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Diesel Engine Smoke Color - What Means What

SMOKE COLOR

Basically there are 3 types of smoke emitted from a diesel engine: black, blue and white.

Black smoke:

Black smoke is the most common emitted from diesel engines and indicates incomplete combustion of the fuel. Black smoke causes can vary widely and include ..

- Incorrect fuel injection timing
- Dirty or worn fuel injectors
- Over fuelling
- Faulty turbocharger, or turbo lag
- Faulty or dirty exhaust gas recycling (EGR) system
- Incorrect valve clearance
- Incorrect fuel to air ratio
- Dirty or restricted air cleaner systems
- Over loading the engine
- Poor fuel quality
- Cool operating temperatures
- High altitude operation
- Excessive carbon build-up in combustion and exhaust spaces

Black smoke can occur across the entire operating range, but is usually worst under full power, or during the lag before the turbocharger boosts air supply to match the fuel usage such as in the early stages of acceleration and during gear changes. Moderate turbo lag smoke is acceptable; otherwise black smoke should be hardly visible in a correctly running engine.

Blue smoke:

Blue smoke is caused by engine lubricating oil burning. The oil can enter the combustion chamber from several sources including:

- Worn valve guides, or seals
- Cylinder &/or piston ring wear
- Cylinder glaze
- Piston ring sticking
- Incorrect grade of oil .. too thin and getting past rings, or valves guides
- Fuel dilution of the oil, making it too thin.

Blue smoke is often evident at cold start, which can reflect reduced oil control due to carbon fouling deposits around the piston rings and/or cylinder glaze. Blue smoke should not be evident at any stage.

An engine may burn oil without the evidence of blue smoke, because good compression burns oil quite cleanly, however, it is not acceptable for any new engine, or engine in good internal condition to burn large amounts of lubricating oil.

White smoke:

White smoke is caused by raw, un-burnt fuel passing into the exhaust stream. Common

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causes include:

- Incorrect fuel injection timing
- Defective fuel injectors
- Low cylinder compression

Low cylinder compression may be caused by leaking valves, sticking piston rings, ring wear, cylinder wear, or cylinder glaze. When white smoke occurs at cold start and then disappears as the engine warms up, the most common causes are fouling deposits around piston rings and/or cylinder glazing.

Continuous evidence of white smoke indicates a mechanical defect, or incorrect fuel timing.