vehicle might have different test results based on which method was used to define the test surface. As explained in the 1991 SNPRM (Notice 5), PFC is more relevant than skid number for the non-locked wheel tests, since the maximum deceleration that can be attained in a non-locked wheel stop is directly related to PFC, which represents the maximum friction available.

GM and MVMA requested that the agency adopt a dry road PFC of 1.0, since compared with a PFC of 0.9, they believe 1.0 more closely parallels a skid number of 81 specified in FMVSS No. 105. Ford requested that the test surface be specified at 0.95 PFC. GM stated that not raising the PFC to 1.0 would require manufacturers to compensate for the loss of adhesion by equipping vehicles with higher rolling resistance tires, which would adversely affect the fuel economy of GM's car fleet by 1.2 mpg. GM further commented that compared with FMVSS No. 105, a cold effectiveness stopping distance of 70 m on a PFC of 0.9 would significantly increase the requirement's stringency.

Based on industry-government cooperative testing to evaluate the effect of fluctuations of PFC on vehicle stopping performance, NHTSA has determined that a PFC of 0.9 reasonably represents stopping on a dry surface and will not be a significant source of variability in the stopping[3] distance tests. While this testing focused on heavy vehicle stopping performance, the agency believes that the test findings are applicable to passenger cars subject to FMVSS No. 135, since the tests addressed the road surface coefficients of friction. Testing indicates that the expected minor variability of a high coefficient of friction surface appears to have a negligible impact on vehicle stopping distance performance. Variation of the average stopping distances for the six different surfaces was small, with the deviation from the average being only 5 feet. Accordingly, the agency believes that any variability in the stopping performance on a high coefficient of friction surface is more likely due to variation in the vehicle's performance rather than test surface variability.

NHTSA has decided that a test road surface specification of PFC 1.0 would result in practicability problems for the agency. It would have to conduct compliance testing on a surface with a PFC higher than 1.0. Such a surface is difficult to find. The agency also notes that GM conducted an extensive survey of actual road surfaces, which indicated that a PFC of 0.9 is fairly typical.

As explained in detail in NHTSA's decision to require heavy vehicles to be equipped with antilock brake systems, using PFC values to express test surfaces is appropriate even though these values may indicate some fluctuation. Given this fluctuation, the agency has considered whether the fluctuation significantly affects the requirement's objectivity. In an earlier rulemaking about FMVSS No. 208, Occupant Crash Protection, the agency explained that since some variability in any test procedure is inherent, the agency need only be concerned about preventing ''unreasonable'' or ''excessive'' variability to avoid causing manufacturers to ''overdesign'' vehicles to exceed the minimum levels of protection specified by the Federal safety standards. (49 FR 20465, May 14, 1984; 49 FR 28962, July 17, 1984.) With respect to the tests in FMVSS No. 135, variability of the PFC value of the test surface will have a negligible impact on a vehicle's ability to comply with the requirements.

Ford stated that it would be impossible to build a track to exactly a PFC of 0.9, given PFC variability, test tire variability, and changing track surfaces due to aging and weathering.

In evaluating the requirement's practicability, NHTSA has considered possible difficulties with respect to building and maintaining test surfaces with a PFC of 0.9 for the high coefficient stopping tests. (Those interested in building and maintaining a test surface should refer to NHTSA's ''Manual for the Construction and Maintenance of Skid Surfaces,'' (DOT HS 800 814.) Variations in PFC for high coefficient of friction surfaces do not affect stopping distance test results appreciably. After reviewing the comments and available information, NHTSA has concluded that specified test surfaces can be achieved and maintained. As explained above, recent ''Round Robin'' testing related to research about heavy vehicle braking by the agency and others on several test tracks indicates that the test surface specification does not raise practicability or objectivity concerns.

MVMA, GM, and Ford recommended use of a correction factor for stopping distance to account for testing on surfaces with PFCs that differed from those prescribed in the standard. They stated that a manufacturer is fortunate if the tests they conduct are actually carried out on surfaces with the precise PFC as specified in the harmonized standard.

NHTSA believes that it would be inappropriate to specify a stopping distance correction factor, as requested by the comments. The agency notes that the same variables that will apply to manufacturer testing in accordance with FMVSS No. 135 also applied to their testing under FMVSS No. 105, and no correction factor was established or needed at the time. NHTSA further notes that a manufacturer may test its vehicles on whatever surface it likes, and may make any corrections it chooses. The FMVSS specifies requirements with which manufacturers must certify that their vehicles comply on a given surface under specified test conditions. Moreover, the agency will follow the procedures specified in the FMVSS for purposes of compliance testing. If a manufacturer is confident that its testing on a different surface will yield results comparable to agency test results under FMVSS No. 135 (by applying a correction factor), it need not exactly follow every agency specification.

Advocates opposed the proposal to replace skid numbers with PFC. It claimed that PFC numbers cannot be correlated to skid numbers because they do not describe the same event. Advocates further commented that most state highway authorities use skid numbers to evaluate a roadway's skid resistance, and that NHTSA would make it impossible for data comparison by encouraging different authorities to use different measurement standards. In contrast, Fiat, Ford, ITT-Teves, GRRF, OICA, Mercedes, and MVMA stated that using PFC rather than skid numbers will lead to more repeatable road surface adhesion measurements and that PFC directly correlates to vehicle stopping distance.

PFC and skid number can both be measured simultaneously during traction tests. However, the two road surface specifications are used for different purposes. Highway officials use skid numbers to determine when to resurface a road, not to determine test vehicle performance in stopping tests. The agency notes that because FMVSS No. 135 evaluates a vehicle's capability during braking to use the available friction capability at the interface between the tire and road, PFC is the more appropriate measure for that purpose. It is not necessary to establish a correlation between the two numbers, for any given surface.

While ITT-Teves, MVMA, and Ford agreed with the proposed use of the ASTM test tire and test procedure, the GRRF, VW, Mercedes Benz, Fiat, and OICA, stated that the ASTM test methods for determining PFC are not

[3] ''MVMA/NHTSA/SAE Round Robin Brake Test,'' Transportation Research Center of Ohio, Report No. 091194, August 26, 1991.