Understanding Engine Certification

ARB regulates tailpipe emissions for many kinds of engines; everything from lawn equipment to on-road and off-road vehicles. To show compliance with these regulations, engine manufacturers must follow strict testing procedures to demonstrate or certify that their engine or vehicle meets the engine emission standards while operating in a specific service class (test cycle and weight restriction). An engine can not be placed in a vehicle and operated outside its service class designation. Emission standards are set for a variety of service classes including new passenger cars (PC), light-duty trucks (LDT), medium-duty vehicles (MDV), heavy-duty engines (HDE) and vehicles (HDV) including urban buses (UB), on- and off-road motorcycles (ONMC and OFMC), all-terrain vehicles (ATV), and electric golf carts (eGC).

Vehicles regulated by the Fleet Rule for Transit Agencies are powered by engines certified to the heavy-duty engine service class.

Heavy-duty engines operate in vehicles with gross vehicle weight rating (GVWR) of above 8,500 pounds (lbs) in the federal jurisdiction and above 14,000 lbs in California (model year 1995 and newer). Engines used in heavy-duty vehicles are further divided into additional service classes by GVWR, as follows:

- Light heavy-duty (LHD) diesel engines: 8,500 lbs < LHD < 19,500 lbs (14,000 lbs < LHDDE < 19,500 lbs in California, for 1995 and newer model year)
- Medium heavy-duty (MHD) diesel engines: 14,000 lbs ≤ MHD ≤ 33,000 lbs
- Heavy heavy-duty (HHD) diesel engines : HHD > 33,000 lbs
- Urban Bus (UB): An UB is a passenger carrying vehicle owned or operated by a public transit agency, powered by a HHD, or of a type normally powered by a HHD and intended primarily for intra-city operation. A bus normally powered by a HHD is usually 35 feet or longer, and/or greater than 33,000 GVWR. An engine used in an urban bus must be certified to the UB service class.
- Alternative fueled engines typically are certified to the compression ignition (diesel engine) certifications above for the heavy duty service classes.

The United States Environmental Protection Agency (USEPA) has separate vehicle and engine emission standards for engines and vehicles operated outside of California in the other 49 states (49-State certified). A vehicle or engine certified to both California (CA) and USEPA standards are known as 50-State certified. Vehicles and engines are not legal for sale in CA unless they obtain a CA or a 50-State certification for that model year. An Executive Order (EO) is issued by ARB when an engine family is certified. The EO tells the emission standard and service class for that engine family. Each new year the engine manufacturer must recertify their engine, by engine family and service class, resulting in a new EO issued. ARB maintains on its website the list of certifications and corresponding EOs. To find a specific EO, please use the following link; www.arb.ca.gov/msprog/onroad/cert/cert.php.
How do I read the Executive Order?

Pertinent certification information is included in an EO such as executive order number, engine model year, engine family, engine size, fuel type, emission standards, test procedure, intended service class, emission control systems and engine models.

How do I read the engine's emissions data?

Standard (STD): The engine emission standards are requirements that set specific limits to the amount of pollutants that can be released into the environment. The STD is always used to calculate compliance regardless of the engine's age. If no standard is listed, the FEL is used. There are cases where there is neither a standard nor FEL listed. Instead there is a set of asterisks. This indicates the lack of applicability of that constituent pollutant standard or FEL to that engine family for that particular executive order.

Family Emission Limit (FEL): This value is an emission level that is declared by the manufacturer to serve in lieu of an emission standard for certification and for the averaging, banking, and trading program (ABT).

Certification Level (CERT): The CERT listed on the executive order includes the deterioration and adjustment factors, and represents emissions for the useful life of the engine but is not the value used to determine compliance.

Not to Exceed (NTE): ARB randomly audits engines over their useful life. The engine must not exceed the STD or FEL using the required operational test cycle. Also, a limit is placed on emissions that an engine is not to exceed (NTE) during “off” cycle operations. This value should not be used to calculate your emissions or determine compliance. The NTE values are used to determine compliance during In-Use Compliance testing.
How do I calculate the emissions for my entire transit inventory?

You can download our emission calculator for further instructions. The link is located at www.arb.ca.gov/msprog/bus/manualcalc.htm.

Use the standard or FEL value to determine the emissions of your engine(s).