

Diesel Engines Exhaust Opacity Factsheet

Opacity is a measure of the amount of light obscured by the particulate matter (PM) or soot in the exhaust from diesel engines, measured under normal operating conditions. Metro Vancouver's *Non-Road Diesel Engine Emission Regulation Bylaw No. 1161, 2012* (the Bylaw) limits the exhaust opacity to 20% for all non-road diesel engines that are 25 horsepower (19kw) or greater, regardless of the engine tier.

The opacity of diesel exhaust can be measured by instruments or visually by certified observers. Metro Vancouver officers are certified opacity observers and can identify excessive PM emissions from diesel engines.

High opacity or excessive PM from diesel engines emissions usually indicates that maintenance is required. Some causes of high opacity from diesel engines include:

- Excessive idling
- Clogged, worn, or mismatched fuel injectors
- Faulty or maladjusted fuel injection pump
- Manifold leaks
- Malfunctioning turbocharger
- Defective air fuel controller
- Poor fuel quality
- Clogged after-treatment devices or spent catalyst
- Improper injection timing
- Malfunctioning after cooler
- Improperly adjusted valve lash or governor
- Defective computer controls (sensors, wiring, etc.)
- Restricted air filter

The graphic below provides an illustration of the opacity range in black smoke associated with diesel exhaust.

RINGELMANN TRADITIONAL VISUAL SCALE

Ringelmann	0%	Opacity (clear)
Ringelmann	20%	Opacity
Ringelmann	40%	Opacity
Ringelmann	60%	Opacity
Ringelmann	80%	Opacity
Ringelmann	100%	Opacity (black)



Please contact us if you have any questions at nonroaddiesel@metrovancouver.org or 604-451-6655.

Web Resources

1. [AirCare ON-ROAD Program](#)
2. [US EPA- Method 9](#)

