

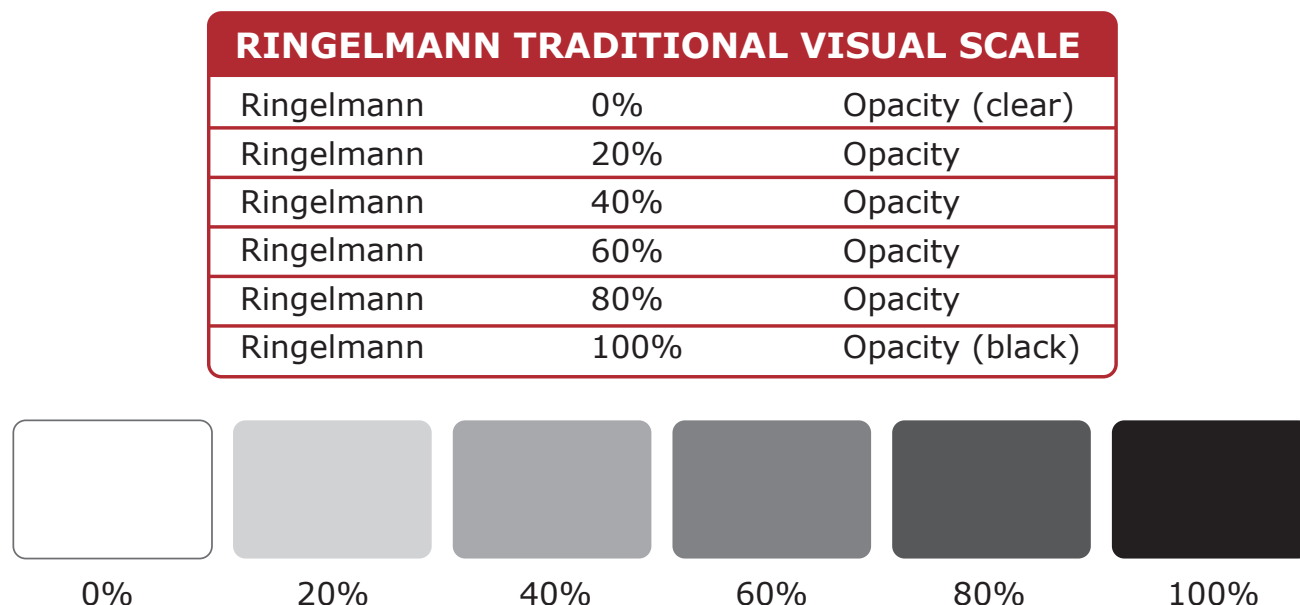
FACTS - Opacity

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. Most engines are certified up to a smoke opacity level by the U.S. Environmental Protection Agency (EPA) when they are manufactured, and these levels range between 5% and 55%. If maintained properly, engine exhaust should never exceed the EPA certified level.

The opacity of diesel exhaust can be measured by instruments or visually by certified observers. High opacity or excessive soot 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.



Web Resources:

1. AirCare ON-ROAD Program <http://www.th.gov.bc.ca/ACOR/>
2. US EPA- Method 9 <https://www3.epa.gov/ttnemc01/promgate/m-09.pdf>

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