



## CARBON MASS BALANCE TEST (CMB)

Fuel consumption measurements by reliable methods have been under constant review for many years. The weight of engineering evidence and scientific theory favors the CMB method by which carbon is measured in the engine exhaust gas is related to the carbon content of the fuel consumed. This method has certainly proven to be the most suitable for field testing where minimizing equipment down time is a factor.

The inquires of accuracy and reliability to which we refer include discussions from international commonwealth and government agencies responsible for the test procedure discussed herein. Thos procedure enumerates the data required for fuel consumption measurements by the CMB or exhaust gas analysis method. The studies conducted show that CMB has been found to be the more precise fuel consumption test method that the alternative volumetric-gravimetric methods.

The CMB is so scientifically reliable that the EPA has adopted this procedure (AS2077-1982) as the "Standard Federal Test Procedure" for fuel economy and emission testing. The elements measured in this test include the exhaust gas composition, (HC, CO, CO<sub>2</sub> and O<sub>2</sub>) temperature and gas flow rate calculated from differential pressure and exhaust stack cross sectional area.

The carbon balance test is a fundamental part of the Australian Standards AS2077-1982. Further, the carbon balance test procedure has proven to be an intricate part of the U.S. EPA, FTP, and HFET Fuel Economy Test. Also, Ford Motor Company characterized the CMB test procedure as being "at least as accurate as any other method of volumetric-gravimetric testing." (SAE Paper # 750002 Bruce Simpson, Ford Motor Company). Finally the CMB procedure is incorporated in the Federal Register Voluntary Fuel Economy Labeling Program, Volume 39.

AR6200 Combustion Catalyst and Burn Modifier tested by the CMB method averages 8% improved MPG.

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