further notes that less than 1.0 percent of vehicles will actually have to undergo the test by model year 1999, given that most vehicles will be equipped with antilock systems and even most of those non-ABS equipped vehicles will pass the wheel lock sequence test. Based on the above considerations, NHTSA has concluded that the expense and time required to administer the torque wheel test will not pose an unreasonable burden on manufacturers.

The agency notes that torque wheels have been in use at least for the last 50 years for evaluating vehicle characteristics other than adhesion utilization. Most of the major vehicle manufacturers already have torque wheels and use them extensively. Therefore, the cost of torque wheels for FMVSS No. 135 needs to be amortized over more than just its use in evaluating adhesion utilization.

No costs associated with the test surface are expected for torque wheel testing because a high coefficient of friction test surface is already required for testing under the existing standard. No costs are expected for the wheel lock sequence test because, if enough surfaces are not already available to potential users, they could use the torque wheel test, given that it would be cheaper to use than constructing and maintaining new test surfaces. In other words, costs associated with the wheel lock sequence test might be so high that manufacturers would go directly to the torque wheel test to incur lesser costs.

6. Cold Effectiveness

The cold effectiveness test evaluates the ability of a vehicle's brake system to bring a vehicle to a quick and controlled stop in an emergency situation. In the 1991 SNPRM, NHTSA proposed the same cold effectiveness test as proposed in the 1987 SNPRM, with some minor modifications. Specifically, the agency proposed that vehicles would have to stop within 70 m in both the fully loaded and lightly loaded conditions. Based on testing and information supplied by the commenters, the agency believed that this stopping distance requirement for a cold effectiveness test is equivalent in stringency to the current requirement in FMVSS No. 105. The agency continues to believe that the requirements for the cold effectiveness test are of equivalent stringency, as explained below.

Like the other effectiveness tests, the proposed stopping distance requirements for the cold effectiveness test was expressed in the form of an equation. Specifically, this equation provides that stopping distance must be less than or equal to 0.10V + 0.0060V, where V refers to velocity in km/h. The first part of the equation, the 0.10V term, accounts for brake system reaction time of 0.36 second. The second part of the equation, 0.0060V, represents an assumed mean fully developed deceleration rate. The specified performance criterion is not the deceleration rate or the system reaction time, but the stopping distance.

Commenters disagreed about the stringency of the proposed stopping distance tests. While GRRF agreed to the proposed 70 m requirement in the interest of harmonization, GM, Ford, MVMA, Advocates, and the CAS disagreed with the proposed stopping distances. GM stated that the reduction in maximum allowable pedal force increased stringency by 27 percent. It further stated that of nine cars it tested, three failed to meet the proposed 70 m and an additional four failed to meet the 70 m within 10 percent compliance margin. Based on this information, GM argued that a significant number of its vehicles would fail the proposed cold effectiveness test, even though they would comply with FMVSS No. 105. Ford and MVMA stated that the stopping distance was appropriate if the PFC were raised to 1.0.

In contrast, Advocates and CAS commented that the proposed stopping distances were not sufficiently stringent. Advocates stated that the stopping distance should be reduced from 70 m in order to force more original equipment manufacturers to include ABS and brake power assist units as standard equipment. CAS objected to increasing the reaction time component in the stopping distance formula.

After reviewing the available information, NHTSA has determined that requiring a passenger car to come to a complete stop within 70 m (230 feet) from 100 km/h (62.1 mph) provides an appropriate level of braking performance. The agency has decided to require the cold effectiveness test to be conducted at both LLVW and GVWR, with the pedal force being between 65 and 500 N (14.6 to 112.4 lbs).

As it has emphasized in earlier notices, NHTSA notes that it is inappropriate to look only at the raw numbers in FMVSS No. 105 and FMVSS No. 135 and state that one standard is more or less stringent than the other. Agency tests conducted on identical vehicles to the performance requirements in FMVSS No. 105 and FMVSS No. 135 indicate that the average margin of compliance for the cold effectiveness tests at GVWR in the two standards were almost identical (11.5 percent for FMVSS No. 135, and 11.9 percent for FMVSS No. 105). Therefore, NHTSA does not agree with GM's assertions that FMVSS No. 135 is more stringent than FMVSS No. 105.

NHTSA notes that the stopping distances specified in FMVSS No. 135 are slightly longer than the distances specified in FMVSS No. 105. Nevertheless, the agency is confident that the two FMVSSs provide a comparable level of safety, for the following reasons. First, the new burnish procedure in FMVSS No. 135, which is closer to real world practice, is not as severe as that in FMVSS No. 105. As a result, the longer stopping distances in the new standard are mostly attributable to the less severe, but more realistic, burnish procedures, not to an inherent weakening of brake efficiency requirements. Second, the maximum allowable pedal force has been reduced from 150 lbs in FMVSS No. 105 to 112.4 lbs in FMVSS No. 135. Along with lengthening the stopping distances slightly, the lower pedal force will more closely reflect the pedal forces likely to be applied by real world drivers, as opposed to those on a test track.

NHTSA notes that CAS incorrectly assumes that increasing the brake reaction time component in the stopping distance equation, by itself, decreases the test's stringency. Brake reaction time is merely part of a formula by which stopping distances are gauged, but it is the stopping distance, and not the formula, which determines the stringency of the rule. To illustrate, in the 1991 SNPRM, the agency increased the reaction time component of the cold effectiveness test equation from 0.07V to 0.10V. However, the stopping distance remained at 70 m. To compensate for this change in the system reaction time, the deceleration term was modified slightly. Accordingly, a vehicle must still stop in 70 m, so there is no actual increase or decrease in stringency from the first SNPRM.

NHTSA believes that Advocates' concern about the installation of power assist units is moot. According to Ward's Automotive Reports (December 30, 1993 and April 18, 1994 Reports), all current U.S. cars and import cars are equipped with power brakes. Moreover, antilock brake systems are quickly becoming a feature available on many cars. As stated above, by MY 1999 the agency expects 85 to 90 percent of all new cars to be ABS-equipped. The market is responding directly to consumer preference, and therefore Advocates' goal of having more vehicles equipped with ABS is being achieved without a more stringent stopping distance requirement.