

UPDATED INFORMATIVE DIGEST

Sections Affected: Amend Title 13, California Code of Regulations, sections 1900, 1960.1, 1976 and 2061 and to the "California Exhaust Emission Standards and Test Procedures for 1988 and Subsequent Model Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles," the "California Evaporative Emission Standards and Test Procedures for 1978 and Subsequent Model Motor Vehicles," the "California Assembly-Line Test Procedures for 1983 and Subsequent Model-Year Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles," and the "California Non-Methane Organic Gas Test Procedures."

Following a September, 1990 public hearing, the Board adopted the Low-Emission Vehicles and Clean Fuels (LEV/CF) regulations. These regulations establish stringent exhaust emission standards for passenger cars, light-duty trucks, and medium-duty vehicles. There are four progressively more stringent categories of standards for light-duty vehicles: Transitional Low-Emission (TLEVs), Low-Emission (LEVs), Ultra Low-Emission (ULEVs), and Zero-Emission Vehicles (ZEVs). Rather than mandate specific phase-in percentages of vehicles for each low-emission category, the regulations use a categorized fleet averaging approach. This allows manufacturers to certify to any combination of the low-emission vehicle categories, or to conventional vehicle standards, as long as the overall fleet average emission requirements for the model year are met. Compliance with the fleet average requirements is determined by calculating the average non-methane organic gas (NMOG) emission standard to which a manufacturer's fleet of light-duty vehicles is certified. The fleet average requirements drop progressively from 1994 through 2003.

The program also provides flexibility to manufacturers in that compliance can be achieved with advanced emission control technology alone or in combination with cleaner-burning fuels. This provides the most cost-effective means of control because the vehicle and its fuel are treated as two components of a single system. Unlike the traditional mass-based emission standards which cannot properly account for the interaction of vehicle technology and cleaner burning fuels on the reactivity of the exhaust, the LEV/CF program provides this capability through the use of "reactivity adjustment factors" (RAFTs). These factors allow all vehicle/fuel systems to be compared on an equal air quality basis because credit is given for the ability of a vehicle and/or its fuels to reduce the potential to create ozone relative to conventional gasoline vehicles. The RAF is calculated by dividing the specific ozone reactivity of a low-emission vehicle operating on a clean fuel by the specific ozone reactivity of a low-emission vehicle operating on conventional gasoline. Once established, the mass emission rate of a clean fuel low-emission vehicle is multiplied by the appropriate RAF to determine compliance with a particular low-emission standard.

As part of the LEV/CF rulemaking, the Board instructed the staff to periodically review the status of implementation of the regulations and to propose any appropriate regulatory modifications. In June of 1992 staff

presented a status report on the progress being made by industry in complying with the requirements. At that time the Board found that the low-emission vehicle standards continue to be technologically feasible within the required time frame. In this present rulemaking, staff proposed amendments to the low-emission vehicle regulations which are generally designed to augment the existing regulations, improve their clarity and facilitate their implementation for manufacturers. These amendments cover a wide variety of subjects related to the certification requirements and test procedures for light and medium-duty vehicles.

Many of the amendments in this rulemaking concern the administrative details and technical aspects of the certification process and reflect consensus between staff and industry. The most prominent technical amendments pertain to two basic categories--hybrid electric vehicles and low temperature test requirements for low-emission vehicles. There were also numerous technical amendments to the California NMOG Test Procedures in order to facilitate a manufacturers' laboratory analysis of exhaust hydrocarbons. In addition, the Board established interim RAFs for TLEVs and LEVs operated on Phase 2 reformulated gasoline certification fuel.

The hybrid electric vehicle requirements have been updated to better reflect understanding of this emerging technology. Hybrid electric vehicles are designed to operate on electric power and/or an auxiliary power unit (APU), which is usually a combustion engine. Given the wide variety of HEV designs and the generally intermittent pattern of APU operation, it is important to develop an appropriate exhaust and evaporative emission test procedure that will ensure that HEVs will perform as expected in use. The new procedures include an all-electric driving range test and exhaust and evaporative emission testing of the APU. Staff is working closely with industry and is participating in a Society of Automotive Engineers working group to further develop these test procedures.

There are two cold temperature requirements being addressed in this rulemaking--cold temperature carbon monoxide (CO) and revisions to the 50 degree F test requirement. The cold temperature CO requirements were adopted because research indicates that while vehicles are designed to adequately control emissions within the 68 - 86 degree F range of the Federal Test Procedure, in some designs, sharp increases in emissions occur below this range. These requirements are needed to further ensure that additional CO reductions are obtained in certain non-attainment areas of the state. The adopted requirements are identical to those of the U.S. EPA, except that the California requirements include alcohol and liquefied petroleum gas vehicles. The current 50 degree requirement was adopted to prevent the use of possible defeat device strategies such as deactivation of the air pump below 68 degrees which might cause sharp increases in emissions. During implementation of the regulation, however, it became clear that manufacturers would be unable to meet this requirement without the use of more advanced control technology. Since this was not the intent of the regulation, the requirements were modified to allow a multiplicative factor with the NMOG standard to determine compliance.

The process for the development and calculation of RAFs was established in the 1990 rulemaking. In November, 1991 a baseline specific reactivity of 3.42 was established for TLEVs operating on conventional gasoline and a RAF of 0.41 was adopted for M-85 vehicles (85% methanol/15% gasoline). Three new values have been added in this rulemaking--RAFs of 0.98 and 0.94 for TLEVs and LEVs, respectively, operating on Phase 2 reformulated gasoline, and a baseline specific reactivity for LEVs and ULEVs of 3.13. These new values are interim values for the 1993 through 1997 model years, thus affording the oil industry and motor vehicle manufacturers an opportunity to provide the ARB with additional emission data that can be used in setting the values for 1998 and subsequent model-year vehicles. In addition, the amendments establish a protocol for calculation of an ozone deterioration factor to be used by manufacturers which develop engine family specific RAFs, and require the use of a methane RAF which would be added to the RAF for natural gas vehicles.