CATERPILLAR®
Power Systems North America

ZIEGLER CAT

NESHAP

What are the design considerations

NESHAP

- **National Emissions Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines (NESHAP for RICE)**
- **EPA 40 CFR Part 63 Subpart ZZZZ**

Final Rule: February 17, 2010
Effective: May 3, 2010

Complete May 2013

Generally, what engines need to be retrofitted under this new regulation?

- **Area source**
  - ✓ Non-emergency (peak shaving, storm avoidance) diesel generators >300hp manufactured before June 12, 2006.
- **Major source**
  - ✓ Non-emergency diesel generators >500 hp manufactured before December 19, 2002

Source Types

- **Major Source**
  - ✓ 10 TPY or more of one HAP
  - ✓ 25 TPY or more of cominatin of HAPS
- **Area Source**
  - ✓ Less thatn 10 TPY of one HAPS
  - ✓ Less that 25 TPY of a cominatin of HAPS

Non-Emergency

- **Existing engines (constructed prior to June 12, 2006) at *area* sources, used in non-emergency applications, >300 hp, require:**
  - Initial Notification before August 31, 2010
  - Installation of Emissions Control Equipment to reduce hazardous air pollutants before May 3, 2013
  - Performance testing of hazardous air pollutant Emission Control Equipment within 180 days of activation
  - Install a crank-case emissions control system
  - Use of Ultra-Low Sulfur diesel fuel
  - **Compliance Reporting**

What needs to be done

- **The addition of:**

  Diesel oxidation converter/catalyst (DOC)

  Crankcase ventilation system

  Monitoring system for temp and backpressure

Compliance testing

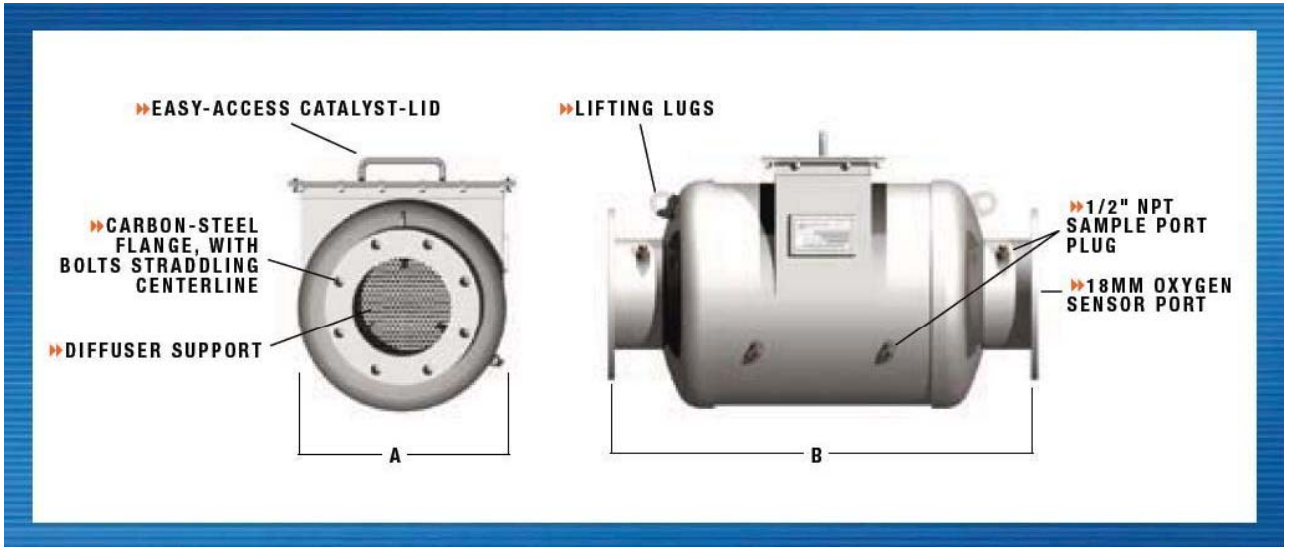
- Initial verification;
- Re-test after 8,760 hrs. system operation or: –
- **Limited Use Engines:** 5 yrs.*(operating hours < 100 hrs./yr.)*
- – **Not Limited Use Engines:** 3 yrs.
  - ✓ ***(Operating hours > 100 hrs./yr.)*****whichever comes first**
  - ✓ **Continuous monitoring & recording: catalyst inlet temp.**

What is the existing style of silencer at your facilities

- Cylinderical barrel type
- Disc type
- Vertical outside style
- Enclosed units

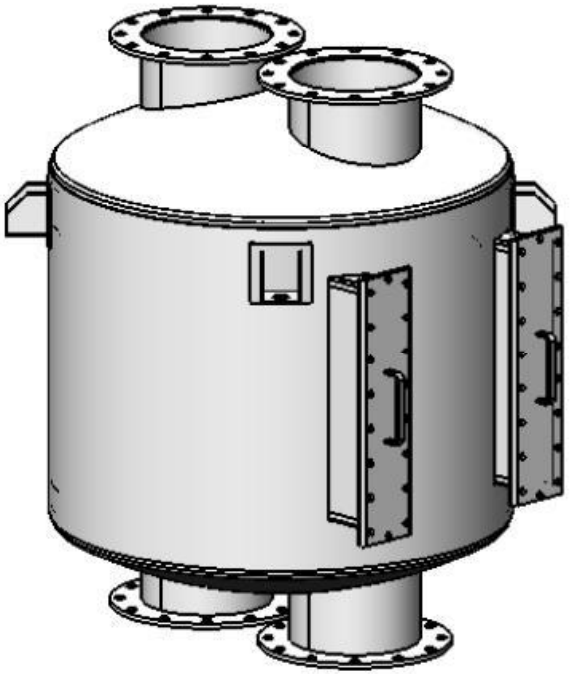
What type of after treatment

- In line style single inlet



What type of after treatment

- In line style dual inlet

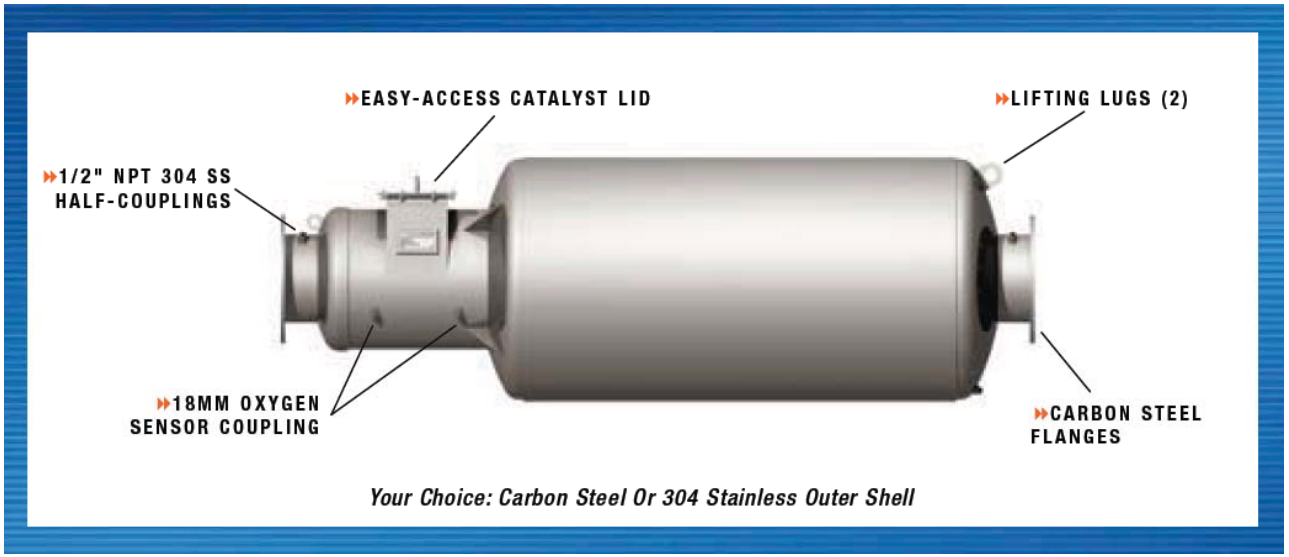


In line style after treatment

- This unit needs to be before the silencer so that debris from the silencer doesn't foul the catalyst
- Will need to verify back pressure to make sure if doesn't go above maximum allowable
- Will need to make changes to piping system
- Will need to add test ports to the system

What type of after treatment

Replacement silencer with after treatment

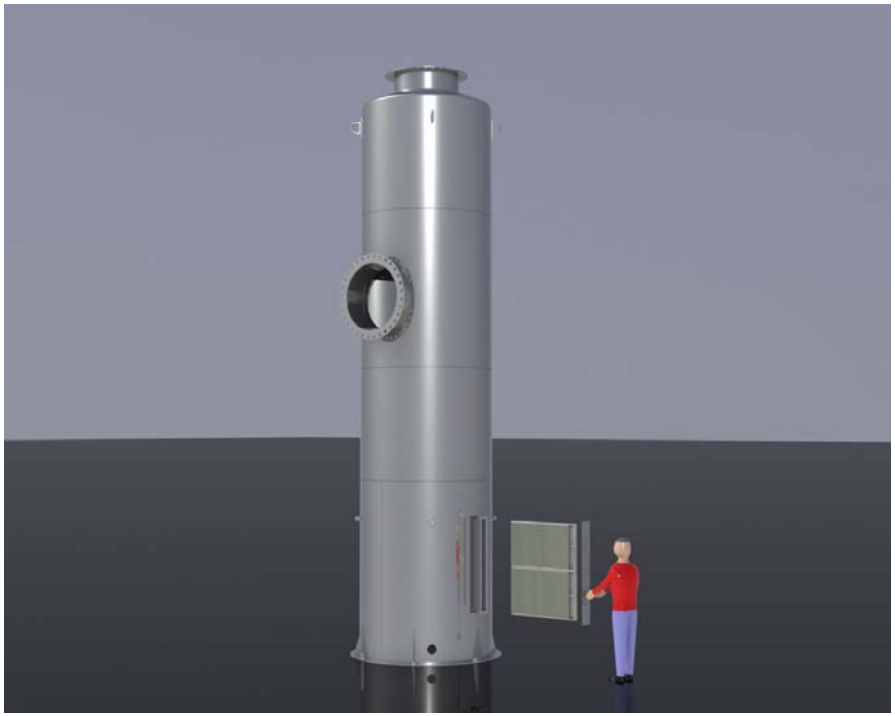


Silencer with after treatment

- **They can be a replacement for your existing silencer**
- **Design will be done not to exceed maximum backpressure**
  - ✓ Will need to modify the mounts
  - ✓ Will need to modify the piping
  - ✓ Will need to add test ports to before and after the silencer for testing

Silencers with after treatment

- Replacement silencers with after treatment



Power modules

After treatment will need be installed on the exterior.

Diesel Oxidation Catalyst Sizing

- **One size doesn't fit all**
  - ✓ Based on allowable backpressure
  - ✓ Service intervals
  - ✓ Oil consumption
  - ✓ Temperature of Exhaust
  - ✓ Configurations of system
  - ✓ 1000 hr warranty or 16000 hr warranty

NESHAP Emissions

Sizing the after treatment system.

- **Go from CAT TMI information**
  - ✓ This is how the operation permits are modeled
    - Not to exceed numbers
    - Nominal numbers
- **Testing can be the point of reference**
- **NON CAT product**
  - ✓ Will need to get a base line of emission so we can reduce by 70 %
  - ✓ Certified tester or non certified tester

Design considerations

- How do you get to the catalyst to service the units when the back pressure builds up.
  - ✓ **Catalyst blocks 30-100 lbs**
  - ✓ **Cat walks**
  - ✓ **Ladders**
  - ✓ **Man lifts**
- Who is going to do the periodic testing of the equipment.
  - ✓ **Contract out the testing**
  - ✓ **Purchase equipment for your own testing**

Additional maintenance items

- **Existing engines (constructed prior to June 12, 2006) at area sources, used in emergency applications, and existing engines (constructed prior to June 12, 2006) at area sources, used in non-emergency applications, <300 hp require:**
  - Change oil and filter every 500 hours of operation or annually, whichever comes first
  - Inspect air cleaner every 1,000 hours of operation or annually, whichever comes first, and replace as necessary
  - **Inspect all hoses and belts every 500 hours of operation or annually, whichever comes first, and replace as necessary**

Cautions

- Catalyst poisoning due to siloxanes, phosphorus, lead, barium, zinc, fuel with sulfur content higher that 50 ppm by weight or other contaminates will void the warranty coverage.

For More Information

- **Emission Rules:**
  - ✓ Legal Advisor
  - ✓ EPG or Local Authorities
- **Technical Information:**
  - ✓ Engine Manufacture

Please be advised that this presentation is for informational purposes only and should not be construed as legal advise. End-users should refer to EPA regulations at 40 CFR Part 63 subpart ZZZZ for more detailed information. For applicability to your situation, please consult your legal advisor. Form more information about technologies to help you meet today's stringent air quality regulations, please contact your local Caterpillar dealer.