style="list-style-type: none"> <li>1. Must maintain the oxidation catalyst so that the pressure drop across the catalyst does not change by more than 2 inches of water from the pressure drop across the catalyst that was measured during the initial performance test.</li> <li>2. Must maintain the temperature of the stationary RICE exhaust so that the catalyst inlet temperature is between 450° and 1350° F.</li> </ol>	
Start-up Requirements	Minimize idle time and engine's start-up to a period needed for appropriate and safe loading of the engine, not to exceed 30 minutes.					

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# RICE NESHAP Applicability Guide

	Emergency	Non-Emergency	Non-Emergency	Non-Emergency	Non-Emergency	Non-Emergency
		2SLB / Landfill / Digester Gas	4SLB / 4SRB	4SLB / 4SRB	4SLB	4SRB
	All HP	All HP	<500 HP	>500HP <24hr/yr	>500HP >24hr/yr	>500HP >24hr/yr
Demonstrating Compliance	Must maintain the stationary RICE and after treatment control device (if any) according to the manufacturer's emission-related written instructions or develop their own maintenance plan. No performance testing needs to be conducted.				<ol style="list-style-type: none"> <li>1. Must maintain the stationary RICE and after treatment control device (if any) according to the manufacturer's emission-related written instructions or develop their own maintenance plan.</li> <li>2. Must conduct an initial performance test to demonstrate that the unit achieves the required emission standards.</li> <li>3. Must test every 8,760 hours of operation or 3 years (5 years for limited use), whichever comes first, to demonstrate that the unit achieves the required emission standards.</li> </ol>	
Reporting Requirements	N/A	<ol style="list-style-type: none"> <li>1. Keep records that show that management practices that are required are being met, including oil and filter change dates and corresponding hour on the hour meter; inspection and replacement dates for air cleaners, hoses, and belts, and records of other emission-related repairs and maintenance performed.</li> <li>2. Must submit all of the applicable notifications as listed in the NESHAP General provisions, including an initial notification, notification of performance test, and a notification of compliance for each stationary RICE which must comply with the specified emission limitations.</li> </ol>				

For additional information or ordering contact 952-440-9200 or SilencerSales@phillipsandtemro.com



# RICE NESHAP Applicability Guide

## Existing Major Sources of HAP Emission (Spark Ignition)

A major source of HAP emissions is a stationary source that emits or has the potential to emit any single HAP at a rate of 10 tons per year or any combination of HAP at a rate of 25 tons per year.

	Emergency	Non-Emergency	Non-Emergency	Non-Emergency	Non-Emergency	Non-Emergency
		4SLB / 4SRB / 2SLB / Landfill / Digester Gas	Landfill / Digester Gas	4SLB	4SRB	2SLB / 4SRB
	All HP	<100HP	100<HP<500	100<HP<500	100<HP<500	100<HP<500 / >500HP
Emission Levels (Except start-up periods)	N/A		177 ppmvd CO at 15% O <sub>2</sub> or 70% CO reduction	47 ppmvd CO at 15% O <sub>2</sub>	10.3 ppmvd formaldehyde at 15% O <sub>2</sub>	225 ppmvd CO at 15% O <sub>2</sub> / 350 ppbvd formaldehyde at 15% O <sub>2</sub>
Low Sulfur Diesel Required?	N/A					
Work Practice Standard	<ol style="list-style-type: none"> <li>1. Change oil and filter every 500 hours of operation, or annually, whichever comes first.</li> <li>2. Inspect spark plugs every 1,000 hours of operation or annually.</li> <li>3. Inspect all hoses and belts every 500 hours of operation or annually, whichever comes first, replace as necessary.</li> </ol>		N/A			
Metallic HAP Reduction	N/A					
Operating Limitations	N/A					<ol style="list-style-type: none"> <li>1. Must maintain the oxidation catalyst so that the pressure drop across the catalyst does not change by more than 2 inches of water from the pressure drop across the catalyst that was measured during the initial performance test.</li> <li>2. Must maintain the temperature of the stationary RICE exhaust so that the catalyst inlet temperature is between 750° and 1250° F.</li> </ol>

For additional information or ordering contact 952-440-9200 or SilencerSales@phillipsandtemro.com



## Exhaust System Considerations

Emergency	Non-Emergency	Non-Emergency	Non-Emergency	Non-Emergency	Non-Emergency	Non-Emergency
	4SLB / 4SRB / 2SLB / Landfill / Digester Gas	Landfill / Digester Gas	4SLB	4SRB	2SLB	4SRB
All HP	<100HP	100<HP<500	100<HP<500	100<HP<500	100<HP<500	>500HP

Start-up Requirements	Minimize idle time and engine's start-up to a period needed for appropriate and safe loading of the engine, not to exceed 30 minutes.					
Demonstrating Compliance	Must maintain the stationary RICE and after treatment control device (if any) according to the manufacturer's emission-related written instructions or develop their own maintenance plan. No performance testing needs to be conducted.	Must conduct an initial performance test to demonstrate that the unit achieves the required emission standards.	<ol style="list-style-type: none"> <li>1. Must maintain the stationary RICE and after treatment control device (if any) according to the manufacturer's emission-related written instructions or develop their own maintenance plan.</li> <li>2. Must conduct an initial performance test to demonstrate that the unit achieves the required emission standards.</li> </ol>			
Reporting Requirements	<ol style="list-style-type: none"> <li>1. Keep records of hours of operation.</li> <li>2. Install a non-resettable hour meter.</li> <li>3. Maintenance checks and readiness testing are limited to 100 hours per year.</li> <li>4. Keep documentation for reason for emergency use, so it won't count toward maintenance and readiness testing hours.</li> <li>5. May operate for non-emergency purposes for 50 hours per year, but counts towards 100 hours for operation other than true emergencies.</li> <li>6. Non-emergency purpose operating can not be for generating income, for example to supply power to an electric grid or supply power as part of a financial arrangement to another entity.</li> <li>7. May operate the emergency engine for a maximum of 15 hours per year as part of a demand response program if the regional transmission organization or equivalent balancing authority and transmission operator has determined there are emergency conditions that could lead to a potential electrical blackout.</li> <li>8. The above 15 hours of operation counts toward the 50 hours non-emergency use.</li> </ol>	N/A	<ol style="list-style-type: none"> <li>1. Keep records that show that management practices that are required are being met, including oil and filter change dates and corresponding hour on the hour meter; inspection and replacement dates for air cleaners, hoses, and belts, and records of other emission-related repairs and maintenance performed.</li> <li>2. Must submit all of the applicable notifications as listed in the NESHAP General provisions, including an initial notification, notification of performance test, and a notification of compliance for each stationary RICE which must comply with the specified emission limitations.</li> </ol>			

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## Limited Warranty Guarantee

### Limited Warranty Guarantee

Phillips & Temro Industries products are guaranteed for one (1) year from date of purchase by the consumer against defects due to materials and the Company's workmanship only, as either and both of which the Company shall be the sole judge.

The sole obligation hereunder shall be to repair, or at the Company's option to replace products as aforesaid, provided same are returned "Transportation Prepaid" to the Company's nearest plant within the said period.

Other defects or failures due to improper or careless installation, storage or handling, or usage contract to manufacturer's directions, design or specification, as to any and all of which the Company shall be the sole judge, are specifically excluded from this guarantee.

No liability is accepted for return transportation charge, following repaid or replacement as aforesaid or for reinstallation costs. No liability for loss or damage of any nature or kind, whether arising out of or from the use of the produce, whether or not defective, is assumed. No other expressed or implied warranties exist in the absence of special agreement.

### Catalytic Performance Guarantee

A performance guarantee is available for most applications; details are available upon request.







# Emission Product Quote Request Sheet

Name: \_\_\_\_\_ Engine Manufacturer: \_\_\_\_\_  
 Phone: \_\_\_\_\_ Engine Model: \_\_\_\_\_  
 Company: \_\_\_\_\_ Date Sent: \_\_\_\_\_  
 E-mail: \_\_\_\_\_ Date Needed: \_\_\_\_\_

Engine Rating (KW, BHP): \_\_\_\_\_  
 Engine Displacement (IN<sup>3</sup>): \_\_\_\_\_  
 Exhaust temperature at silencer/catalyst location (°F): \_\_\_\_\_  
 Maximum exhaust gas flow rate (ACFM): \_\_\_\_\_  
 Exhaust system back-pressure limitations (W.C.): \_\_\_\_\_

**Catalyst:**

RICE NESHAP Application? Yes  No  Monitoring system needed? Yes  No

If yes, is it a Major source of Area source of Hazardous Air Pollutants (HAP)? Major  Area

Type of engine:

\* Diesel  Rich-burn natural gas  Lean-burn natural gas  Natural gas

\* If it is a diesel engine please specify which diesel fuel is being used.

<15 ppm Sulfur (ULSD)  <15 ppm Sulfur  Other  \_\_\_\_\_

\* Catalyst Housing Material: Carbon Steel  304 Stainless Steel  Other  \_\_\_\_\_

\* 304 Stainless Steel is required for exhaust temperatures over 1,000°F

Pollutants (g/bhp)	Raw Emissions	Desired Emissions	Other Emissions
NOx	_____	_____	_____
CO	_____	_____	_____
NMHC	_____	_____	_____
CH2O	_____	_____	_____

**Connection Type:**

Flanged  \_\_\_\_\_  
 Pipe Stub  \_\_\_\_\_  
 Other  \_\_\_\_\_

Size limitations, if any: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Catalyst/Silencer Combination Needed? If Yes, Please Continue: Yes  No

Sound Specification: Silenced DBA \_\_\_\_\_ @ \_\_\_\_\_ FT

Design: Side-in  End-in

**Housing Style**

Cylinder (J-type)   
 Disk   
 Spark Arrestor: Yes  No

**Required dBA reduction:**

12-17 dBA: Industrial   
 18-24 dBA: Residential   
 25-34 dBA: Critical   
 35-40 dBA: Hospital

Mounting: Specify desired mounting options: \_\_\_\_\_  
 \_\_\_\_\_

Size limitations, if any: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_