



Diesel Engines

Jeffrey Moninger

Mine Safety & Health Administration

Approval and Certification Center

Mechanical and Engineering Safety Division



How are diesel engines regulated in underground mines?

- ▶ Coal Mines must use MSHA approved diesel engines.
 - 30 CFR PART 7, Subpart E, October 25, 1996
 - Newly Introduced must Meet 30 CFR PART 72.500 Diesel Particulate Matter (DPM) limits, January 19, 2001 (Health Standard)

- ▶ M/NM Mines must use acceptable diesel engines introduced into the mine
 - 30 CFR PART 7, Subpart E
 - 30 CFR PART 36
 - Or Meet or Exceed Diesel Particulate Matter, Table 57.5067-1 July 5, 2001 (Health Standard)



What is an MSHA approved diesel engine?

- ▶ MSHA approves diesel engines for underground mines under 30 CFR Part 7, Subpart E, Category A & B
 - Category A engines are used in gassy areas of the mine
 - Category B engines are used in all other places
- ▶ MSHA Approved Products Part 7 Diesel Engines
 - Support & Resources/Equipment Approval & Certification/Approved Diesel Engines
 - <https://lakmshaegov01.msha.gov/ReportView.aspx?ReportCategory=EngineAppNumbers>



DPM Emission Limits for Underground Coal Mines – Part 72.500

- ▶ Permissible Equipment (Used in Gassy Areas of Mine)
 - 2.5 grams/hour

- ▶ Heavy-Duty Equipment (Cuts/Moves Rock/Coal, Drilling or Bolting, Longwall Components, Fuel Transport)
 - 2.5 grams/hour

- ▶ Light-Duty Equipment
 - 5 grams/hour
 - Meet or Exceed Table 72.502-1



New Technology Diesel Engines

- ▶ Include Exhaust Aftertreatment Devices to Reduce Tailpipe Emissions
 - Diesel Particulate Filter (DPF)
 - Diesel Oxidation Catalyst (DOC)
 - Exhaust Gas Recirculation (EGR)
 - Selective Catalytic Reduction (SCR)
 - Diesel Exhaust Fluid (DEF)



MSHA Approved Diesel Engine 185 HP @ 2200 RPM

- ▶ 24 gr/hr (0.22 gr/hp-hr) DPM, Category B,
- ▶ 1.2 gr/hr (0.009 gr/hp-hr) DPM, Category A, With Diesel Particulate Filter (DPF)
- ▶ 0.6 gr/hr (0.007 gr/hp-hr) DPM, Category A, With Diesel Particulate Filter (DPF) & Diesel Oxidation Catalyst (DOC)

EPA Tier 2 = 0.15 gr/hpr-hr (175<300 hp)

EPA Tier 4 = 0.015 gr/hpr-hr (175<300 hp)

(Category A data is based on calculated values.)



MSHA Approved Diesel Engine

- ▶ 15 gr/hr (0.13 gr/hp-hr) DPM, Category B
 - 215 HP @ 2200 rpm
- ▶ 1.1 gr/hr (0.010 gr/hp-hr) DPM, Category B, With Diesel Particulate Filter (DPF) & Diesel Oxidation Catalyst (DOC)
 - 200 HP @ 2200 rpm
- ▶ 1.1 gr/hr (0.010 gr/hp-hr) DPM, Category B, With Diesel Exhaust Fluid (DEF)
 - 200 HP @ 2200 rpm

EPA Tier 2 = 0.15 gr/hpr-hr (175<300 hp)

EPA Tier 4 = 0.015 gr/hpr-hr (175<300 hp)



New Technology Diesel Engines

- ▶ New technology diesel engines are available for M/NM Mines to assist in meeting the DPM standards.
- ▶ Coal Mines have some newer technology diesel engines to use in further reducing DPM emissions.



Effective Controls to Reduce DPM Emissions

- ▶ New technology diesel engines produce lower DPM emissions.
- ▶ Diesel particulate filters remove DPM.
- ▶ Alternative fuels reduce DPM emissions
- ▶ Maintenance program ensures methods working properly.
- ▶ Environmental Cabs
- ▶ Ventilation



Thank You

Jeffrey Moninger

MSHA A&CC

Mechanical and Engineering Safety Division

moninger.jeffrey@dol.gov

304-547-2324

