Adaptation Values

- In order to maintain an "ideal" air/fuel ratio, the engine control module is capable of adapting to various environmental conditions encountered while the vehicle is in operation (i.e. changes in altitude, humidity, ambient temperature, fuel quality, etc.).

- The adaptation system can only make slight corrections and can not compensate for large changes which may be encountered as a result of incorrect airflow or incorrect fuel supply to the engine.

- Within the areas of adjustable adaption, the engine control module modifies the injection rate under two areas of engine operation:

  1. During idle and low load mid range engine speeds **(Additive Adaptation),**
  2. During operation under a normal to higher load when at higher engine speeds ***(Multlplicative Adaptation).***

  These values are displayed in the "Diagnosis Requests" section of the DIS software and is a helpful diagnostic toot that shows how the system is trying to compensate for a less than ideal initial air/fuel ratio.

NOTE: If the adaptation value is greater than "0.0 ms" the Engine control module is trying to en-richen the mixture. if the adaptation value is less then "0.0 ms the .Engine Control Module is trying to lean-out the mixture.

Diagnosis Request Status	Explanation
Additive mixture adaptation (idle)	If the value is greater than 0.2 ms there is an unmetered air leak or not enough fuel being supplied to the system. • The O sensor indicates a LEAN condition • The engine control module tries to **RICHEN** the mixture. If the value is less than -0.2 ms there is an air restriction or too much fuel is being supplied to the system. • The 02 sensor indicates a RICH condition • The engine control module tries to **LEAN** out.the mixture.
Multiplicative mixture km (Part Load)	If the value is greater than 8 % there is an unmetered air leak or nott enough fuel being supplied to the system. • The 02 Sensor indi .a es a LAN condition • The engine control module tries to **RICHEN** the mixture. If the value is less than -8 % there is an air restriction or too much fuel being supplied to the system. • The 02 sensor indicates a RICH condition • The engine control module tries to **LEAN** out the mixture.

Alternate or Equivalent Phase-in: Phase in of equivalent emission reductions by the end of the last year of the scheduled phase-in.

The emission reductions are calculated by multiplying the percent of vehicles (based on the manufacturer's projected sales volume of all vehicles and engines) meeting the new requirements per year by the number of years implemented prior to and including the last year of the scheduled phase-in and then summing these yearly results to determine a cumulative total.

Base Fuel Schedule: refers to the fuel calibration schedule programmed into the Powertrain Control Module or PROM when manufactured or when updated by some offboard source, prior to any learned on-board correction.

Catalyst Monitoring:

Non-Low Emission Vehicles: The catalyst system shall be considered malfunctioning when its conversion capability decreases to the point that HC emissions increase by more than 1.5 times the standard over an FTP test from a test run with a representative 4000 mile catalyst system.

Transitional Low Emission Vehicles TLE1h these vehicles sha**l** employ an emission threshold malfunction criterion of 2.0 times the applicable FTP HC standard plus the emissions from a test run with a representative 4000 mile catalyst system.

Low Emission Vehicles LEV: The catalyst system shall be considered malfunctioning when its conversion capability decreases to the point that either of the following occurs:

1. Hydrocarbon (HC) emissions exceed the applicable emission threshold specified. The emission threshold criterion for LEV and ULEV applications shall be 2.5 and 3.0 times the applicable FTP HC standard, respectively, plus the emission level with a representative 4000 mite catalyst system. Notwithstanding, beginning with the 1998 model year, manufacturers shall phase in an emission threshold of 1.75 times the applicable FTP HC standard for all categories of low emission vehicles, which shall not include the emission level with a 4000 mile catalyst system.

Federal Test Procedure (FTP): a specific driving cycle that is utilized by the EPA to test light duty vehicles and light duty truck emissions. As part of the procedure for a vehicle manufacturer to obtain emission certification for a particular model/engine family the manufacturer must demonstrate that the vehicles) can pass the FTP defined driving cycle two consecutive times while monitoring various components/systems.

Some of the components/systems must be monitored either once per driving cycle or continuously.

Components/systems required to be monitor once within one driving cycle:

Oxygen Oxygen Sensors
rSecondary Air Injection System
• Catalyst Efficiency
• Evaporative Vapor Recovery System

Components/systems required to be monitored continuously.

• Misfire detection
• Fuel system
• Oxygen Sensors
• All emissions related systems providing or receiving signals to the DME, EGS, or EML.

NOTE: Due to the complexity involved in meeting the test criteria within the FTP defined driving cycle, all tests may not be completed within one "customer driving cycle". The test can be successfully completed within the FTP defined criteria, however customer driving styles may- differ and therefore may not always monitor all involved components/systems in one "trip".

Fuel trim: refers to feedback adfustments to the base fuel schedule. Short-term fuel trim refers to dynamic or instantaneous adjustments. Long-term fuel trim refers to much more gradual adjustments to the fuel calibration schedule than short-term trim adjustments. These long terror adjustments compensate for vehicie differences and gradual changes that occur over time.

Functional check: for an output component means verification of proper response to a cuter command. For an input component, functional check means ve 'nflcation of the input signal being in the range of normal operation, including evaluation of the signals rationality in comparison to all available information.