significant figure beyond that of the acquired data. Round the values after the final calculations.

2.5.4.1 Calculate the resultant angle at each traverse point:

R_i = arc cosine [(cosine Y_i) (cosine P_i)] Eq. 1–2

Where:

R_i = Resultant angle at traverse point i, degree.

Y_i = Yaw angle at traverse point i, degree.

P_i = Pitch angle at traverse point i, degree.

2.5.4.2 Calculate the average resultant for the measurements:

$$R = \frac{R_i}{n} \qquad \text{Eq. 1–3}$$

Where

R = Average resultant angle, degree.

n = Total number of traverse points.

2.5.4.3. Calculate the standard deviations:

$$S_d = \sqrt{\frac{\sum_{i}^{n} (R_i - R)^2}{(n-1)}} \qquad \text{Eq. 1–4}$$

Where:

S_d = Standard deviation, degree.

2.5.5 The measurement location is acceptable if $R < 20°$ and $S_d < 10°$.

2.5.6 Calibration. Use a flow system as described in Sections 4.1.2.1 and 4.1.2.2 of Method 2. In addition, the flow system shall have the capacity to generate two test-section velocities: one between 365 and 730 m/min (1200 and 2400 ft/min) and one between 730 and 1100 m/min (2400 and 3600 ft/min).

2.5.6.1 Cut two entry ports in the test-section. The axes through the entry ports shall be perpendicular to each other and intersect in the centroid of the test-section. The ports should be elongated slots parallel to the axis of the test section and of sufficient length to allow measurement of pitch angles while maintaining the pitot head position at the test-section centroid. To facilitate alignment of the directional probe during calibration, the test-section should be constructed of plexiglass or some other transparent material. All calibration measurements should be made at the same point in the test-section, preferably at the centroid of the test-section.

2.5.6.2 To ensure that the gas flow is parallel to the central axis of the test-section, follow the procedure in Section 2.4 for cyclonic flow determination to measure the gas flow angles at the centroid of the test section from two test ports located 90° apart. The gas flow angle measured in each port must be ±2° of 0°. Straightening vanes should be installed if necessary to meet this criterion.

2.5.6.3 Pitch Angle Calibration. Perform a calibration traverse according to the manufacturer's recommended protocol in 5° increments for angles from −60° to +60° at one velocity in each of the two ranges specified above. Average the pressure ratio values obtained for each angle in the two flow ranges, and plot a calibration curve with the average values of the pressure ratio (or other suitable measurement factor as recommended by the manufacturers) versus the pitch angle. Draw a smooth line through the data points. Plot also the data values for each traverse point. Determine the differences between the measured data values and the angle from the calibration curve at the same pressure ratio. The difference at each comparison must be within ±2° for angles between 0° and 40° and with ±3° for angles between 40° and 60°.

2.5.6.4. Yaw Angle Calibration. Mark the three-dimensional probe to allow the determination of the yaw position of the probe. This is usually a line extending the length of the probe and aligned with the impact opening. To determine the accuracy of measurements of the yaw angle, only the zero or null position need be calibrated as follows. Place the directional probe in the test section and rotate the probe until the zero position is found. With a protractor or other angle measuring device, measure the angle indicated by the yaw angle indicator on the three-dimensional probe. This should be within ±2° of 0°. Report this measurement for any other points along the length of the pitot where yaw angle measurements could be read in order to account for variations in the pitot markings used to indicate pitot head positions.

5. By adding Citations 13 and 14 to Section 3, as follows:

3. Bibliography

* * * * *

13. Smith, W.S. and D.J. Grove. A Proposed Extension of EPA Method 1 Criteria. "Pollution Engineering". XV(8):36–37. August 1983.

14. Gerhart, P.M. and M.J. Dorsey. Investigation of Field Test Procedures for Large Fans. University of Akron. Akron, Ohio. (EPRI Contract CS–1651). Final Report (RP–1649–5) December 1980.

[FR Doc. 85–11392 Filed 5–9–85; 8:45 am]

BILLING CODE 6560–50–M

FEDERAL MARITIME COMMISSION

46 CFR Part 516

[Docket No. 85–10]

Marine Terminal Agreements; Correction

AGENCY: Federal Maritime Commission.

ACTION: Proposed rule, correction.

SUMMARY: This document corrects the proposed rule relating to marine terminal agreements that the Commission issued on April 2, 1985, and which appeared in the **Federal Register** of Friday, April 5, 1985, beginning at 50 FR 13617. This action is necessary to correct a substantive error in the Supplementary Information. Minor typographical and other errors in the Supplementary Information and in the text of the regulations will be corrected, as necessary, in the final rule.

DATE: Comments on or before June 4, 1985.

ADDRESS: Send comments (original and 15 copies) to: Bruce A. Dombrowski, Acting Secretary, Federal Maritime Commission Washington, D.C. 20573, (202) 523–5725.

FOR FURTHER INFORMATION CONTACT:

Joseph C. Polking, Director, Bureau of Agreements and Trade Monitoring, Federal Maritime Commission, Washington, D.C. 20573, (202) 523–5787

John Robert Ewers, Director, Office of Regulatory Overview, Federal Maritime Commission, Washington, D.C. 20573, (202) 523–5866.

The following corrections are made in FR Doc. 85–8184 beginning on page 13617 in the issue of Friday, April 5, 1985:

Supplementary Information [Corrected]

On page 13621, in the first column:*

1. The discussion under section 516.5(a) should read:

This section exempts marine terminal leases, agreements other than terminal leases which relate solely to the financing and/or construction of marine terminal facilities and agreements which relate to off-dock container freight station facilities and/or services from the filing and effectiveness/approval requirements of both the 1984 and 1916 Acts and 46 CFR Parts 572 and 560. This section also exempts proprietary marine terminal agreements from the filing and approval requirements of the 1916 Act and 46 CFR Part 560.

2. The headings and discussions for section 516.5(b) and section 516.5(c) are removed. Note that in the proposed rule there is no § 516.5(c) or § 516.5(d).

3. The heading "§ 516.5(d)" should read "§ 516.5(b)". The discussion following this section remains unchanged.

By the Commission.

Bruce A. Dombrowski,

Acting Secretary.

[FR Doc. 85–11389 Filed 5–9–85; 8:45 am]

BILLING CODE 6730–01–M

* Pages 16 and 17 of the Commission issuance.

DEPARTMENT OF TRANSPORTATION

National Highway Traffic Safety Administration

49 CFR Parts 541 and 567

[NHTSA Docket No. T84-01; Notice No. 04]

Performance Standards and Criteria for Selection of Covered Vehicles and Replacement Parts—Motor Vehicle Theft Law Enforcement Act of 1984

AGENCY: National Highway Traffic Safety Administration (NHTSA), DOT.

ACTION: Notice of Proposed Rulemaking (NPRM).

SUMMARY: This notice proposes performance standards for inscribing or affixing identification numbers onto certain major original and replacement parts of high theft lines of passenger motor vehicles. It further proposes guidelines and procedures for selection of such high theft lines, and establishes which major parts are to be included in the marking program. Finally, it proposes a manner and form for certifying compliance with the standard and specifies who will be authorized to certify such compliance.

This rulemaking is undertaken pursuant to the Motor Vehicle Theft Law Enforcement Act of 1984, Pub. L. 98-547. The law creates a comprehensive program to reduce vehicle thefts through use of the following: parts identification; expansions in federal criminal penalties for motor vehicle theft, and new criminal sanctions against tampering with identification markings; and tighter controls on the import and export of motor vehicles. This rulemaking constitutes the first phase of the NHTSA's implementation of its responsibilities under Pub. L. 98-547.

DATES: Comments on this NPRM are due no later than June 10, 1985. The agency anticipates publication of the Final Rule by August 12, 1985. The theft prevention standard would become effective 6 months after issuance and apply to passenger cars and replacement equipment for them beginning with model year 1987.

Written comments should refer to the docket number and the number of this notice, and should be submitted to: Docket Section, Room 5109 Nassif Building, 400 Seventh Street, SW., Washington, D.C. 20590. (Docket hours are 8:00 a.m. to 4:00 p.m.)

FOR FURTHER INFORMATION CONTACT: Mr. William Boehly, Director, Office of Market Incentives, Room 5313, National Highway Traffic Safety Administration, 400 Seventh Street SW., Washington, D.C. 20590 (202-426-1714).

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I. Background: The New Law

In response to growing national concern over the problem of motor vehicle theft, Congress, in October 1984, enacted the Motor Vehicle Theft Law Enforcement Act of 1984. The new law is, in the words of the House Energy and Commerce Committee, "a comprehensive package . . . designed to curb the theft of motor vehicles by preventing thefts and decreasing the ease with which certain stolen vehicles and their major parts can be fenced, while trying to minimize regulation of the domestic and foreign motor vehicle manufacturing industry . . . It also gives law enforcement officials at all levels of government the . . . prosecutory tools to crack criminal theft rings and . . . to apprehend, successfully prosecute and punish motor vehicle thieves." House Report at 2-3.

A. Congressional Intent

Congress determined that legislation was needed to address the auto theft problem because its nature and scope has changed dramatically in the past twenty years. Whereas auto theft was once largely the province of "joyriding" teenagers, it has overwhelmingly become a professional criminal enterprise. The percentage of those arrested for motor vehicle theft who were juveniles dropped to its lowest rate in history in 1983. The recovery rate for stolen vehicles has fallen steadily, along with the value of those vehicles which are recovered, as the crime has been "professionalized."

Congress found that cars are frequently stolen so that they can be "chopped" into component parts that are subsequently resold to repair shops and used to repair damaged vehicles. Once a car is "chopped" into its component parts and those parts are separated from the identifying Vehicle Identification Number (VIN) plate and numbered engine and transmission, it is no longer possible for law enforcement officials to establish that they were stolen, much less to trace them to a particular stolen vehicle. As a result, thieves often cannot effectively be prosecuted when found in possession of such unmarked parts, and stolen cars or component parts, once recovered, cannot be traced and returned to the original owners or their insurers.

B. Comprehensive Approach Taken

The Motor Vehicle Theft Law Enforcement Act mounts a comprehensive attack on vehicle theft by combining the following elements: a marking system for the major component parts of frequently stolen vehicles; increased federal criminal penalties for vehicle theft (including listing in the Racketeering Influenced and Corrupt Organizations Act (RICO) as a predicate felony), and penalties for tampering with the new marking system; tighter controls on the import and export of motor vehicles; and a series of studies over the next five years of the new theft prevention program's effectiveness, to determine if the program should be modified or expanded.

The new law calls for swift implementation of the parts-marking standard, requiring that a proposed standard be published promptly. It calls

for selection of vehicles to be covered by the standard within one year of the date of enactment, i.e., by October 24, 1985.

C. Scope of This NPRM

Responsibilities for implementation of the Motor Vehicle Theft Law Enforcement Act of 1984 are distributed among several Federal agencies, primarily the Department of Transportation and the Department of the Treasury (U.S. Customs Service). Full implementation of the Department's responsibilities will require several phases of rulemaking.

This Notice of Proposed Rulemaking, which represents the first phase, addresses some of the responsibilities assigned by the statute to the Department of Transportation (which are, in turn, delegated to the National Highway Traffic Safety Administration). It focuses on the key near-term elements of the major component parts-marking standard to be implemented. Those elements are: the performance standard for affixing or inscribing major parts with identifying numbers or symbols; the criteria and procedures for selection of covered high theft lines and their major parts; certification of compliance with the standard; and the manner and form of certification to be employed.

This Notice reflects the agency's consideration of comments received by the agency since enactment of the Theft Law Enforcement Act. The agency has received many written and oral comments in that time. A public meeting was conducted on December 6th and 7th, 1984, at which all interested persons were invited to comment on a series of questions related to implementation of the law. Copies of all written materials submitted to the agency during and after the public meeting, as well as a copy of the agenda and a transcript of the meeting, are in the docket. In addition, many written comments were submitted during the comment period which ended December 17.

D. Future Rulemaking Action Planned

Subsequent rulemakings will take up other matters not on the statute's accelerated rulemaking schedule, such as: Reporting requirements for manufacturers, Sec. 603(c); reporting requirements for insurance companies, Sec. 612; procedures for exempting up to two lines of passenger motor vehicles per manufacturer per year if they are equipped with effective anti-theft devices, Sec. 605; and a possible voluntary theft prevention standard for vehicles not required to be covered under the terms of the statute, Sec. 613.

II. Definitions for the Theft Program

"Car line" or "line" means a group of motor vehicles of the same make, which have the same body or chassis, or otherwise are similar in construction or design. Some examples of makes and lines are AMC-Alliance, BMW-BMW 320, Chevrolet-Cavalier, Chrysler-New Yorker, and Ford-Escort. If the same car line nameplate were placed on 2-door, 4-door, station wagon and hatchback versions of a vehicle, then all of those versions would be in the same line.

"Committee report" or "report" refers to the House Energy and Commerce Report, "Motor Vehicle Theft Law Enforcement Act of 1984," H. Rept. 98-1087, 98th Cong. 2d Sess.

"Interchangeable part" means a passenger motor vehicle major part that is sufficiently similar in size and shape to a major part of another car line that it could be used to replace the similar part on a vehicle of the other line, with no modification to the vehicle other than to the interior or exterior trim.

"Model year," with reference to any specific calendar year, means a manufacturer's annual production period for a particular line (as determined by the EPA Administrator) which includes January 1 of such calendar year. If a manufacturer has no annual production period for that line, the model year is the same as the calendar year. (Note: the EPA Administrator uses the manufacturer's start of production to determine model year.) Since the annual production periods for a manufacturer's lines may differ, a manufacturer may have model years with different beginning and ending dates for different lines.

"Public Meeting" refers to the December 6th and 7th, 1984 public meeting held by the NHTSA at the Department of Transportation in Washington, D.C., at which all interested persons were invited to respond to a series of questions about implementation of Title VI.

"Title VI" refers to Title VI of the Motor Vehicle Information and Cost Savings Act. Section 101 of the Motor Vehicle Theft Law Enforcement Act of 1984 (MVTLEA) amended the Cost Savings Act by adding a new Title VI. All of the portions of the statute which create responsibilities for the National Highway Traffic Safety Administration are contained in the new Title VI. Hereinafter this NPRM will refer to Title VI rather than the MVTLEA.

III. The Theft Prevention Standard

A. Original Parts

Title VI requires the agency to promulgate a theft prevention standard. It is to be a minimum performance standard for the identification of major parts of new motor vehicles (and major replacement parts designed as replacements for such major parts), to be achieved by inscribing or affixing numbers or symbols to such parts. The agency proposes the following basic elements of the standard:

1. The number of symbol to be used must consist of the Vehicle Identification Number (VIN) or a derivative thereof.

Discussion

While the statute itself is silent, the committee report on Pub. L. 98-547 calls for the use of the full VIN, or if that is too costly or difficult, a derivative (i.e., some subset of the VIN's seventeen digits) for the inscribed or affixed identification of major parts. The report states (at p. 12) that ". . . it is most desirable if the number used for identification of major parts is the same as that required for the vehicle identification number (VIN) . . ." The law enforcement advantages of using the full VIN over a derivative of the VIN or some other, altogether different number system are significant.

First, each vehicle's 17-character VIN is a unique "signature" that, in order to comply with the applicable Federal Motor Vehicle Safety Standards, cannot be repeated on any two vehicles during a period of thirty years. Since manufacturers are allowed to repeat assembly sequence numbers on vehicles of the same make and model manufactured at separate assembly plants, use of some derivatives could lead to confusion. Use of the full VIN allows a law enforcement agency to differentiate two identical make and model vehicles from different assembly plants. Therefore, if a vehicle's VIN is used to mark its major parts and those parts are stolen and recovered, they can still conclusively be identified as having come from that vehicle. Prosecution of motor vehicle thieves is far more likely to be successful if this link between the initial vehicle theft and the thief's possession of the part from the stolen vehicle can be firmly established.

Second, the full, 17-character VIN is the basis for the National Crime Information Center's vehicle theft reporting system, which is used by law enforcement officials around the nation to detect and track stolen vehicles. When a vehicle is reported stolen, local and state law enforcement officials file uniform theft reports with the NCIC, usually within 24 hours. Once a vehicle theft report is entered into the system, all participating law enforcement

agencies nationwide have access to it and can check the VIN of suspected stolen vehicles against the NCIC master list. Thus, use of the VIN for the theft prevention standard will enable law enforcement officials to employ the existing NCIC data base with ease, rather than develop a new or modified one, to query whether component parts uncovered during investigations were once attached to vehicles reported stolen.

Third, since the full VIN is the commonly used vehicle identifier for all law enforcement agencies, its continued use would mean minimal disruption of the vehicle identification processes of those agencies and avoid the necessity for training of the personnel of those agencies for a new or modified system.

Because of these considerations, the Agency is proposing tht manufacturers be required to employ the VIN in marking covered major component parts. *See* committee report at 12.

However, several factors militate against a requirement that the entire VIN appear on every covered major part.

First, the statute provides that, if any manufacturer is already engaged in identifying vehicle engines and transmissions in a manner which substantially complies with the theft prevention standard at the time the standard goes into effect, that manufacturer shall not be required to conform to an identification system that imposes greater costs. All manufacturers now stamp engines and transmissions with a derivative of the VIN rather than the entire seventeen digits.

Second, the committee report raises the possibility that there may be some identification technologies (although it did not identify any) for which the costs of affixing or inscribing the entire VIN would be higher than the costs of affixing or inscribing a shorter derivative. *See* report at 12.

In view of the foregoing, the agency is proposing as an alternative the use of a VIN derivative. The agency believes that there may be some derivatives that would enable an investigator to determine if a particular component comes from a stolen vehicle. Comments are requested on the specific composition of derivatives that would be sufficient for that purpose and on the cost differential between the use of those derivatives and the full VIN. Further, the agency is proposing that manufacturers which are placing a VIN derivative other than the one specified above on engines and transmissions as of the effective date of the standard be permitted to continue using that derivative on those particular engines and transmissions even if the agency ultimately decides to require the use of the full VIN on other parts.

2. The theft prevention standard must be a performance rather than a design standard; it must be practicable; and it must employ relevant, objective criteria.

Discussion

The committee report indicates that the Agency must take into account all relevant factors involving reasonableness and achievability in drafting a practicable standard (and, of course, must take into account the statute's $15.00/car limit). These factors include the availability of technology and a reasonable lead time for implementing the standard. It specifies that the agency should use either "general criteria" or "performance tests" in drafting the standard. *See* committee report at 10. The standard should promote the statute's goal of making parts more easily traceable and recoverable, and hence an "important objective . . . will be to ensure that the number is as permanent as possible and cannot be easily altered, tampered with or obliterated." Committee report at 12.

"Practicable" and "objective," as used in Title VI, are to be given the same meaning as they are given in interpretation of the Safety Act. That is, "practicable" means "economically and technologically capable of being done"; "objective" means "capable of being measured objectively without recourse to any subjective determination." For further discussion of these terms, *see* page 16 of H. Rept. No. 1776 on the Motor Vehicle Safety Act of 1966, 89th Congress; *Chrysler* v. *DOT*, 472 F. 2d. 659, 675 (6th Cir. 1972).

The Agency has identified a number of criteria that it believes are relevant to the goals of reducing vehicle theft, improving traceability and recoverability of stolen parts, and aiding prosecution, and are reasonable and objective. These criteria are expressed below in terms of performance rather than design, as required by Title VI.

The Agency is proposing that the following criteria be met by the manufacturer's inscription or affixation of the VIN or a derivative onto covered major parts. Comments are requested on the appropriateness of these criteria in light of the above goals and the available technology. (Comments are also requested whether any performance requirement proposed to apply to labels only should be extended to inscriptions.)

(a) The inscription or affixation must meet the same SIZE AND STYLE requirements as the current standard for the Vehicle Identification Number (VIN); i.e., it must have a minimum height of 4 mm; must consist of the Arabic or Roman numerals and/or letters set out in Table 1 of § 571.115; and must consist of capital, sans-serif characters.

(b) The inscription or affixation must be AS PERMANENT AS POSSIBLE. This requirement is not intended to be absolute, i.e., it is not intended to result in inscriptions or affixations that are immune to damage under all possible circumstances. Instead, it is intended that the identification be made in such a way that, under normal conditions of wear, tear, and repair, it will continue to meet the other performance requirements of the theft standard for the average life of the car (ten years).

The agency is also proposing, as an alternative to the "permanence" requirement, a requirement that the marking remain legible only for the average length of time during which cars are generally susceptible to high theft rates. Comments are invited regarding the appropriateness of this approach, and regarding the length of time during which most vehicles are susceptible to high rates of theft.

(c) Locations selected for labels must provide Protection From Damage as a result of normal maintenance and exposure conditions while still being Accessible to investigators Without Further Disassembly once the parts are removed from the vehicle. Further, to ensure that the label is placed in a consistent location on a particular type of part, the identification must be placed in the same 5 cm X 5 cm area on each part of that type. The manufacturer may select any location, consistent with the above requirements. Identifications placed on parts by means of inscription would be subject to the requirements concerning accessibility and consistent location. Given the greater durability of inscriptions, there does not appear to be any need to require that they be placed in a location where they are protected from accidental damage.

(A different location for the parts identifier is being proposed for replacement parts; *see* III B.1 below. The locations selected by the manufacturer would have to accommodate both the original and the replacement part marking standards.)

The committee report specifies that the agency should "consider the location of the number on a particular part, to ensure that the purposes of the Act are satisfied." It instructs the agency to "consider the location of the number so that it will not be easily susceptible to damage in the normal course of dealer preparation (for such procedures as rustproofing and undercoating), or be

easily damaged in the course of repair, or regular automobile maintenance by repair shops or car owners." Committee report at 12.

The agency interprets the committee report to mean that the standard should be written in such a way that a complying identification would be placed in a location where it was as protected as possible from unintentional obliteration, while still serving the law enforcement purposes of the statute. In other words, the markings must be placed where they are protected from damage due to repairs or repainting, but where they can readily be found by law enforcement personnel conducting an investigation.

One representative of the law enforcement community has commented that, as a general rule, parts discovered during field investigations are already disassembled when they are found so that accessibility of markings on fully assembled vehicles was not essential. However, another expert indicated to the agency that there are times when it would be helpful for the police to be able to read an identifier without taking the vehicle apart, and that markings should be placed accordingly. Both commenters agreed, however, that NHTSA's regulations should ensure that investigators will not have to conduct any *additional* dismantling (over and above what the chop shops, parts dealers or thieves have ordinarily done) to locate the identifier on parts removed from a vehicle.

At the public meeting, manufacturers' representatives indicated that, due to variations in vehicle design and marking technologies, it would be very difficult to draft a regulation establishing a uniform location for the placement of all identifying markings for each component part to which the standard will apply. Moreover, law enforcement experts who spoke at the meeting (and provided additional information in subsequent conversations with agency personnel) indicated that the standard need not provide for uniformity of location in order to ensure its effectiveness.

Uniformity among different manufacturers and car lines is unnecessary because the National Automotive Theft Bureau (NATB) currently makes available to law enforcement officials information which it receives from the manufacturers about the location on each car line of identifying numbers on engines, transmissions and elsewhere. This system is probably adaptable to the motor vehicle theft standard, and obviates the need for a standard which specifies a uniform location for the marking on each covered part.

However, since the NATB system depends upon the manufacturer consistently placing its identifiers in the same spot for the entire model year of a car line, the agency has tentatively determined that the manufacturers be permitted to choose the location for labels or inscriptions on each car line as long as that location remains consistent. Comments are solicited as to whether uniformity of placement should be required for the entire time period during which a covered line is produced, or whether the requirement would adequately serve law enforcement purposes if it applies only on an annual basis.

For the reasons discussed above, it is the agency's tentative view that the dual goals of protection from obliteration and accessibility to law enforcement officials are best served by establishment of performance criteria for location selections, rather than by requiring manufacturers to place markings in a particular location. It is therefore proposing that actual location of identifiers be left to the discretion of the manufacturer, subject to the criteria outlined above.

(d) Removal of the affixation must cause the affixation to SELF-DESTRUCT and ALTER THE APPEARANCE of the vehicle part. For example, it must not be possible to remove the affixation from one part and transfer it to another without leaving evidence of the tampering on the original part. Removal of the affixation must uncover or create a "footprint" (i.e., physical evidence that an affixation was originally present or required to be present) on that part. Similarly, removal or alteration of an inscription must ALTER THE APPEARANCE OF THE PART.

Thus, the fact that a marking was transferred to another part must be obvious enough to be discerned by a trained investigator who inspects the part under field conditions. For example, if an inscription is removed and re-welded into another part, the traces left by re-welding would satisfy the standard. If a labelling method is used, self-destruction of the label or rendering the number on it illegible will ensure that it cannot be reaffixed to a new part.

(e) The affixation must be RESISTANT TO COUNTERFEITING; that is, it must be extremely difficult for an unauthorized person systematically to duplicate the marking, or it must be so expensive to duplicate the marking that the price of an illegally obtained part would begin to approach the price of a legitimately purchased replacement part. For example, the 3-M corporation maintains that the process by which it manufactures its security tape, "Confirm," has thus far proven impossible to counterfeit. (Information on this and other attributes of "Confirm" may be found in agency memoranda summarizing meetings with 3-M. Copies of these memoranda are in the public docket.) The agency requests comments on whether it is reasonable to expect that compliance with this requirement would be voluntarily supplemented through the imposition by label and vehicle manufacturers of stringent controls at their plants to safeguard the labels and the marking system so that blank labels could not be stolen, marked and applied by thieves.

As a further guard against counterfeiting of labels, each label would be required to bear a distinctive logo or trademark identifier along with the VIN. Especially if this marking is incorporated in the material of the label itself instead of simply being stamped on the label, use of the marking would make counterfeiting of the label more difficult and expensive because standard templates could not be readily located or purchased.

In proposing the above performance criteria, the agency recognizes that the performance standard might have been stated in test-specific terms such as resistance to levels of abrasion or, for labels, resistance to removal by various common solvents. The tentative decision to state the performance criteria in more general terms was reached because of the following considerations:

First, the time limitations imposed by the language of the statute preclude any of the extensive experimentation by either the agency or the manufacturers which would be necessary to devise appropriate temperature, abrasion or chemical tests. Congress imposed an extraodinarily tight timetable, and urged the agency to avoid seeking extensions unless absolutely necessary. (". . . the Committee expects the Secretary to promulgate the standard as expeditiously as possible so that major parts may begin to be numbered by the earliest applicable model year.") It may be inferred that the legislators placed a higher priority on swift implementation of the standard than they did on the development of one which is more precise. Indeed, the committee report expressly contemplates the course tentatively selected by the agency: "(t)he DOT will establish the test *or general criteria* which the identification must meet." *See* report at 10–11 (emphasis added).

Second, the committee report repeatedly stresses the importance of avoiding formulations that could hinder development of new unanticipated technologies. By stating the standard in more general terms the Agency reduces the possibility of impeding technological advancement.

Third, both industry and law enforcement participants in the public meeting noted that the Agency's current standard for the VIN label or plate, worded as general performance criteria, has resulted in affixation of VIN plates that are very helpful to law enforcement. (The standard provides simply that "[t]he VIN of each vehicle shall appear clearly and indelibly upon either a part of the vehicle other than the glazing that is not designed to be removed except for repair or upon a separate plate or label which is permanently affixed to such a part," and that it shall be "readable, without moving any part of the vehicle, through the vehicle glazing under daylight lighting conditions . . . etc., and . . . . [e]ach character in the VIN . . . shall have a minimum height of 4 mm." 49 CFR 571.115 S4.5 and 4.6.) The agency invites comments regarding whether the criteria of Standard 115 are equally well-suited to achieving the goals of the theft prevention standard and Title VI.

3. Parts to be covered by the standard

Section 602 of Title VI provides that this standard is to apply only to major parts, and limits the number of covered major parts to fourteen per vehicle. Section 601(7) of Title VI defines the term "major part" by listing a number of parts and including a provision under which the agency may select for coverage other parts of comparable design or function. The list consists of the following 15 (or 17) parts:

"(A) The engine;

"(B) The transmission;

"(C) Each door allowing entrance or egress to the passenger compartment;

"(D) The hood;

"(E) The grille;

"(F) Each bumper;

"(G) Each front fender;

"(H) The deck lid, tailgate, or hatchback (whichever is present);

"(I) Rear quarter panels;

"(J) The trunk floor pan;

"(K) The frame or, in the case of a unitized body, the supporting structure which serves as the frame; and

"(L) Any other part of a passenger motor vehicle which the Secretary, by rule, determines is comparable in design or function to any of the parts listed in subparagraphs (A) through (K)." Sec. 601(7).

The committee report provides that "the actual selection or choice of the major parts is done in accordance with other specified sections of the file" (sic). Committee report at 10, presumably referring to the provision in Section 603(a)(2) that "(t)he specific lines, and the major parts of the vehicles within such lines, which are to be subject to the standard may be selected by agreement between the manufacturer and the Secretary."

Discussion

Because the list of "major parts" appearing at 601(7) contains 15 to 17 parts (depending on whether a covered vehicle has 2 or 4 doors) and the statute limits the standards to a maximum of 14 major parts per covered vehicle, the drafters obviously anticipated that the agency would select among the parts listed (or would select by rule additional unlisted parts that serve the same or comparable functions) or permit affected manufacturers to so select, in order to derive an appropriate list of covered parts.

Based upon comments offered by law enforcement officials and other persons at the public meeting and in other conversations with the NHTSA, the agency has developed three alternative proposals regarding the parts which should be marked. Under the first proposal, the following parts, if present, would be required to be marked on all covered car lines:

1. Engine;
2. Transmission;
3. Right front fender;
4. Left front fender;
5. Hood;
6. Left front door;
7. Right front door;
8. Front bumper;
9. Rear Bumper;
10. Left rear quarter panel;
11. Right rear quarter panel; and
12. Decklid, tailgate or hatchback (whichever is present).

These parts were selected from the statute's list because they were found to be most frequently repaired or most costly to replace. A more detailed discussion of replacement costs and frequency of repairs appears in section III of the PRIA.

Comments are solicited regarding the existence of any other parts, comparable in design or function, that should be covered by the standard in addition to or in place of the parts on the above list.

While engines and transmissions may not be subject to frequent accidental damage, Congress' intent to include these two parts in the standard is clearly expressed in both the statute and the committee report. In addition, while the frame is an expensive part, it may be the case that the frame is rarely stolen alone; rather, a part of the frame is stolen while still attached to other parts. For this reason, a separate identifier on the frame was given a lower priority. Comments are invited regarding this selection.

The second and third alternative proposals are based on the agency's recognition that vehicles will not uniformly be designed to have all twelve parts listed under the first alternative proposal. The second proposal would be like the first, except that it would require the marking of two additional parts. The standard would not specify the two additional parts but would permit manufacturers individually to propose the additional two parts to the agency for agreement. NHTSA would agree to the manufacturer's proposal if the two parts proposed were on the statute's list. If the manufacturer proposed marking a part that was not on the list but was comparable in design or function, rulemaking by the agency would be necessary before approval could be granted. (See Sec. 601(7).) Timing problems might be created if such rulemaking had to be conducted each year. Comments are requested on the extent of such problems and how they might be minimized.

The third proposal would be like the second, except that the two additional parts to be marked would be specified in the standard. Those two parts would be selected based on the comments from interested parties on this notice. Candidates for the additional parts to be selected are: Rear doors (if present); grille (if present); floor pan; and frame.

The agency is proposing, as well, to permit the certification plate or label (now affixed to the left front door or pillar) to serve as the left door's identification for the purposes of Title VI if affixed to that door. This approach appears reasonable because the certification plate or label must already meet legibility, permanence and non-transferability requirements comparable to the ones proposed for the theft prevention standard, and must include the VIN. *See* 49 CFR 567.4. Since Title VI prohibits the agency from issuing a rule requiring more than one marking per part, it appears consistent with Congress' intent for the agency not to require a second affixation or inscription of the VIN on the door.

After considering the proposal, offered by the National Automobile Theft Bureau (NATB) at the public meeting, that each vehicle be subdivided into three zones and the manufacturer be permitted to make limited selections regarding which parts to mark within each zone, the agency has tentatively

rejected that approach as unnecessarily complex.

4. Cost of compliance with the theft prevention standard

Sec. 604(a) of Title VI provides that the theft prevention standard "may not . . . impose costs upon any manufacturer of motor vehicles to comply with such standard in excess of $15 per motor vehicle . . ." The committee report explains that "[t]his is a limitation on DOT. If DOT, when promulgating the standard, determines that this cost will be exceeded, the standard should not be issued until it is adjusted to be within the limitation. In short, there is no authority to issue a standard that exceeds the cost limitation." Committee report at 16.

Sec. 604(c) (1) and (2) require that the $15.00 cap be annually adjusted to 1984 dollars as reflected in the Consumer Price Index (CPI). Percent changes in the CPI are to be certified to the Agency by the Bureau of Labor Statistics each year, and published in the **Federal Register.**

Discussion

The agency interprets the above statutory language and legislative history to mean that it is NHTSA which determines the cost of compliance with the standard, after consultation with vehicle manufacturers and with manufacturers of the various types of marking technologies. NHTSA may not issue a standard which cannot reasonably be met by all manufacturers for $15, but the standard need not be capable of being met for $15 with every technology by every manufacturer. In other words, the standard would meet this requirement if for each manufacturer there was at least one reasonable means of compliance that, based on reasonable and generally accepted management and accounting techniques, would cost not more than $15. The agency has broad discretion to make adjustments to the standard so that it falls within the $15 limit. Such adjustments would then be generally applicable to all manufacturers. But Congress clearly did not contemplate that no standard would issue merely because one manufacturer claims unverified or reasonable costs above that limit. Nor did Congress contemplate that the agency would have the authority to exempt a manufacturer entirely or modify the standard for a particular manufacturer to bring its costs to that manufacturer below $15. The same performance requirements must pertain to all manufacturers even if adjustments are necessary in order to comply with the $15 limitation.

Based on public comments and statements in the committee report, the agency does not anticipate that any manufacturer will make a claim that it is unable to meet the standard for $15 per vehicle. Given the availability of inexpensive labeling and engraving technologies, every manufacturer should be able to find at least one marking system adaptable to its assembly and management techniques within the cost limitation.

If an occasion does arise in which a manufacturer is able to demonstrate that it cannot despite diligent effort meet the $15 limit, the non-conforming manufacturer should petition the agency to adjust the standard. The manufacturer would not automatically be exempted from the requirements of the standard.

Comments are solicited as to whether other methods for resolving such issues would better serve the goals of Title VI.

B. Performance Standards for Replacement Parts

Title VI provides that the theft prevention standard shall apply to replacement parts as well as to the parts originally installed by the manufacturer.

Sec. 602(d)(2) specifies that the standard may not require identification of any replacement part which is not designed as a replacement of a major part required to be identified under the standard. It further provides that the standard can not provide for the inscribing or affixing of any identification other than a symbol identifying the manufacturer and a common symbol identifying the part as a major replacement part.

The committee report notes that the standard for replacement parts "for example, could be a manufacturer's logo with the initial 'R' for replacement part affixed or inscribed on the part." Committee report at 12.

Discussion

1. Number or Symbol to be Used; Location of Marking. Numerous commenters have noted that the theft prevention standard is only as good as the replacement part-marking standard, because motor vehicle thieves will seek to obliterate identifying unique VIN's on original equipment parts and to replace those VIN's with counterfeit logos and "R" designations. It may be far easier repeatedly to counterfeit a single letter and logo than it is to counterfeit a new unique VIN for each stolen part.

To address the problem of criminals removing VIN's and replacing them with an "R" and a logo, NHTSA is proposing that the *standard* for replacement part identifiers be identical to that for major parts, (i.e., permanent, non-transferable, leave physical evidence if altered or removed, etc.) but that it be combined with a requirement that a different *location* be selected and exclusively used for placement of the "R" and logo. Comments are requested on the burdens that such a requirement would place on manufacturers who produce replacement parts, but not original equipment parts. Such manufacturers would have the burden of learning the location of the theft standard identification on original equipment parts.

If a different location must be selected for replacement part markings, it would be easier for law enforcement officials to discern that a replacement marking has been improperly placed on an original equipment part. It would not be possible, for example, to remove a unique identifier label and place a "replacement part" label over the same spot on the part to obscure the fact that the part's marking had been tampered with.

2. Cost Limitations of the Replacement Part Standard. Sec. 604 of Title VI provides that costs of complying with the standard for any manufacturer of replacement parts shall not be in excess of a reasonable amount, less than $15, per replacement part. The agency must specify that amount in the standard.

Discussion

The agency notes that while the $15 limitation applies to the entire vehicle, the "reasonable lesser amount" limitation applies to each replacement part. This difference in approach presumably reflects factors such as the difference in economies of scale between original parts manufacturers and replacement parts manufacturers. Comments are solicited regarding what "reasonable lesser amount" should be specified and whether it should be the same for each covered part. Comments are specifically requested on the appropriateness of the following amounts: $1 and $5 per part. The amount ultimately specified would be adjusted for inflation in the same manner as the $15 per car cost limitation, and the agency would be limited to a standard that reasonably could be complied with at that per part cost.

Commenters at the public meeting appeared to concur with the agency's interpretation that the language in Sec. 604 gives NHTSA flexibility to determine, for example, that because of the special danger posed by counterfeit replacement part logos, it is necessary to require use of a more costly technology such as stamping for the marking of replacement parts.

The proposed rule does not presently contain such a requirement, but interested parties are invited to comment on that option.

IV. Designation of High Theft Lines; Selection of Such Lines To Be Covered by the Standard

The theft prevention standard applies only to high theft lines. there are three different groups of vehicle lines that may qualify as high theft lines. The first group consists of those "existing lines" (i.e., lines introduced before the beginning of the two calendar years immediately preceding the year in which the standard is promulgated) which are determined to have had a "new passenger motor vehicle theft rate in the 2 calendar years immediately preceding the year in which the final standard is promulgated which exceeds the median theft rate for all new passenger motor vehicle thefts in such 2–year period." Sec. 603(a)(1)(A).

Subsection (b)(5) of 603 provides that "new passenger motor vehicle thefts', when used with respect to any calendar year, refers to those thefts in the United States in such year which are of passenger moior vehicles with the same model-year designation as that calendar year."

The second group consists of lines which are introduced into commerce in th United States at any time after the beginning of that two year period, and which are "determined" by agreement between the manufacturer and the agency (or by the agency alone, if the two are unable to reach agreement) to be "likely to have a theft rate exceeding" the median. Sec. 603(a)(1)(B).

The third group includes those low theft lines or likely low theft lines containing major parts that are interchangeable with the majority of the major parts of a line subject to the standard. An exception is made for a group of low theft lines produced by a manufacturer if they account for more than 90 percent of the production of all lines of that manufacturer containing those interchangeable parts. Sec. 603(a)(1)(C).

For manufacturers producing more than a combined total of 14 high theft lines in the first and second categories, Sec. 603(a)(3) provides that, "of those passenger motor vehicle lines initially introduced by a manufacturer into commerce in the United States before the effective date of the standard, no more than 14 of the lines of any manufacturer shall be selected as high theft lines." In such cases, Sec. 603(a)(2) provides that the "lines which are to be subject to the standard may be selected by agreement between the manufacturer and the Secretary. If the manufacturer and the Secretary disagree as to such selection, the Secretary shall select such lines after notice to the manufacturer and opportunity for written comment . . ."

Discussion

The agency interprets the "selection-by-agreement" provision in Sec. 603(a)(2) to be applicable to those situation in which a manufacturer has more than fourteen high theft lines introduced into commerce before the effective date of the standard.

In those cases where a manufacturer is found to have less than fourteen high theft lines, the agency intends to "select" them all without negotiation. Although the wording of the statute is ambiguous, comments made by manufacturers at the public meeting and in other discussions with the agency indicated that this intepretation is consistent with the intent of Congress. In view of the timetable for implementation of the standard established by the drafters, it is unlikely that Congress contemplated that a separate agreement would have to be reached with each manufacturer having high theft lines where there is no necessity to select among that manufacturer's high theft lines.

For manufacturers having more than fourteen high theft lines introduced into commerce before the effective date of the standard, the agency proposes to establish criteria to be applied in selecting among those lines to determine which ones should be covered by the standard. Rather than incorporate these criteria into the Rule itself, NHTSA proposes to adopt them as binding policy and publish them in an Appendix to the Rule. Comments are solicited on the criteria themselves as well as on the appropriateness of this approach.

Proposed criteria for selection of each of these three categories of "high theft lines" are discussed in turn below. Comments are additionally invited regarding the relative priorities that should be given to high theft lines as between the three groups of lines.

A. Existing Lines

For existing car lines (defined in Secs. 601 and 603(a)(1)(A) as lines introduced into commerce before the beginning of the two year period consisting of the two calendar years immediately preceding the year in which the final standard is promulgated), the statute provides that the following procedures are set to be followed in order to select which lines are to be covered by the theft prevention standard:

1. Determine the theft rate for each line.

The theft rate for a line is expressed by a fraction, whose numerator and denominator are as follows:

NUMERATOR=

new passenger motor vehicle thefts for that line in the two calendar years immediately preceding the calendar year in which a final rule is promulgated

DENOMINATOR=

production volumes of all passenger motor vehicles of that line (as reported to the EPA) which were produced in the two model years having the same model-year designations as the two calendar years immediately preceding the calendar year in which the final rule is promulgated.

Discussion

To make the theft rate determinations, the agency had to make tentative selections of data bases regarding car thefts and production. There were two data sources for nationwide thefts available for NHTSA's consideration: the National Crime Information Center (NCIC), maintained by the Federal Bureau of Investigation, and the National Automobile Theft Bureau (NATB), an independent organization funded mainly by insurance companies. NHTSA examined the merits of both systems and tentatively decided to use NCIC data in determining the value of the numerator in the theft rate fraction. This agency believes that the NCIC system has two advantages over the NATB system. First, the NCIC system includes self-insured and uninsured vehicles. Second, it includes vehicles that are recovered within the first 24 to 48 hours of theft. By contrast, the NATB system does not record the theft to those quickly recovered vehicles except in the few states where entry of those thefts is mandatory. In choosing the NCIC system, NHTSA also considered Congressional intent and public comments. The Committee Report (at 15) indicates a preference for using government provided data. Although NHTSA initially had some concern regarding the accuracy and comprehensiveness of NCIC data, public comments, particularly those by NCIC representatives, have eliminated these concerns.

In determining which NCIC data to use, the agency interpreted the definition of "new passenger motor vehicle thefts" when used with respect to any calendar year, to mean that, for the purposes of making theft rate calculations, it is to include, for example, 1983 model-year cars stolen in calendar year 1983, and 1984 model-year cars stolen in calendar year 1984.

NHTSA's interpretation of that definition appears to rule out inclusion of 1983 model-year cars stolen in 1984, and 1984 model-year cars (some of which will be on the road before calendar year 1984) stolen in 1983. The agency recognizes that this definition may result in a skewing of the data relied upon for determining theft rates, since some manufacturers may begin their model year earlier or later than others, resulting in a higher- or lower-than normal number of their cars being on the road and subject to theft during the relevant calendar year.

Comments are solicited regarding any inequities which may result from this anomaly. Comments are also solicited on any alternative interpretation of the legislative language that can be supported.

A second problem with the accuracy of the data base may arise because the numerator of the fraction may include vehicles stolen that were not included in the EPA production data which comprises the denominator. Some vehicles reported stolen in the United States (and hence appearing in the NCIC's data base that will make up the numerator) have been imported into the U.S. by parties other than the manufacturer under the bonding procedures of the Safety Act (i.e., "direct imports"). Such vehicles would not be "counted" by the original manufacturers when those manufacturers supply domestic production totals to the EPA.

The agency has identified two possible ways for adjusting the data to correct for the imbalance that may result. The first is to eliminate from the numerator all vehicles reported stolen that do not have a U.S. VIN. Direct imports are labeled with Euro-VINs, and it is the Euro-VIN that has been used by the NCIC in recording reported thefts of these vehicles. Removing such cars from the numerator would mean that the theft rate for the lines affected would be calculated based on the line's U.S. authorized dealership sales only; other vehicles of the same line would be omitted from both numerator and denominator. The agency has tentatively concluded that this is the preferable approach, and is proposing to use this method in calculating the theft rate.

This approach is attractive because it is consistent with the statute's instruction to the agency that it adjust the NCIC figures for accuracy, as appropriate. However, a possible problem may affect the accuracy of the results obtained. If for any reason the theft rate for direct imports within a vehicle line differs significantly from the theft rate for the vehicle line as a whole, elimination of all direct imports from the numerator and denominator would skew that line's theft rate in relationship to other lines. However, the agency believes that this is unlikely to occur, and has seen no evidence to suggest that the theft rates of direct imports are anything other than proportional to their numbers in the vehicle population.

An alternative approach would be to augment the denominator's production figures by adding to it the number of vehicles (of the appropriate model years) of the line in question which have been certified as in compliance with the Safety Act and imported into the U.S. during the same calendar year, and which are therefore "on the road" and subject to theft in the U.S. during the relevant time period. However, the statute instructs the agency to use only the EPA production figures in the denominator and does not expressly authorize the agency to amend these figures even if doing so will improve their accuracy.

The agency solicits comments on the two approaches outlined above—and on the third possible approach, which would be to leave the formula undisturbed and presume that the inaccuracies are not statistically significant.

A third issue related to the accuracy of the theft rate calculations arises because of the time delay in receiving accurate end-of-year production figures from manufacturers. The NHTSA is instructed to rely on production data provided to EPA and will, presumably, need final figures for 1983 and 1984 to calculate the denominators of the theft rate fraction. Yet, the final 1983 figures had still not been provided by all manufacturers as of December 1984.

To address this problem, the agency proposes to rely on the 1984 estimated production data for domestic vehicles appearing in the November 19, 1984 issue of Ward's Automotive Reports Weekly for all car lines that have not submitted final production data to EPA. NHTSA has been informed that the EPA regularly relies on these data in the absence of final figures from manufacturers, and that the figures are more accurate than the manufacturers' mid-model year estimates provided to the EPA. Manufacturers who view the figures as inaccurate are free to suggest a more accurate source of data or to submit final production data as soon as possible to the EPA and to the NHTSA. The latter course of action would enable the agency to rely on the manufacturers' own totals.

Because no comparable listing appears in Ward's for imported vehicles, the agency proposes to rely on the mid-model year projections of total U.S. sales that are submitted by foreign manufacturers to the EPA in those cases where final production figures are not yet available. Comments are invited regarding whether this approach will provide NHTSA with the most accurate possible data base for calculating vehicle theft rates in accordance with the statutory formula.

To summarize: If the statute's formula is strictly applied (and assuming that a final rule is promulgated in 1985) the following fraction will determine the theft rate for an existing line:

$$\frac{\text{MY 83 cars stolen in CY 83} + \text{MY 84 cars stolen in CY 84}}{\text{EPA production volume for MY 83} + \text{EPA production volume for MY 84}}$$

2. Determine the median theft rate.

Sec. 603(b)(2) provides that the median theft rate is "that theft rate midway between the highest and the lowest theft rates" for car lines (as determined above). If an even number of theft rates is determined to exist, "the median theft rate is the arithmetic average of the two adjoining theft rates midway between the highest and the lowest of such theft rates."

3. Determine high theft lines.

Sec. 603(a)(1) provides that all lines with theft rates above the median are high theft lines.

4. Select high theft lines to be covered by the standard.

Discussion

(a) Criteria. The agency proposes that the following criteria, set forth at the end of the notice in Appendix B, be applied to "existing high theft lines" for the purpose of selecting such lines for coverage under the standard. As outlined above, the criteria would be applied only in those cases in which a manufacturer produces more that fourteen high theft lines. (Note: many of these criteria were drawn from the record of the public meeting):

i. How close to the median theft rate does the line fall? Vehicles close to the top of the list should be given higher priority than those on the margin.

ii. How many of such vehicles are scheduled to be produced in the upcoming model year or years? Obviously, if a vehicle line involves a large number of vehicles, the overall impact of the theft prevention standard will be greater and the vehicle line should be given higher priority. Alternatively, if a line is scheduled to be discountinued in the near future, it should be given lower priority.

iii. Is the line's design going to be altered materially, such as through downsizing? If so, the new car design's parts will not all be interchangeable with earlier model years and, by beginning to mark the line in the new model year, all vehicles with interchangable parts within the car line will be identified from the outset. Such lines, like entirely new lines to be discussed below, should receive the highest priority.

iv. Does the line have a higher-than-average whole-vehicle recovery rate? If the whole-vehicle recovery rate is significantly higher than average, it might mean that the particular line is often stolen for joyriding, or that it is popular with car rental agencies whose vehicles are often abandoned by customers unable to pay. If that is the case, the line should receive a relatively low priority in selection because marking the parts wouldn't address the problem of vehicle theft attributable to professional thieves.

v. Is the manufacturer likely to begin installation of an anti-theft device for which it intends soon to seek an exemption from the standard? If the manufacturer can demonstrate a strong likelihood that it will seek and procure and exemption based on installation of a theft prevention device as standard equipment, then the vehicle should be given a relatively low priority. It will be protected by other means, and since subsequent model years' parts would not be marked, the marking system will be devalued even for the interim period during which the standard was applicable. (Comment is requested on whether this criterion should be applied before the agency has completed the rulemaking necessary to implement the provision in Title VI for exempting vehicles with anti-theft devices.)

vi. What is the status of models with interchangeable parts? If the line in question does not have parts that are interchangeable with *any* non-covered lines, it should be given higher priority because marking is likely to be the most effective for such a line. Decreasing priority should be given to vehicles based on the number (i.e., total production number, not number of lines) of other vehicles which have interchangeable parts but which are not covered by the standard.

Selection of vehicles to be covered is not expected to be an exact science. The agency tentatively proposes to apply the above criteria, and to "rank" a manufacturer's vehicles accordingly, in making its selections.

Comments are solicited as to whether a more numerically precise method would better serve the goals of Title VI; for example, it has been suggested by one commenter that these criteria be given numerical values and the vehicles scoring highest be selected for coverage under the standard. The agency also solicits comments on any additional criteria which should be taken into account in selecting high theft lines for coverage.

(b) Procedures. Procedures to be used in reaching agreement with manufacturers regarding which high theft lines are to be covered by the theft prevention standard. The following is a summary of the procedures that NHTSA plans to publish for comment in a subsequent proceeding:

i. A manufacturer with more than fourteen existing high theft lines as determined by the statute's formula and the agency would meet to discuss the application of the criteria outlined above to all the manufacturer's high theft lines and the rationale for the resulting ranking.

ii. If the agency did not agree with the manufacturer's rankings, it would provide the manufacturer with its own rankings and the rationale for those rankings.

iii. The manufacturer could request the agency to amend them.

iv. The agency would make a final selection of covered lines. That selection would be a final decision of the agency, and hence would be subject to a review by the courts.

(c) Lead Time. Sec. 603(a)(4) provides that the agency shall prescribe procedures designed to assure that, to the extent practicable, selection of lines which were introduced initially before the effective date of the standard and are to be subject to the standard should be completed at least six months before the first applicable model year beginning after such selection.

Sec. 603(a)(5) specifies that "(a) manufacturer shall not be required to begin to comply with the standard pursuant to any selection [done in accordance with the agreement process discussed above] for a model year beginning earlier than 6 months after the date of selection."

Sec. 602(a)(4) provides that the theft prevention standard "shall take effect not earlier than 6 months after the date such final rule is prescribed," unless NHTSA finds that an earlier date is in the public interest.

Finally, sec. 602(a)(5) provides that "[t]he standard may apply only with respect to . . . major parts which are installed by the motor vehicle manufacturer in any passenger motor vehicle which has a model year designation later than the calendar year in which such standard takes effect."

The agency anticipates that the above-noted constraints on lead time and effective dates will lead to the following implementation schedule:

The agency intends to publish, simultaneously with the theft prevention standard, those "selections" of covered lines which do not require reaching agreement with the manufacturers. In addition, the agency plans to publish a Notice of Proposed Rulemaking that outlines the requirements for submission of information necessary to "select" likely high theft new lines, and to "select" among those high theft lines of manufacturers producing more than fouteen of such lines.

The agency proposes that, in accordance with sec. 602(a)(4), the theft prevention standard take effect six months after promulgation. As explained below, the practical effect of such an effective date would be that manufacturers are required to begin marking vehicles in model year 1987.

Domestic manufacturers generally begin new model years in August to October of the preceding calendar year. Foreign manufacturers may gear introductions to the calendar year. It is the agency's view that "selection" of covered lines by this fall will mean that the standard will go into effect for all 1987 models introduced in calendar year 1986, so long as those introductions are at least 6 months after this fall. This conclusion is based on the statute's constraints outlined above, coupled with the following considerations:

The time necessary to complete the rulemaking process and the "selection" process mean that, for some manufacturers at least, model year 1987 is the first year in which the standard could legally be applied. The agency considers it inequitable to require those manufacturers whose high theft lines can be "automatically" selected to comply sooner than those manufacturers having more than fourteen covered lines (selection of which must await the rulemaking), and the committee report clearly states that "(t)he standard cannot apply to a car in the middle of the model year." Report at 11. It therefore seems appropriate uniformly to apply the standard beginning in model year 1987. Comments are invited regarding the timetable outlined above.

The agency encourages manufacturers of existing lines that have been selected at the time the final theft prevention standard is promulgated to begin voluntarily to comply with the standard in model year 1986, as well.

B. New Lines

Sec. 601[4] defines as a "new line" any line introduced into commerce on or after the beginning of the two calendar years immediately preceding the calendar year in which a final rule is promulgated. Assuming a final rule is promulgated in 1985, the agency believes that new lines would include any lines introduced into the marketplace on or after January 1, 1983.

Sec. 603(a)(1)(B) instructs the agency to determine which new lines are "likely to" have high theft rates, and then to select such lines for coverage under the anti-theft standard by agreement with the manufacturer. If no agreement can be reached, the agency will "select" the line(s) itself.

Discussion

As with the criteria outlined above (some of which will also be applicable to selection of likely high theft "new lines"), the agency is proposing to establish criteria for making selections and to publish them as an Appendix to the final rule. Procedures for selecting likely high theft lines are summarized below and NHTSA plans to publish for comment in a later proceeding.

1. Criteria. Proposed criteria for determining whether a line is "likely to" have a high theft rate (Note: many of these criteria were suggested by participants at the public meeting):

a. What is the anticipated retail price of the vehicle?

b. What is the vehicle's "image" (e.g., sporty; low-priced; suitable for a family car; exotic; etc.)? The answer to this question will of necessity be partially subjective, but will be based in part on the manufacturers' views regarding styling, equipment and performance as well as planned advertising campaigns or other indicators of the marketing strategy for the vehicle.

c. Against what other vehicles does the manufacturer expect the new line to compete? If those competing vehicles have high theft rates, the new line can be expected to be similarly subject to high theft rates.

d. What existing car line (and hence purchasing audience) of the manufacturer's own lines does the new line replace, if any? If the existing line has a high theft rate, it is more likely that its successor will have the same.

e. Are there any new devices or systems—perhaps short of a vehicle anti-theft device but nevertheless effective—that can be expected to reduce the theft rate?

f. If any theft data are available, what do they reveal? (This criterion requires that the agency factor in the usual months-long delay that generally occurs after introduction of a new line, while thieves become familiar with the vehicle's theft-prevention system and learn to disable it. Nevertheless, vehicles demonstrating a high theft rate immediately upon introduction into the marketplace would be likely candidates for coverage under the standard.)

Unlike the selection of existing high theft lines for coverage under the standard, selection of any new line for coverage will have to be done on a case-by-case basis through agreement between manufacturer and agency with the agency making final determination in case agreement cannot be reached.

2. Procedures. The agency tentatively intends to rely on the following procedure for the selection of new lines likely to have high theft rates. The selection process would begin long enough in advance for a final selection to be reached eight months before scheduled start production. The initial selection would be made by the agency based on available information. If a manufacturer objects to the selection of one of its lines, it would be permitted to seek reconsideration.

The NHTSA is aware that sensitive confidential business information will have to be made available to the agency to facilitate selection of new lines likely to have high theft rates. It is the agency's current assessment that its existing confidentiality regulations, at 49 CFR 512, will be adequate to protect such information; however, comments are solicited regarding any confidentiality issues needing further agency attention.

C. Lines With Interchangeable Parts

Sec. 603(a)(1)(C) defines as "high theft lines" those low theft lines or likely low theft lines containing major parts which are interchangeable with the majority of the major parts of a line subject to the standard. An exception is made for such lines if the low theft lines account for more than 90 percent of the production of all lines which contain those interchangeable parts.

Discussion

Based on comments made at the public meeting, the agency believes that "interchangeability" should be fairly broadly construed and should not require that parts be absolutely identical to be regarded as "interchangeable".

As one commenter pointed out, thieves would prefer to steal a car for which a part's interior trim need not be redone in order to serve as an adequate replacement part. However, once it becomes known that, for example, the front door of an interchangeable line has different trim but *is not marked with an identifying number*, the interchangeable vehicle will become the target of theft. Under this analysis, it is appropriate to read the term "interchangeable" broadly; otherwise, this year's low theft model will, if only broadly interchangeable and unmarked, be next year's high theft model anyway.

NHTSA intends soon to undertake a rulemaking, as mandated by 603(c), to "require each manufacturer to provide information necessary to select . . . the high theft lines and the major parts to be subject to the standard." At that time, the agency hopes to establish the form and manner in which manufacturers must provide data regarding interchangeability of parts.

Once interchangeability has been determined, the agency proposes to apply the mathematical formula spelled out in sec. 603(a)(1)(C). It should be noted that interchangeable lines introduced into commerce before the effective date of the standard are not "counted" against the initial fourteen-line limit for each manufacturer. *See* sec. 603(as)(3). With respect to new lines, the selection of covered interchangeable parts' lines will be based on an initial decision as to whether a line is likely to be high theft; if so, interchangeable lines will be covered unless the statute's formula exempts them. The agency intends to make selections of new and interchangeable-part high theft lines simultaneously, in accordance with the leadtime schedule set out in IV.A.4. (iii) above.

V. Certification of Compliance With the Theft Prevention Standard

Sec. 606(c)(1) provides that "[e]very manufacturer of a motor vehicle subject to the standard . . . and every manufacturer of any major replacement part subject to such standard, shall furnish at the time of delivery of such vehicle or part a certification that such vehicle or replacement part conforms to the applicable motor vehicle theft prevention standard." It further provides that the agency may issue rules prescribing the manner and form of such certification.

Sec. 607(a) prohibits any person from importing into the United States any motor vehicle or part covered by the standard, unless it is in conformity with the standard. The committee report states that "[a]ny motor vehicle not in compliance will be refused admission into the United States." Report at 18.

The committee report indicates that the agency should take "into consideration its present certification practices in the case of safety" in

determining the method and form of certification for the theft prevention standard. *Id.*

A. Who May Certify

Title VI provides, as noted above, that every manufacturer of a motor vehicle or motor vehicle replacement part covered by the standard shall furnish certification of compliance with the theft prevention standard at the time of delivery, and that the certification shall accompany the vehicle until the delivery of the vehicle to the first purchaser. *See* Sec. 606(c)(1).

"Manufacturer" is defined in section 2(7) of the Motor Vehicle Information and Cost Savings Act as "any person engaged in the manufacturing or assembling of passenger motor vehicles or passenger motor vehicle equipment including any person importing motor vehicles or motor vehicle equipment for resale."

Discussion

While it is clear from the statute that compliance with the theft prevention standard must be certified by the "manufacturer," the question arises whether each and every "manufacturer," as that term is defined in section 2(7), should be permitted to certify that a vehicle or part is in compliance. In other words, should the authority to certify compliance be limited by the agency to some narrower subset of the universe of "manufacturers"?

Some of the participants at the pubic meeting argued strenuously that the power to certify vehicle or replacement part compliance with the theft prevention standard should be granted only to the original manufacturers of such vehicles and parts.

A rule restricting power to certify compliance to original manufacturers would effectively preclude "direct importers"—individuals who are manufacturers under the statutory definition because they "import motor vehicles or motor vehicle equipment for resale"—from bringing vehicles into compliance and so certifying. This, in turn, could significantly affect the market for "direct imports," which consists primarily of European luxury vehicles not originally manufactured in accordance with U.S. safety standards.

Both the National Traffic and Motor Vehicle Safety Act of 1966 (the Safety Act) and the Clean Air Act and their attendant regulations currently allow for the importation of such non-complying vehicles under bond. Direct importers then make changes in or add the equipment necessary to bring the vehicles into compliance with U.S. law. The vehicles are then "certified" as in compliance by the importer/manufacturer to the satisfaction of NHTSA and EPA, and the customs bond is liquidated. This system was anticipated by Sec. 108(b) of the Safety Act, which specifies that the Secretary may issue regulations allowing the importation of non-complying vehicles subject to terms and conditions (such as the furnishing of a bond) that will ensure that the vehicles are brought into compliance or exported.

Proponents of the original-manufacturer-only approach to regulating compliance with Title VI (primarily law enforcement personnel and representatives of European vehicle manufacturers and their authorized dealers) made several arguments as to why the theft prevention standard should be treated differently from the safety and emissions standards, for which importer/manufacturers are currently permitted to certify compliance.

First, it was argued, the prosecutorial goals of the statute would best be served by limiting the number of persons who are legitimately in possession of the tools and equipment to mark vehicle parts in accordance with the theft prevention standard. The broader the distribution of the marking technologies, they argued, the less secure from tampering and counterfeiting the system will be.

A former prosecutor (now representing a vehicle manufacturer) argued, for example, that if only original manufacturers can certify compliance, then suspected thieves found in possession of marking technology (such as blank labels or etching equipment) could not argue that they had a legitimate reason for possessing the equipment; i.e., they could not claim to be importers for resale, or "manufacturers," intending legally to mark legitimate imports. Prosecutors could more easily prove criminal intent based on possession of the marking equipment. Evidence of fampering or alteration of identifying markings could more easily be tied to persons in possession of such equipment if it is not widely available.

The 3–M Corporation's representative expressed concern that producers of security labelling technology like 3–M are able to guarantee the usefulness of their product only when the distribution of the product can be tightly controlled. If they are required to make their security tape more widely available in the marketplace, the system's integrity and uniqueness will be more easily compromised.

It was further argued that Congress had important prosecutorial goals in mind when it did not provide for bonding and temporary importation of non-complying vehicles as it had under the Safety Act. In fact, earlier versions of the legislation contained bonding provisions which were dropped before the law's enactment.

While the Safety Act permits the temporary importation into the U.S. of non-complying vehicles, the committee report on the Theft Prevention Act states that vehicles not in compliance with the Theft Prevention Act will be "denied admission to" the United States. This, it was argued, showed an intent to prevent importation under any circumstances of non-complying vehicles.

Moreover, while Title VI neither expressly endorses nor repudiates the definition of "manufacturer" spelled out in section 2(7), it was argued that the wording of certain portions of the Title indicates Congress did not contemplate that every manufacturer (as the term is defined in section 2(7)) would be involved in complying with the theft prevention standard. Proponents of this narrower reading pointed to the language of sec. 602(a)(1), which provides that the standard will apply to "the covered major parts *which are installed by manufacturers* into passenger motor vehicles," and to 602(d)(1), which also refers to "major parts *installed by the motor vehicle manufacturer*". (Emphasis added to both.) It was argued that importer/manufacturers may *alter* but do not *install* major parts, and that Congress intended by these provisions to refer only to original or assemblying manufacturers. Senator Percy, the original sponsor of the Senate's anti-theft bill, stated during Floor debate that, "[u]nder the bill, motor vehicle manufacturers would be required to apply these numbers *before each vehicle leaves the factory.*" (Emphasis added.) (130 Cong. Rec. S13585, Oct. 4, 1984). This statement, it was argued, supports a narrower reading of Congress' intent.

Proponents of the narrow reading of the statute recognized that limiting compliance certification authority to original manufacturers would adversely affect certain parties—i.e., both individuals and direct importers would be prevented from bringing non-complying covered vehicles into the U.S They argued, however, that the adverse impact must be balanced against the adverse impact on the overall theft prevention program if parties other than original manufacturers were given certification authority.

They argued that persons purchasing imported vehicles from the original manufacturer's authorized dealers would be harmed if there is a loss of central control over the marking authority and technology. If numerous types of markings and technologies could legitimately be present on "converted" imports of a given car line, police would find it more difficult to distinguish the genuine from the forged identifiers. Criminals would therefore find it less risky to steal those lines of cars and tamper with the original manufacturer's markings on manufacturer-authorized dealers' vehicles, because investigation of such thefts would be more difficult. This, it was argued, would make imported vehicles still more attractive to thieves than they already are. Because the presence of only a small number of illegitimately-marked vehicles of a particular line can compromise the integrity of the entire marking program for that line (by providing defendants with the defense that possession of a questionably-marked vehicle part is inconclusive), it was argued, the adverse impact on the few (manufacturer/importers) should not be permitted to impose a hardship on the many (those who purchase from original manufacturers).

Finally, it was argued, permitting the widespread marking of vehicles would encourage the importation of stolen vehicles by lending stolen and "marked" vehicles a false imprimatur of legitimacy.

Proponents of permitting certification of compliance by persons other than the original manufacturer, primarily representatives of direct importers, argued strenuously that a broader approach more effectively serves the purposes of the Act.

First, they argued, the statute was clearly intended to have only a minimal economic impact on the auto industry, of which they are an important, if small, competitive segment. Statutory limitations on the cost of the standard, and the requirements that the standard be practicable, reasonable and achievable, indicate that any standard which would put a substantial segment of the market out of business would not be consistent with Congressional intent.

Proponents of a broader authority to comply and certify under the theft prevention standard argued that NHTSA could devise a workable system to achieve the Congress' anti-theft goals without imposing harsh economic consequences on direct importers. While the statute does not expressly authorize importation under bond (for marking in the United States), they argued, it does not expressly forbid this approach if it makes sense for the agency to allow it. Since vehicles are now routinely imported under bond for conversion to U.S. safety and emissions standards and then certified, they contended, there is no reason why that system cannot be expanded to include compliance with the theft prevention standard, as well.

Alternatively, they proposed that either the Department of Transportation or the U.S. Customs Service could establish a program for the controlled issuance of security labels or other identifiers to supply to manufacturers other than original manufacturers. If the government were to control access to the marking system, and to require, for example, photographic evidence that each label had been applied in compliance with the standard, then concerns about the integrity of the system could be met without unnecessarily restricting direct imports.

The proponents further argued that, while "importation" of uncertified vehicles may arguably be prohibited by Title VI, a vehicle need not be defined as "imported" until a posted customs bond has been liquidated and the vehicle in question has passed into commerce in the United States. Thus, they maintained, a vehicle could be brought to the U.S. but not actually "imported" by an importer/manufacturer under the statute; brought into compliance while under bond on U.S. soil; certified by the manufacturer; and then "imported" once the bond had been liquidated.

Finally, they argued, it is inconsistent with the United States' international trade policies to erect non-tariff barriers to the entry of foreign goods.

After giving careful consideration to the arguments made at the public meeting and in other discussions with affected parties, including law enforcement and manufacturing representatives and the U.S. Customs Service, the agency has tentatively determined that the purposes of the statute will be better served if only original manufacturers are authorized to certify compliance with the theft prevention standard.

This decision is based on several considerations. First, the agency is persuaded that the effectiveness of the overall theft prevention program is only as good as its weakest link. In combating a highly organized and professional criminal enterprise, law enforcement officials must anticipate that every possible avenue for bypassing the new law will be sought out, and must act to plug as many loopholes as possible.

Limiting the legitimate possession of marking techniques to a few major manufacturers of vehicles and parts would mean that other persons in possession of such technologies can be more easily linked to their criminal enterprises. (Similarly, replacement parts covered by the standard, mostly large sheet metal or heavy duty cast parts, will tend to be produced only be established industrial manufacturers rather than by many small shops and producers. The universe of replacement part manufacturers legitimately possessing marking technologies will not include many parties not directly linked to the original vehicle manufacturers.) While the statute does not make illegal the mere possession of the marking tools or labels, possession of these instruments will be valuable evidence in a prosecutor's case if a lawful purpose for their possession cannot be argued by the defendant.

Second, the NHTSA interprets the statute's repeated references to *manufacturer's* compliance and certification as precluding DOT's issuance of secure labels in the type of government program proposed by several of the commenters. Sec. 606(c)(1) provides that "[e]very manufacturer of a motor vehicle subject to the standard . . . shall furnish at the time of delivery . . . a certification that such vehicle . . . conforms to the applicable motor vehicle theft prevention standard." The committee report directs the agency to "take() into consideration its present certification practices in the case of safety." Report at 18. In the view of the agency, government participation in assisting manufacturers with achieving compliance would be inconsistent with current practice under the Safety Act.

The responsibility for compliance with the Safety Act is entirely with the manufacturer, and the NHTSA does not "approve" designs or equipment for manufacturers. The same is true for the Motor Vehicle Theft Law Enforcement Act. This is an essential element in the regulatory philosophy of "performance standards" and self-certification (such as specified by Title VI and the Safety Act) as contrasted with "design standards" and pre-sale government type approval mechanisms. DOT should not play a role in compliance by providing labels, or otherwise assist in the process of bringing a vehicle into compliance; if it did, the agency would then become involved in accepting certification of its own compliance, since compliance would be measured in part by whether the agency had provided "complying" products (i.e.,

labels) to manufacturers. (Similarly, Customs officials would be placed in the untenable situation of issuing "complying" products and then enforcing certification of compliance at the border if that agency were to undertake the task of issuing labels or other identifiers.) This type of procedure surely was not contemplated by the drafters. It differs radically from practices under the Safety Act; no resources in the budget are available; and Title VI provides for neither additional budget authority nor authority to seek reimbursement through user fees or some other mechanism.

Third, while it is true that the legislative history indicates a combined purpose for the new law of both curbing automobile theft and "minimiz(ing) regulation of the domestic and foreign motor vehicle manufacturing industry," the agency believes that minimizing regulation at the expense of the effectiveness of the overall theft prevention program would run counter to the Congress' intent. Law enforcement officials and European manufacturers' representatives argued that a marking system known to have less integrity for the imported vehicles than for the domestic (since the original manufacturer/importer for resale issue does not arise in the case of domestically-produced vehicles) can only make all lines of imported vehicles more attractive to thieves. Moreover, the wide availability of the marking equipment would mean that domestic vehicles would also be less protected from counterfeiting and tampering.

It should be added that the agency disagrees with the argument, offered at the public meeting, that "importation" does not occur until a posted customs bond has been liquidated. The U.S. Customs Service has indicated that it does not concur with that analysis; according to the Customs Service's interpretation of the law, the vehicle is "imported" and a bond is posted only to ensure that it is later brought into compliance with U.S. standards. Liquidation of the bond indicates compliance is completed.

If only original manufacturers can apply markings and certify compliance, the enforcement and inspection burden on the agency will be vastly simplified. If the task of properly policing compliance with the theft prevention standard is not manageable, and hence is ineffectively carried out, professional criminals will swiftly learn that the system's integrity is easily breached. Once again, the prosecutorial value of the standard will suffer. Based on NHTSA's experience with the odometer tampering enforcement program, the agency believes that strict inspection and enforcement of the standard, particularly in the beginning years, is essential to the overall success of the program.

The agency notes that the importation of passenger cars not originally manufactured to comply with Federal motor vehicle safety standards (the so-called "gray market"), subject to bonding and subsequent modification to assure compliance, has increased substantially in popularity in recent years. While section 607 of the Cost Savings Act prohibits the importation into the U.S. of any vehicles subject to the theft standard which do not comply with the theft standard, the agency specifically seeks comments on whether it would be consistent with the Theft Act to construe the term "manufacturer" so as to permit entities other than the original manufacturer to certify compliance with the standard.

Commenters should discuss whether any alternative scheme is consistent with the agency's authority under the Theft Act and the Congressional intent underlying that Act. Commenters are also invited to address the effects of both the agency's proposal and any alternative certification scheme on international trade and on U.S. purchasers of foreign-manufactured motor vehicles. In particular, the agency seeks comments and data on the costs and benefits of different certification proposals, as well as on the effects of the various proposals on the avenues through which foreign-manufactured automobiles may be sold in the United States. Are there other alternatives possible within the constraints of the Theft Act that would not adversely affect the gray market?

Commenters should also provide details as to how any proposed alternative certification schemes would be structured. In particular, the agency seeks comments on whether separate certifications should be permitted for compliance with vehicle safety and theft standards, and whether such certifications could be made by different entities. The agency also requests commenters to specify what type of manufacturer "logo" would be used by entities other than original equipment manufacturers. The agency is particularly interested in receiving comments on the effects of any alternative certification scheme on law enforcement agencies, including the use of Euro-VINs rather than U.S. VINs in theft markings, the ability to trace persons other than original equipment manufacturers, and whether inexpensive marking systems such as paper labeling could continue to be used for marking purposes. The agency also seeks comments as to whether parties other than original manufacturers could comply with the standard for less than the $15 cost cap established by the Act, and whether an alternative certification scheme would require modifications to the performance standard for theft markings that would increase compliance costs for original manufacturers.

Because the agency is tentatively taking the position that only original manufacturers should be allowed to certify compliance with the standard, it need not address in detail the question of what number or identifier, other than a U.S. VIN, would be placed on the major parts of vehicles not assigned U.S. VIN's.

With respect to vehicles which are not in other respects designed to be in compliance with U.S. safety and emissions standards, comments are invited as to whether foreign manufacturers should be permitted to comply with the theft prevention standard via use of the Euro-VIN initially assigned to their vehicles, and then to certify compliance through affixation of a certification plate or label comparable to the U.S. certification plate (as explained further below) but limited to certification of compliance with the theft prevention standard alone rather than in conjunction with the safety and bumper standard compliance certification statements. Such a system would ensure that a vehicle retains its "signature" VIN, which all interested parties appear to consider essential for law enforcement purposes. At the same time, it would permit continued importation and "conversion" of direct imports without compromising the integrity of the parts-marking program if foreign manufacturers so desired. Comment is also requested on whether foreign manufacturers would be likely to certify compliance with the theft prevention standard alone. Commenters should discuss why foreign manufacturers would or would not be likely to so certify.

B. Manner of Certification

1. Major parts.

At present, manufacturers are required under the Safety Act to affix a permanent plate or label to each vehicle providing a number of pieces of information including the following statement:

"This vehicle conforms to all applicable Federal motor vehicle safety

standards in effect on the date of manufacturer shown above."

In the case of passenger cars, the expression 'and bumper' has been included in the statement following the word 'safety' for all vehicles manufactured on or after September 1, 1978.

The agency proposes to require that, for vehicles covered by the theft prevention standard, the statement on the certification plate be modified to read:

"This vehicle conforms to all applicable Federal motor vehicle safety, bumper, and theft prevention standards in effect on the date of manufacture."

The legislative history of Title IV, which urges the agency to consider its Safety Act certification method and which stresses minimization of the regulatory burden on manufacturers (see committee report at 2) favors this simple approach to certification. As discussed above, since the agency intends to limit to original manufacturers the authority to certify compliance, requiring alterations in the certification plate should prove feasible for all affected parties.

2. Replacement Parts.

Once again relying on the committee report's instructions that the agency take into account current certification practices under the Safety Act, NHTSA proposes that certification of compliance with the standard for replacement parts be achieved by marking each replacement part with the symbol "DOT". This method of certification can easily be combined with the marking requirement of the theft prevention standard itself. The DOT symbol should be placed immediately adjacent to the "R" and logo required by the theft prevention standard.

While a member of the public suggested at the public meeting that the agency permit crates or boxes containing replacement parts be marked, instead of the parts themselves, with a "DOT" for the purposes of certification, the agency has tentatively rejected this proposal for several reasons.

First, most or all of the major parts to be covered by the standard are too large to be shipped in boxes or crates. Certification by means of marking the shipping containers, while appropriate for small parts such as lamps, brake hoses or seat belts, is impracticable when each part is likely to be shipped separately or to be separated rapidly from any crate or box in which it may have been shipped.

Second, the law enforcement officials who commented on this issue suggested that the value of the certification lies in its being present and visible on the major replacement part at the time an inspection is undertaken. If the certification disappears with the packaging material, its value as legal evidence will be lost because its absence will have no significance.

NHTSA proposes to adapt the language of the certification standard for motorcycle helmets, at 49 CFR 571.218 S5.6.1. The standard would provide that "the symbol DOT constitutes the manufacturer's certification that the replacement part conforms to the applicable theft prevention standard."

VI. Regulatory Impacts

A. Costs and Benefits to Manufacturers and Consumers

The agency has determined that this rulemaking should be classified as significant under the Department's regulatory policies and procedures, but not as a major rulemaking within the meaning of E.O. 12291. A Preliminary Regulatory Evaluation (PRE) is being placed in the public docket simultaneously with the publication of this Notice. A copy of the Evaluation may be obtained by writing to: National Highway Traffic Safety Administration, Docket Section, Room 5109, 400 Seventh Street, SW., Washington, D.C. 20590.

The Department's determination that the proposed rule is significant is based on the costs that the rule will impose on manufacturers, as well as on the benefits (in terms of reduced thefts, increased vehicle recoveries, and lower insurance premiums) that are anticipated from its promulgation. The rule is further expected to affect "direct imports," possibly resulting in a significant reduction of the market for those services.

As discussed in more detail in the PRE, the agency estimates that approximately 43% of all cars produced would be selected as high theft models subject to the standard. Assuming 10 million passenger car sales per year, 4.3 million cars annually would be covered. Costs of compliance are estimated at $8.40 per vehicle for stamped identifiers, and $3.60 per vehicle for label identifiers. The total annual fleet costs are thus estimated at $35 million for stamped identifiers ($8.40 × 4.3 million), and $15 million for label identifiers ($3.60 × 4.3 million).

Benefits of the proposed rule are estimated in the PRE based on the anticipated reductions in thefts attributable to the marking system. Assuming that the marking system will reduce thefts of high theft lines by 10%, the agency estimates that 23,000 thefts per year might be averted by the rule. Since the average value per stolen vehicle is $3,900, the annual value of the assumed 10% reduction in thefts is $90 million (23,000 thefts averted × $3,900). Because no systematic data on theft reductions attributable to marking systems currently exist, this estimate should be considered preliminary.

B. Small Business Impacts

Because of the proposed rule's potential impacts on "direct importers," this action is likely to have a significant economic effect on a substantial number of small entities. Accordingly, a preliminary regulatory flexibility analysis has been incorporated in the PRE.

The NHTSA estimates that there are approximately 400 separate enterprises engaged in one or more aspects of vehicle conversion; many of those enterprises would be designated "small businesses" under the terms of 13 CFR Part 121 because they derive annual revenues of less than $3.5 million (for servicing) or less than $11.5 million (for retail sales) from those businesses. The industry association estimates that a majority of these 400 enterprises are engaged solely in vehicle conversion. Those establishments that now depend on direct importing high theft lines for a significant part of their revenues could be forced either to expand into other fields or to go out of business. Comments are invited regarding the number of enterprises and employees that would be affected by the proposed rule.

C. Environmental Impacts

In accordance with the National Environmental Policy Act of 1969, the agency has considered the environmental impacts of the proposed rule and anticipates no significant environmental effects. Accordingly, no Environmental Impact Statement will be filed.

D. Paperwork Reduction Act

The Office of Management and Budget has already approved the NHTSA requirement that vehicle identification numbers appear on all new vehicles (OMB # 2127–0051). However, since this notice proposes to expand the scope and uses of the vehicle identification number system, it would impose additional information collection requirements, as that term is defined by OMB in 5 CFR Part 1320. Accordingly, these proposed requirements are being submitted to the OMB for its approval, pursuant to the requirements of the Paperwork

Reduction Act (44 U.S.C. 3501 *et seq.*). Comments on the proposed information collection requirements should be submitted to: Office of Management and Budget, Office of Information and Regulatory Affairs, Washington, D.C. 20503, Attention: Desk Officer for NHTSA. It is requested that comments sent to the OMB also be sent to the NHTSA rulemaking docket for this proposed action.

VII. Public Comments

Interested persons are invited to submit comments on the proposal. It is requested but not required that 10 copies be submitted.

All comments must be limited not to exceed 15 pages in length. (49 CFR 553.21) Necessary attachments may be appended to these submissions without regard to the 15-page limit. This limitation is intended to encourage commenters to detail their primary arguments in a concise fashion.

If a commenter wishes to submit certain information under a claim of confidentiality, three copies of the complete submission, including purportedly confidential information, should be submitted to the Chief Counsel, NHTSA, at the street address given above, and seven copies from which the purportedly confidential information has been deleted should be submitted to the Docket Section. A request for confidentiality should be accompanied by a cover letter setting forth the information specified in the agency's confidential business information regulation (49 CFR Part 512).

All comments received before the close of business on the comment closing date indicated above will be considered, and will be available for examination in the docket at the above address both before and after that date. To the extent possible, comments filed after the closing date will also be considered. However, the rulemaking action may proceed at any time after that date, and comments received after the closing date and too late for consideration in regard to the action will be treated as suggestions for future rulemaking. The NHTSA will continue to file relevant material as it becomes available in the docket after the closing date, and it is recommended that interested persons continue to examine the docket for new material.

Those persons desiring to be notified upon receipt of their comments in the rules docket should enclose, in the envelope with their comments, a self-addressed stamped postcard. Upon receiving the comments, the docket supervisor will return the postcard by mail.

List of Subjects

49 CFR Part 541

Administrative practice and procedure, Labeling, Motor vehicles, Reporting and recordkeeping requirements.

49 CFR Part 567

Labeling, Motor vehicle safety, Reporting and recordkeeping requirements.

VIII. The Rule

1. Title 49 of the CFR would be amended by adding a new Part 541, to read as follows:

PART 541—FEDERAL MOTOR VEHICLE THEFT PREVENTION STANDARD

Sec.

541.1 Scope.
541.2 Purpose.
541.3 Application.
541.4 Definitions.
541.5 Requirements for passenger cars.
541.6 Requirements for replacement parts.
Appendix A
Appendix B
Appendix C

Authority: Sec. 101, Pub. L. 98-547, 98 Stat. 2754 (15 U.S.C. 2021); delegation of authoirty at 49 CFR 1.50.

§ 541.1 Scope.

This standard specifies performance requirements for identifying numbers or symbols to be placed on major parts of certain passenger motor vehicles.

§ 541.2 Purpose.

The purpose of this standard is to reduce the incidence of motor vehicle thefts by facilitating the tracing and recovery of parts from stolen vehicles.

§ 541.3 Application.

This standard applies to those passenger car parts identified in § 541.5(a) that are present in the car lines listed in Appendix A. It also applies to major replacement parts for those cars.

§ 541.4 Definitions.

(a) *Statutory terms.* All terms defined in sections 2 and 601 of the Motor Vehicle Information and Cost Savings Act are used in accordance with their statutory meanings unless otherwise defined in paragraph (b) below.

(b) *Other definitions.* (1) "Interior surface" means, with respect to a vehicle part, a surface that is not directly exposed to sun and precipitation.

(2) "Line" or "car line" means a name which a manufacturer applies to a group of motor vehicle models of the same make which have the same body or chassis, or otherwise are similar in construction or design. A "line" may, for example, include 2-door, 4-door, station wagon and hatchback vehicles of the same make.

(3) "Manufacturer" means the orignial producer who installs or assembles the covered major parts of the passenger motor vehicle.

(4) "Passenger car" is used as defined in § 571.3 of Part 571.

(5) "VIN" means the vehicle identification number required by Part 565 and § 571.115 of this chapter.

§ 541.5 Requirements for passenger cars.

(Proposal 1)

(a) Each passenger car subject to this standard must have an identifying number affixed or inscribed on each of the parts specified in paragraphs (a)(1) through (a)(12), if present on the vehicle.

(1) Engine.
(2) Transmission.
(3) Right front fender.
(4) Left front fender.
(5) Hood.
(6) Right front door.
(7) Left front door.
(8) Front bumper.
(9) Rear bumper.
(10) Right rear quarter panel.
(11) Left rear quarter panel.
(12) Deck lid, tailgate, or hatchback (whichever is present.)

(Proposal 2)

(a) Each passenger car subject to this standard must have an identifying number affixed or inscribed on each of the parts specified in paragraphs (a)(1) through (a)(12), if present on the vehicle, and on two additional parts, selected by the manufacturer and agreed to by the Administrator from the parts specified in paragraphs (a)(13) through (a)(16).

(1) Engine.
(2) Transmission.
(3) Right front fender.
(4) Left front fender.
(5) Hood.
(6) Right front door.
(7) Left front door.
(8) Front bumper.
(9) Rear bumper.
(10) Right rear quarter panel.
(11) Left rear quarter panel.
(12) Deck lid, tailgate, or hatchback (whichever is present.)
(13) Frame.
(14) Grille.
(15) Trunk floor pan.
(16) (Parts to be determined in the final rule which are comparable in design or function to any of the parts listed in paragraphs (a)(1) through (a)(15).)

(Proposal 3)

(a) Each passenger car subject to this standard must have an identifying number affixed or inscribed on each of the parts specified in paragraphs (a)(1) through (a)(14), if present on the vehicle.

(1) Engine.

(2) Transmission.

(3) Right front fender.

(4) Left front fender.

(5) Hood.

(6) Right front door.

(7) Left front door.

(8) Front bumper.

(9) Rear bumper.

(10) Right rear quarter panel.

(11) Left rear quarter panel.

(12) Deck lid, tailgate, or hatchback (whichever is present).

(13) [To be determined in the final rule.]

(14) [To be determined in the final rule.]

(b) (1) Except as provided in paragraph (b)(2) of this section, the number required by paragrah (a) shall be the VIN of the passenger car.

(2) In place of the VIN, engines and transmissions being marked with any derivative of the VIN on the day preceding the effective date of this standard may be marked with that derivative.

(c) The characteristics of the number required to be affixed or inscribed by paragraph (a) of this section must be identical in size and style to the characteristics of the VIN as provided for in S4.7 and S4.8 of § 571.115 of this Title.

(d) The number required by paragraph (a) of this section must be affixed by means that comply with paragraph (d)(1) of this section or inscribed by means that comply with paragraph (d)(2) of this section.

(1) Labels.

(i) The number must be printed indelibly on a label, and the label must be permanently affixed to the car's part.

(ii) The number must be placed on each part specified in paragraph (a) of this section in a location such that the number is, if practicable, on an interior surface of the part as installed in the vehicle and is protected from damage during maintenance or repair of the vechicle.

(iii) The number must be placed on each part specified in paragraph (a) of this secion in a location that is visible without further disassembly once the vehicle part has been removed from the vehicle.

(iv) The number must be placed within the same 5 cm × 5 cm region of the part, on each part specified in paragraph (a) of this section [the duration of the model year OR the duration of production of such vehicle line].

(v) Removal of the label must—

(A) Cause the label to self-destruct by tearing or rendering the number on the label illegible, and

(B) discernibly alter the appearance of the vehicle part by creating or uncovering evidence that a label was originally present or required to be present.

(vi) Alteration of the number on the label must leave traces of the original number or otherwise visibly alter the appearance of the label material.

(vii) The label and the number shall be resistant to counterfeiting.

(viii) The logo or some other unique identifier of the vehicle manufacturer must be placed on the label in a manner such that alteration or removal of the logo visibly alters the appearance of the label.

(2) Other means of identification.

(i) Removal or alteration of any portion of the number must visibly alter the appearance of the vehicle part.

(ii) The number must be placed on each part specified in paragraph (a) of this section in a location that is visible without further disassembly once the part has been removed from the vehicles.

(iii) The number must be placed within the same 5 cm × cm region of the part on each part specified in paragraph (a) of this section for [the duration of the model year OR the duration of production of such vehicle line].

§ 541.6 Requirements for replacement parts.

(a) Each replacement part for a part which is specified or selected under § 541.5 must have the registered trademark of the manufacturer of the replacement part and the letter "R" affixed or inscribed on such replacement part by means that comply with § 541.5(d), except as provided for in paragraph (c) of this section.

(b) The trademark and letter "R" required by paragraph (a) must be at least 1 cm high.

(c) The trademark and letter "R" must be placed in a location that is at least 15 cm away from the location where the original part's theft prevention marking is placed.

(d) The trademark and letter "R" must be placed within the same 5 cm × 5 cm region of the part for [the duration of the model year OR the duration of production of such replacement part].

(e) Each replacement part must bear the symbol "DOT" in letters at least 1 cm high, within 5 cm of the trademark and letter "R". The symbol "DOT" constitutes the manufacturer's certification that the replacement part conforms to the applicable theft prevention standard.

Appendix A

Passenger car lines covered by the motor vehicle theft prevention standard (reserved for inclusion of list).

Appendix B

Criteria for limiting selecting for coverage under the theft prevention standard to 14 lines of a manufacturer.

Scope

These criteria specify the factors which the Administrator will take into account in determining which high theft lines initially introduced by a manufacturer into commerce in the United States before [insert effective date of the standard] will be selected for coverage under the theft prevention standard.

Purpose

The purpose of these criteria is to enable the Administrator to select, with the agreement, if possible, of the manufacturer, those high theft lines for which the greatest benefits in reducing motor vehicle theft are likely to be achieved by being made subject to the theft prevention standard.

Application

These criteria apply to those high theft lines produced by a manufacturer of passenger motor vehicles having more than fourteen "high theft lines" that have been introduced into commerce in the United States before [insert effective date of the standard].

Methodology

For each manufacturer producing more than fourteen high theft lines that were introduced into commerce in the United States before [insert effective date of the standard], these criteria will be applied in order to rank such lines against one another. Each manufacturer's lines will be considered in relationship to other lines produced by the same manufacturer. Once the manufacturer's lines have been ranked according to which lines appear likely to demonstrate the greatest benefits in reducing vehicles theft if covered by the standard, the Administrator will select, by agreement with the manufacturer, if possible, and in accordance with the procedures set out elsewhere in this Appendix, up to fourteen of such lines for coverage under the theft prevention standard.

Criteria

1. Proximity of the line's theft rate, calculated in accordance with the statutory formula, to the median theft rate. Higher theft rate receives higher priority.

2. Approximate number of vehicles within such line scheduled to be produced in the upcoming model year. Larger total number receives higher priority. However, if the line is scheduled to be discontinued in the near future, it should be given lower priority than one which will continue to be produced.

3. Likelihood of significant changes in the design of the line (such as downsizing or restyling) that would reduce the number of interchangeable parts within such line as between the new model year and previous model years. Lines with significant style changes receive higher priority.

4. Whole vehicle recovery rate for such line in the most recent calendar year for which data are available. Lines with higher recovery rates receive lower priority.

5. Plans for installation of an anti-theft device for which the manufacturer intends to seek an exemption under Sec. 605 of Title VI. Lines likely to be exempted receive lower priority. (This criterion would not be applied until the agency has completed rulemaking regarding that exemption process.)

6. Number of lines, and actual number of vehicles produced, having interchangeable parts. Lines for which numerous low theft vehicles or lines have interchangeable parts receive lower priority.

Appendix C

Criteria for Selecting New Likely High Theft Lines.

Scope

These criteria specify the factors which the Administrator will take into account in determining whether a new line is likely to have a high theft rate and whether such line should therefore be covered by the theft prevention standard.

Purpose

The purpose of these criteria is to enable the Administrator to select, by agreement, if possible, with the manufacturer, those new lines which are likely to be high theft lines and therefore should be subject to the theft prevention standard.

Application

These criteria apply to lines of passenger motor vehicles initially introduced into commerce in the United States at any time after the beginning of the 2 calendar years immediately preceding the year in which the final theft prevention standard is promulgated; i.e., "new lines".

Methodology

These criteria will be applied to each "new line." The likely theft rate for such new line will be determined in relation to the national median theft rate, as detemined for the 2 calendar years immediately preceding the model year in which such new line will be introduced. If the new line is determined to be likely to have a theft rate above the national median, then the Administrator may select such line for coverage under the theft prevention standard.

Criteria

1. Retail price of the vehicle line.

2. Vehicle "image" or marketing strategy.

3. Vehicle lines against which the new line is intended to compete, and theft rate(s) of such line(s).

4. Vehicle line(s), if any, which the new line is intended to replace, and theft rate(s) of such line(s).

5. Presence or absence of any new theft prevention devices or systems.

6. For new lines already introduced into commerce on the date the final theft prevention standard is promulgated, preliminary theft rate(s), if known, based on data available.

PART 567—CERTIFICATION

Part 567 would be amended as follows:

2. The authority citation for Part 567 would be revised to read as follows:

Authority: 15 U.S.C. 1392, 1401, 1403, and 1407; 15 U.S.C. 1912 and 1915; 15 U.S.C. 2021, 2022, and 2023; delegation of authority at 49 CFR 1.50.

3. Section 567.1 would be revised to read as follows:

§ 567.1 Purpose.

The purpose of this part is to specify the content and location of, and other requirements for, the label or tag to be affixed to motor vehicles as required by section 114 of the National Traffic and Motor Vehicle Safety Act of 1966 (15 U.S.C. 1403) (the Safety Act) and by sections 105(c)(1) and 606(c) of the Motor Vehicle Information and Cost Savings Act (15 U.S.C. 1915(c) and 2026(c)) (the Cost Savings Act), and to provide the consumer with information to assist him in determining which of the Federal Motor Vehicle Safety Standards (Part 571 of this chapter) and Theft Prevention Standards (Part 541 of this chapter) (Standards) are applicable to the vehicle.

4. Section 567.2 would be revised to read as follows:

§ 567.2 Application.

(a) Except as povided for in subsection (c) of this section, this part applies to manufacturers and distributors of motor vehicles to which one or more standards are applicable.

(b) In the case of imported motor vehicles, the Safety Act requirement of affixing a label or tag applies to importers of vehicles admitted to the United States under 19 CFR 12.80(b)(1) to which the required label or tag is not affixed.

(c) In the case of imported motor vehicles, certification of compliance with the Motor Vehicle Theft Prevention Standard, as required by Section 606 of the Cost Savings Act, applies only to the manufacturer of the motor vehicle, as defined in § 541.4(b) of this chapter.

5. Section 567.4(g)(5) would be revised to read as follows:

§ 567.4 Requirements for manufacturers of motor vehicles.

* * * * *

(g) * * *

(5) The statement: "This vehicle conforms to all applicable Federal motor vehicle safety and bumper standards in effect on the date of manufacture shown above." The expression "U.S." or "U.S.A." may be inserted before the word "Federal."

(i) In the case of passenger cars manufactured on or after [insert the effective date of the theft prevention standard], and subject to the theft prevention standard of part 541, the expression ", bumper, and theft prevention" shall be substituted in the statement for the expression "and bumper".

* * * * *

(Sec. 101, Pub. L. 98-547, 98 Stat. 2754 (15 U.S.C. 2021); delegation of authority at 49 CFR 1.50)

Issued on May 3, 1985.

Diane K. Steed,

Administrator.

[FR Doc 85-11206 Filed 5-9-85; 8:45 am]

BILLING CODE 4910-59-M

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49 CFR Part 571

[Docket No. 85-06; Notice 1]

Federal Motor Vehicle Safety Standards; Hydraulic Brake Systems; Passenger Car Brake Systems

AGENCY: National Highway Traffic Safety Administration (NHTSA), DOT.

ACTION: Notice of proposed rulemaking.

SUMMARY: This notice proposes a new Standard No. 135, *Passenger Car Brake Systems*, which would replace Standard No. 105, *Hydraulic Brake Systems*, as it applies to that vehicle type. The new standard would differ from the existing one primarily in that it contains a revised and shortened test procedure based on a draft harmonized international procedure developed by the United Nations Economic Commission for Europe (ECE). NHTSA believes that the new standard would ensure the same level of safety for the aspects of performance covered by Standard No. 105, while improving safety by addressing some additional safety issues. The standard would make it easier for manufacturers to build the same braking systems for installation in cars to be sold in different parts of the world, thereby resulting in cost savings. Compliance costs would also be reduced by the shorter test procedure.

DATES: Comments must be received on or before October 7, 1985. The proposed changes in the Code of Federal Regulations would become effective 30 days after publication of a final rule in the **Federal Register**, at which time optional compliance with the new standard instead of Standard No. 105 would be permitted. The proposed effective date for mandatory compliance with the new standard is September 1, 1991.

ADDRESSES: Comments should refer to the docket and notice numbers and be submitted to: Docket Section, National Highway Traffic Safety Administration, 400 Seventh Street, SW., Washington, D.C. 20590. Docket hours are 8 a.m. to 4 p.m., Monday through Friday.

FOR FURTHER INFORMATION CONTACT: Mr. Duane Perrin, Office of Vehicle Safety Standards, National Highway Traffic Administration, 400 Seventh Street, SW., Washington, D.C. 20590 (202–426–2800).

SUPPLEMENTARY INFORMATION:

Background

Over the past several years, NHTSA has had a policy of reviewing its Federal motor vehicle safety standards to assess the current effectiveness of and necessity for each of those standards. Efforts to identify ineffective or unnecessarily burdensome provisions have taken several courses. The agency on its own has initiated a variety of rulemaking actions to modify or eliminate such provisions while preserving the safety goals of the affected standards. The agency has also worked with international standards bodies to revise some of its standards through the harmonization process.

This rulemaking action, which relates to the brake requirements for passenger cars, grew out of that process. As the automotive industry has become an increasingly worldwide industry, interest in international harmonized standards has increased. With harmonized standards, manufacturers can build the same product to sell in different parts of the world. Significant cost savings can be achieved in areas of vehicle design, production, inventory and certification. Harmonization takes on additional importance under the Trade Agreements Act of 1979. That Act provides that Federal agencies may not engage in standards-related activity which creates unnecessary obstacles to the foreign commerce of the United States. In developing standards, agencies are required to take into consideration international standards and, if appropriate, base the standards on international standards. However, agencies are not required to base standards on international standards if it would be inappropriate to do so for reasons of safety.

Over the past several years, the United Nations Economic Commission for Europe (ECE) has worked toward developing an international harmonized brake standard for passenger cars. As a member of ECE, the United States has participated in that work.

This notice proposes a new Standard No. 135, *Passenger Car Brake Systems* which would replace Standard No. 105, as it applies to that vehicle type. The new standard differs from the passenger car provisions of Standard No. 105, *Hydraulic Brake Systems*, primarily in that its test procedure would be shorter. Standard No. 105 incorporates a very lengthy and complex test procedure, much of which consists of various conditioning procedures. The new test procedure is based on a simplified one developed during the ECE harmonization process.

The agency believes that the proposed standard would ensure the same level of safety for the aspects of performance covered by Standard No. 105, while improving safety by addressing some additional aspects of performance. Like Standard No. 105, the proposed standard would specify requirements for service brake effectiveness, fade and recovery, partial system failure, parking brakes, and equipment integrity. For the first time, the agency would establish adhesion utilization requirements, for the purpose of ensuring stability during braking under all conditions of traction, including wet roads. Unlike Standard No. 105, the proposed standard would not include water recovery requirements. As discussed below, the agency tentatively concluded that water recovery requirements can be eliminated since they are not necessary for disc brakes and all passenger cars now sold in the United States have front disc brakes.

In developing this proposal, NHTSA carefully evaluated a proposed harmonized test procedure and tentative performance requirements developed by an ad hoc committee of the ECE, as well as Standard No. 105. Performance data for vehicles tested according to these two procedures, and various other available data were also evaluated. Evaluation of any braking standard must include consideration of two major components: the test procedure and actual performance requirements. The test procedure of a braking standard consists primarily of numerous stops under various test conditions. Single vehicles are required to be capable of going through the entire test procedure while meeting specified performance requirements, e.g., stopping distances.

To the extent that the ECE draft harmonized test procedure adequately addressed aspects of performance covered by Standard No. 105, the agency tentatively adopted the ECE draft procedure for the proposal. Where the ECE draft contained requirements addressing aspects of performance not covered by Standard No. 105, the agency evaluated the appropriateness of proposing such requirements. Finally, where the ECE draft did not cover aspects of performance subject to the requirements of Standard No. 105, the agency evaluated the appropriateness of retaining or deleting such requirements.

During this process, the agency recognized that major deviations from the ECE draft harmonized test procedure, other than at or near the end, could reduce the usefulness of test data accumulated from tests run according to that procedure, for purposes of harmonization. As a vehicle goes through the test procedure, there are cumulative effects on the vehicle's braking performance. If NHTSA were to adopt a standard with major changes in the early part of the harmonized test procedure, the rest of the test procedure might no longer be comparable in terms of stringency to the original ECE draft. To the extent that changes are made only at or near the end of the harmonized procedure, the earlier parts of the test procedure remain comparable.

In considering specific performance requirements, the agency largely focused on the current levels established by

Standard No. 105. Those performance requirements have now been in effect for a decade and have not caused manufacturers any significant difficulty. The requirements have been justified in the past, and NHTSA does not believe that they should be reduced in stringency. The bulk of the proposed standard's test procedure is consistent with the ECE draft. Adoption of the proposed standard would be a major step toward harmonization and would make it much easier for manufacturers to build vehicles for the world market.

While the agency has sought to propose requirements that are similar in stringency to those of Standard No. 105, it should be emphasized that the issue of what levels of performance for the proposed standard are equivalent to Stadard No. 105 is a difficult one. Test procedures can significantly affect the stringency of performance requirements, both by the sequence of testing, i.e., the cumulative effects noted above, and by the various test conditions. As discussed below, the test procedure for the proposed standard is significantly different than that of Standard No. 105, making comparisons fairly difficult. The agency has devoted considerable effort to the task of estimating equivalent levels of stringency, including conducting a test program. The proposed performance requirements have been compared to the requirements of Standard No. 105 using several different methods for determining equivalent stringency, each of which has several advantages and disadvantages. The different methods and their results are discussed in the agency's Regulatory Evaluation. The agency requests comments on them and on the issue of whether any other methods should be considered. Results of NHTSA's test program are available in Docket 79-18-GRRF.

The agency emphasizes that the proposed standard is in many respects an entirely new standard. While this preamble discusses the more significant differences between the proposed standard and Standard No. 105, commenters are encouraged to carefully compare the regulatory texts.

Effectiveness Requirements

A crucial test of a vehicle's brake system is its effectiveness in bringing the vehicle to a quick and controlled stop in an emergency situation. Like Standard No. 105, the proposed standard would test a vehicle's braking performance in both a pre-burnish or new condition and after burnish, i.e., in a broken-in condition. (As discussed below, however, manufacturers would have the option of omitting the burnish procedure and going directly from the pre-burnish tests to the tests ordinarily conducted after burnish.) The pre-burnish tests are conducted under fully loaded conditions. The after-burnish tests are referred to as cold effectiveness tests in the proposed standard and would be conducted under both fully loaded and lightly loaded conditions. Performance requirements are specified in terms of stopping distances.

The ECE draft international harmonized test procedure does not include a pre-burnish test. The agency tentatively concludes that such a test should be included in the new standard since braking performance can vary significantly between pre-burnished and post-burnished conditions, and vehicles may be driven for many miles in a pre-burnished state. In order to preserve harmonization of the test procedure, the proposed standard incorporates the pre-burnish effectiveness test into the ECE draft's burnish procedure.

As noted above, manufacturers would have the option of omitting the burnish procedure and going directly from the pre-burnish tests to the cold effectiveness tests. The agency tentatively concludes that this option would minimize compliance costs while ensuring that vehicles are adequately tested during the cold effectiveness tests. In many cases, vehicle performance improves with burnish. If a manufacturer chooses the option of foregoing burnish, it may thus be more difficult to meet the cold effectiveness test requirements. In this situation, there does not appear to be any reason to impose the burnish procedure on the manufacturer. It is also possible that a vehicle's braking performance may be degraded by burnish. However, the agency believes that other requirements included in the standard would prevent any significant degradation caused by burnish. The reasons discussed below concerning why the agency believes that several of the proposed standard's requirements would ensure that a vehicle's braking performance is not significantly degraded by heating during fade are also relevant to this issue.

The three proposed tests discussed above, i.e., pre-burnish; cold effectiveness—fully loaded; and cold effectiveness—lightly loaded, correspond generally to Standard No. 105's first, second and third effectiveness tests.[1]

Standard No. 105 also includes a fourth effectiveness test. This test is conducted near the end of the test sequences, after the fade and recovery tests. As discussed below, the fade and recovery tests simulate the conditions experienced during a mountain descent. A vehicle's brakes become very hot during such conditions, which may affect subsequent braking performance. The fourth effectiveness test ensures adequate braking effectiveness after experiencing high temperatures. The test also includes a high speed test to ensure adequate braking for vehicles which are capable of very high speeds.

While NHTSA believes that these aspects of performance are important, it has tentatively concluded that they can adequately be addressed by means other than a full fourth effectiveness test. As discussed below, the proposed standard's fade and recovery tests include a hot stop test and a recovery stop test. These tests would help ensure that a vehicle's braking performance is not significantly degraded by the simulated fade conditions. Moreover, a final effectiveness test, which consists of 4 stops from 100 km/h (62.1 mph) and is included at the end of the proposed standard, following spike stops, would protest against significant degradation due to the simulated fade conditions. The proposed standard also includes high speed effectiveness tests, conducted before the fade and recovery tests, under both fully loaded and lightly loaded conditions. The agency believes that all of these tests together would adequately ensure the aspects of performance addressed by Standard No. 105's fourth effectiveness test and that including an additional test in the proposed standard would merely lengthen the test procedure without offering any concomitant benefits.

30-mph Tests

The agency also notes that the proposed standard's effectiveness tests do not include tests corresponding to Standard No. 105's 30-mph tests, which are part of that standard's first, second and fourth effectiveness tests. Tests at a speed of this magnitude were not included in the ECE draft harmonized test procedure because there was general agreement among the

[1] The proposed standard does not use the terminology of first, second, third and fourth effectiveness tests. As used in Standard No. 105, that terminology is based in part on the organization of the regulatory text. It should be noted in comparing the regulatory texts that they have different organizations. For example, the regulatory text of Standard No. 105 concerning effectiveness tests is organized in part by loading conditions, i.e., the second effectiveness test is at the fully loaded condition while the third effectiveness test is at the lightly loaded condition, whereas comparable tests in the proposed standard are organized together as part of the cold effectiveness test.

international delegates that such tests offer little information not provided by the higher speed tests. The agency tentatively agrees with this view. Assuming that a vehicle is capable of meeting the proposed standard's higher speed tests, the agency believes that it is highly unlikely that the vehicle would have difficulty meeting a 30-mph test of similar stringency.

Adhesion Utilization

The purpose of adhesion utilization requirements is to ensure that a vehicle's brake system is able to utilize whatever adhesion is available at the tire-road interface in such a way that a stable stop can be made within a specified distance. Adhesion utilization is addressed to some extent by Standard No. 105's (and the proposed standard's) service brake effectiveness requirements, since stops must be made within specified distances without leaving a lane of a specified width. All of those stops are made on a high friction surface, however. Standard No. 105 does not include any requirements concerning stops made on lower friction surfaces, such as wet roads.

The proposed adhesion utilization requirements are similar to those in the ECE's current braking standard, Regulation 13, and the corresponding directive of the European Economic Community (EEC). The requirements are expressed in terms of plots on a graph of the amount of adhesion utilized at each axle of the vehicle to produce a given level of deceleration. Using a specified test procedure, the adhesion utilized is graphically compared to the level of adhesion available at the tire/road interface. Four adhesion curves are plotted, representing the front and rear axle brake performance at each of two load conditions.

Two basic performance requirements would be established. First, none of the curves could cross an upper line for coefficients of friction between 0.2 (a low friction surface) and 0.8 (a high friction surface). The purpose of this requirement would be to ensure that, on all road surfaces from very slippery to dry, one axle is not overbraked with respect to the other. Put another way, this requirement would limit the amount that the performance of an individual axle could deviate from theoretically ideal brake balance. The effect of the overbraking of one axle with respect to the other would be to reduce the overall braking efficiency of the vehicle and make wheel lock-up at the axle more likely.

The second requirement would be that for all deceleration rates between 0.15 g (a mild stop) and 0.8 g (a severe stop), the curve for the front axle must be above that for the real axle. The purpose of this requirement would be to ensure stability of the vehicle by requiring the front axle to have a greater adhesion utilization than the rear axle. In practical terms, this means that if a driver applied the brakes hard enough to get wheel lockup, the front brakes would be the first to lock. Since locked wheels always tend to lead, the vehicle would skid but would remain stable, i.e., heading forward. However, if the rear wheels were to lock first, there would be a spin-out since those wheels would tend to lead.

The proposed adhesion utilization requirements differ from those of Regulation 13 in three ways. First, the proposal does not follow Regulation 13 in including an exception to the requirement that, for all deceleration rates between 0.15 and 0.8 g, the curve for the front axle must be above that for the rear axle. Between 0.3 and 0.45 g, Regulation 13 permits the curves to invert, as long as they remain close to theoretically ideal adhesion. NHTSA does not believe that there is any reason to adopt the exception. Wheel lockup can easily occur on slippery wet roads in the range of decelerations between 0.3 and 0.45 g, which could result in spin-outs.

Second, the proposed adhesion utilization requirements take into account the engine retardation effects of a vehicle being braked in gear, whereas Regulation 13 does not. NHTSA believes this approach is more realistic, since it is not typical for a driver to place the car in neutral or deculutch at the beginning of a stop. The effect of considering engine retardation is to move the adhesion utilization curves for the driven axle to the right.

Third, while the proposed standard specifies a test method for determining adhesion utilization, Regulation 13 does not. In Europe, compliance with safety standards is based on type approval. Manufacturers submit various information to governmental authorities which approve or disapprove a vehicle based on the information and on vehicle testing. In the United States, the government does not engage in approving or disapproving vehicles with respect to their safety performance. Under the National Traffic and Motor Vehicle Safety Act, manufacturers must certify that their vehicles comply with applicable safety standards. Safety standards are required to be objective to enable manufacturers to ensure that their vehicles are in compliance. To provide such objectivity, the agency must specify a specific method for determining adhesion utilization.

The proposed method involves a road test to determine actual braking force as a function of brake line pressure for each axle separately. From this information, plus brake valve characteristics, coast-down effects, engine braking effects, and center of gravity, the curves of adhesion utilized versus deceleration can be plotted. While the final curves are based on calculations, the input variables are all actual test measurements made under specified conditions. The proposed method takes account of rolling friction, aerodynamic drag and engine braking, which are present in actual braking situations but are not considered in theoretical design calculations, which are generally used for type approval.

The curves would be generated for a speed of 50 km/h (31.1 mph), which represents a value in the middle of the range of speeds that a vehicle ordinarily experiences during braking. Although higher initial speeds are used for stopping distance testing, the agency believes that 50 km/h is an appropriate speed for adhesion utilization testing because a vehicle shows more sensitivity to wheel lockup at slower speeds than at higher speeds and because a slower speed makes the test easier and safer to run. Curves would be calculated for vehicle performance in gear in order to account for engine braking effects normally present in actual driving situations. The adhesion utilization test procedure is discussed at length in a paper published by the Society of Automotive Engineers (SAE), Radlinski, R.W., and Flick, M.A., "A Vehicle Test Procedure for Determining Adhesion Utilization Properties," #840334, February 1984. The proposed procedue has been revised slightly from that in the SAE paper, to decrease its sensitivity to testing variability. The agency specifically requests comments on the proposed test procedure and on any others that should be considered.

The agency notes that there are limitations to any possible single adhesion utilization test, since brake balance, like most other aspects of braking performance, can change in use and over time. It is not feasible at this time to establish specific performance requirements which test a vehicle's adhesion utilization under all of the many varied conditions a vehicle is likely to experience during its lifetime. The proposed requirements would ensure reasonable adhesion utilization for new vehicles, a significant step toward ensuring safer vehicles. A vehicle meeting such requirements could become unsafe over time if the brake balance significantly changed. However,

by using sound engineering judgment, manufacturers could design vehicles in such a manner that good brake balance will be maintained over a vehicle's lifetime.

The agency also emphasizes that it is not proposing to decrease the level of stringency of any of Standard No. 105's other requirements in light of the proposed adhesion utilization requirements. In particular, available data clearly show that Standard No. 105's stopping distance requirements can easily be met by vehicles which have good adhesion utilization.

The proposed adhesion utilization requirements would apply only in part to vehicles equipped with fully operational anti-lock systems. The stability aspect of adhesion utilization would automatically be satisfied as long as the anti-lock system prevented wheel lockup as intended. Anti-lock-equipped vehicles would still have to meet the braking efficiency aspect of the adhesion utilization requirement, however. Regulation 13 includes special requirements to test anti-lock-equipped vehicles which have not been adopted in this proposal. In testing two vehicles with anti-lock systems to these ECE requirements, NHTSA encountered problems with the test procedure. One vehicle showed braking efficiencies of well over 100%, which is theoretically impossible. The ECE is currently considering possible changes to the anti-lock requirements. At present, NHTSA does not believe that it should propose any similar requirements.

The agency notes that five out of 19 cars tested failed the proposed adhesion utilization requirements. The agency believes that the vast majority of cars can meet the proposed requirements with either no changes or relatively minor changes. It is possible that manufacturers may choose to meet the requirements for some cars by using variable proportioning valves. The agency particularly requests comments on the types of changes that may be necessary to meet the proposed requirements and the number of vehicles that would be affected.

Fade and Recovery

The purpose of the fade and recovery tests is to ensure adequate braking capability during and after exposure to the high brake temperatures caused by prolonged or severe use. Such temperatures are typically experienced in long, downhill driving. The proposed requirements consist of a heating sequence, a hot stop test, a cooling sequence and a recovery stop test.

The agency is not proposing to adopt the ECE draft test procedure's heating sequence. In vehicle tests, that heating sequence produced brake temperatures more than 100 °F. lower than Standard No. 105's second fade test procedure. The temperatures produced by Standard No. 105's procedure had previously been verified as being representative of the temperatures experienced by vehicles travelling in mountainous areas. The agency is particularly concerned about this difference because the relationship between temperature and fade is not a linear one. For one brake lining, there is a "knee" in the curve, above which degradation due to fade is much more pronounced. If that "knee" occurred at a temperature between those produced by the ECE draft test procedure and Standard No. 105 procedure, a vehicle's braking system could meet the ECE draft requirements but still experience a sharply increased propensity to fade during mountain descents.

The agency has developed a new heating sequence for this proposal, based on SAE Recommended Practice J1247 (Apr 80), Simulated Mountain Brake Performance Test Procedure. This sequence produces temperatures similar to those of the Standard No. 105 procedure. The agency believes that it produces a temperature cycle that more closely approximates an actual mountain descent than either Standard No. 105 or the ECE draft test procedure.

As an alternative, the agency is considering modifying the ECE draft test procedure by shortening the time interval between snubs from 45 seconds to 30 seconds. This would result in temperatures that compare with those obtained in Standard No. 105. One problem, however, is that some cars are not powerful enough to accelerate to the 120 km/h test speed in the time interval permitted. The primary advantage of this alternative is that it would be closer to the heating sequence of the ECE draft test procedure.

The agency requests comments on both alternatives and, with respect to the second alternative, comments on how vehicles that cannot accelerate to 120 km/h in the specified time interval should be tested. Since NHTSA believes that the first alternative more closely approximates an actual mountain descent, the agency would particularly appreciate more detailed comments from any commenters which support the second alternative. The agency contemplates adopting one or the other alternative and not providing an option in this area.

The proposed test procedure and the ECE draft procedure differ in the method used for determining the amount of force to be applied to the brakes during fade and other brake testing. The proposal uses the constant output method while the ECE draft harmonized test procedure uses the constant input method. In the constant output method, vehicle deceleration is held constant and pedal force is varied as necessary to keep deceleration at the prescribed level. In the constant input method, either pedal force or brake line pressure is held constant and the deceleration of the vehicle is allowed to vary.

Although the choice of method is not very important for most types of brake testing, the agency believes that it is important for fade testing. Brake fade is caused by heat buildup in the brake components. This heat buildup is a function not only of the total amount of energy imparted to the brakes during the stops or snubs, but also the rate at which that energy is applied. For a given sequence of brake applications, the total energy input depends only on the number of applications, and the initial and final speed. That will be the same with either method. For the constant decleration method, the rate of application of that energy will also be fixed. For the constant pedal force method, however, the deceleration rate (and hence the time to input the energy) will vary with the performance of the brakes. If the brakes fade, the deceleration drops off. A drop in deceleration decreases the amount of work being done by the brakes, which decreases the amount of heat buildup (the factor that causes fade). Therefore, the test becomes easier for vehicles that perform poorly. This result leads the agency tentatively to disfavor the constant input method because NHTSA believes that a test that varies in severity according to the performance of the vehicle being tested is inappropriate for a Federal motor vehicle safety standard. Accordingly, the constant output method appears preferable.

Another reason in favor of a constant output method is that it produces less variability in testing. With the constant output method, the test driver attempts to maintain the prescribed deceleration throughout each test run, and any random errors will tend to cancel each other out. With the constant input method, however, the pedal force maintained is based on the average pedal force on two baseline snubs. Any errors made in determining the baseline pedal force will therefore also be introduced in each subsequent brake application, and the effect will be additive, rather than self-cancelling. With the constant output method, there is no need for the baseline snubs.

As noted above, the proposed fade and recovery test includes two

performance tests. The first, a hot stop test, specifies both a minimum stopping distance and a percentage limit on degradation from the performance achieved in the cold service brake test. This latter requirement would limit the amount of reduction in performance that a driver experiences when brakes are heated. The allowable pedal force could not exceed the mean pedal force actually used on the best cold stop.

The second, a recovery stop test, places both lower and upper limits on the difference in performance after recovery from that achieved in the cold service brake test. These limits are the same as included in the ECE draft. The upper limit is included to ensure that brakes do not become too sensitive when heated and "over-recover."

It is difficult to directly compare Standard No. 105's fade and recovery test with the proposed test, since the test procedures are entirely different. The proposed requirements are more simple than Standard No. 105's, since only one series of tests is run instead of two. Standard No. 105 does not include a hot stop performance test, although there is a limit on the pedal force applied during the heating stops. As noted above, both the proposal and Standard No. 105 include a recovery performance test. The agency believes that the proposed requirements would reduce the costs of testing while, particularly in light of the hot stop performance test, better ensuring safety.

Partial System Failure

Like Standard No. 105, the proposed standard would specify stopping distance requirements for conditions of circuit failure, power assist failure, and anti-lock or proportioning valve failure. If part of the service brake system should fail, it is crucial that the vehicle's brake system still be able to bring the vehicle to a controlled stop in a reasonable distance.

The agency notes that 11 out of 43 cars tested failed the proposed stopping distance requirement for power assist failure. As discussed by the Regulatory Evaluation, the primary factor which explains the failures is the lower maximum allowable control force of the proposed standard as compared to Standard No. 105 (500 N versus 667 N). This proposed test condition change, which is the same as the ECE draft, would increase the stringency of the requirement and necessitate redesigning of brake components on some cars to provide as greater mechanical or hydraulic gain. The test data indicate that while some redesign would be necessary, passenger cars can easily meet the proposed requirements. As discussed below, the agency believes the 500 N control force limit is justified based on human factors data. The proposed stopping distance, which is not significantly different from the specified in Standard No. 105, is derived from the proposed requirement for service brake stopping distance, using the same mathematical relationship used in the ECE draft. Since the agency is proposing a more stringent service brake stopping distance than that tentatively selected for the ECE draft, however, the proposed stopping distance for power assist failure is also more stringent. Given the number of failures in the test program, the agency particularly requests comments on the proposed requirements of power assist failure.

The proposed standard would also establish a new requirement for brake performance after engine failure. The requirement would ensure that a driver can make at least one stop with 90 percent of full service brake performance following engine failure. Since engine failure is a relatively common occurrence, the agency believes this is a reasonable requirement.

The vast majority of all cars already meet the proposed engine failure requirement, which requires the use of a supplemental source of stored energy for the booster, such as a vacuum reservoir or hydraulic accumulator. Of 44 cars tested, one failed the proposed requirement. That car was equipped with a hydraulic booster without an accumulator. The agency requests comments on the costs associated with meeting the requirements and the specific number of vehicles that would be affected.

Parking Brake

Like Standard No. 105, the proposed standard would require that the parking brake of passenger cars be able to hold the vehicle when it is parked on a specified gradient and a force not exceeding a specified amount is applied to the parking brake. There are several significant differences in test conditions, however.

Since the static parking brake test is a pass/fail type of test, i.e., the parking brake either holds the vehicle or it does not, the test conditions determine the stringency of the performance requirement. Two conditions are of primary importance, the gradient and allowable control force. The two are interrelated in that, for the same parking brake system, it is generally true that the higher the force that is applied to the control, the steeper the gradient on which the vehicle can be held in place.

The agency believes that the proposed parking brake requirement would have a level of stringency approximately the same as that of Standard No. 105. The standard would specify a less stringent gradient, 20 percent instead of 30 percent, in line with the ECE draft harmonized test procedure. To offset that change and thereby maintain the existing level of stringency, the agency is also proposing a more stringent, i.e., lower, allowable control forces, 500 N (113 pounds) for foot-operated parking braking systems instead of 125 pounds and 320 N (72 pounds) instead of 90 pounds for hand-operated parking brake systems.

The agency notes that of 18 passenger cars with foot-applied parking brakes that were tested to the proposed requirements, five failed. The agency believes that the vast majority of cars can meet the proposed requirements with either no changes or relatively minor changes, such as improving the mechancial advantage of some foot-applied parking brakes. The agency requests comments on the types of changes that may be necessary to meet the proposed requirements and the number of vehicles that would be affected.

While Standard No. 105 tests the parking brake with the vehicle in both a fully loaded condition and a lightly loaded condition, the proposed standard would only test the vehicle in the fully loaded condition. The purpose of testing in a lightly loaded condition is to ensure that the parking brakes do not simply lock a very lightly loaded axle and allow the vehicle to slide. Wheel slide is not likely to be a problem on a 20 percent gradient given the weight distribution of passenger cars. Gradients which are significantly greater than 20 percent are very rare in the United States, and the agency does not believe that this aspect of performance needs to be tested.

The agency notes that Standard No. 105 includes a barrier impact test of the strength of a transmission or driveline parking mechanism, as part of an option. For vehicles with a transmission or transmission control incorporating a parking mechanism that must be engaged before the ignition key can be removed (most automatic transmissions have this feature), manufacturers have the option of meeting the 30 percent gradient test with the transmission's parking mechanism engaged, so long as certain other requirements are also met. These include passing the same test on a 20 percent grade without the parking mechanism engaged and the moving barrier test. Since the proposed standard would specify a 20 percent grade instead

of a 30 percent grade, the agency does not believe this type of option should be provided. The agency requests comments on not providing the option.

The proposed standard would establish a new dynamic stopping test using the parking brake. NHTSA believes that the primary means for emergency stopping should be the service brakes. That aspect of performance is addressed by the partial failure requirements. Nevertheless, drivers could occasionally use the parking brake as an emergency brake. The proposed parking brake dynamic stopping test, which is identical to that in the harmonized test procedure, would improve safety by ensuring that drivers can also use the parking brake for that purpose.

The ECE draft harmonized test procedure also includes a parking brake test which NHTSA is not proposing, a test with a trailer. That test requires a passenger car's parking brake to be able to hold the vehicle and an attached trailer on a 12 percent grade. Based on engineering analysis, the agency has determined that the proposed parking brake test without a trailer ensures that a vehicle would be able to meet this requirement so long as trailer weight is not more than about 65 percent of passenger car weight. Accordingly, the agency does not believe there is a safety need to include the trailer test in the proposed standard for passenger cars.

Equipment Integrity

Like Standard No. 105, the proposed standard would test the capability of a vehicle's braking system to withstand a series of severe "spike" stops without loss of structural integrity. A final effectiveness test follows the spike stops to ensure that the vehicle still has adequate braking capability. While these tests are not included in the ECE draft harmonized test procedure, the agency believes that the tests address an important aspect of safety performance. Since a vehicle's brakes are occasionally subjected to sudden, very hard applications during normal usage, it is important that the brake system components be strong enough to avoid being bent or otherwise damaged by those applications. As noted above, the final effectiveness test following the spike stops would also help ensure that a vehicle's brakes are not significantly degraded by conditions of fade.

The spike stop test and final effectiveness test are relatively simple to conduct. Since they are conducted at the end of the test sequence, their inclusion would not affect the relative stringency of the preceding portion of the test procedure.

Since these tests are not included in the ECE draft harmonized test procedure, the agency specifically requests comments on the desirability of their inclusion in the proposed standard. Any commenters opposing adoption of the tests should provide detailed arguments in favor of their position, including comments addressing the above discussion.

Equipment Safety and Failure Warning Requirements

Standard No. 105 includes a number of equipment and failure warning requirements, most notably for reservoir capacity, failure warning indicators, and fluid reservoir labeling. Regulation 13 contains similar, but in some cases different, requirements. While these requirements have been discussed to some extent as part of the ECE harmonization process, they have not yet received the degree of attention that has been given to the road tests. Most of the proposed requirements are essentially the same as those in Standard No. 105.

One notable addition is a requirement that the fluid level in a master cylinder reservoir be able to be checked without removing the cap. The agency believes that this is in the interest of safety for two reasons. First, since it would be easier to check fluid level, drivers and maintenance personnel would be more likely to routinely make such checks. Second, it is desirable not to have to remove the cap since that creates a situation where the brake fluid can be contaminated. Under the proposal, the requirement could be met by a means to check fluid without removing the reservior cap, e.g., by constructing the reservior of a transparent material or by having a fluid level sensor. There is already a trend in passenger car design to use transparent material to enable checking of the brake fluid without removing the cap. If a passenger car had a fluid level seneor, i.e., activation of the brake warning light in situations of low fluid level, the requirement would be deemed met. With a fluid level sensor, drivers would automatically be warned about low fluid level. The agency notes, however, that drivers would have to remove the cap to determine the actual level of brake fluid. Also, drivers might want to remove the cap to check brake fluid level rather than rely on the sensor for that purpose. The agency requests comments on permitting use of a fluid level sensor to meet this requirement.

Water Recovery

Unlike Standard No. 105, the proposed standard would not include a water recovery test. The purpose of a water recovery test in Standard No. 105 is to ensure that a vehicle will have adequate braking capability after exposure to water, such as would occur in going through a flooded area. Standard No. 105's test assesses the effects of such exposure by providing for driving a vehicle through a water trough and then testing its braking capability.

Application of a water recovery test to cars sold in this country does not appear to be necessary to ensure safe braking, for several reasons. First, there is little evidence that the potential adverse safety effects of water on braking capability is a problem for today's passenger cars. This is due in large part to the fact that all passenger cars sold in the United States now have disc brakes on at least the front axle. In the past, passenger cars had drum brakes on both the front and rear axles. While brake drums can trap water, the design of disc brakes is such that they tend to expel water. Indeed, with Standard No. 105's current test procedure, disc brakes on vehicles driven through the water trough often become completely dry before the vehicle's braking capability can be tested.

Second, the agency does not believe that inclusion of a water recovery test is necessary to ensure that manufacturers continue to equip their cars with front disc brakes. In Europe, where there is no water recovery requirement, almost all passenger cars have front disc brakes.

Third, the agency believes that the brakes of modern cars are sufficiently shielded from direct water spray to make water fade unlikely. Moreover, the application of friction materials that are highly resistant to wet fade is fairly widespread on current passenger cars.

Test Conditions

Many of the proposed standard's test conditions are different from those of Standard No. 105. Some of those differences are discussed above. Other significant difference include the following:

A. Burnish. The proposed standard's burnish procedure, which is based on the ECE draft harmonized test procedure, is significantly shorter than that of Standard No. 105. The nature of many brake linings is such that a break-in period is needed for the braking system to achieve its full capability. Inclusion of a lengthy burnish procedure, however, significantly increases the cost of testing. The agency believes that brakes can adequately be burnished using a shorter procedure than that specified by Standard No. 105, thereby decreasing testing costs. As

discussed above, manufacturers would be permitted the option of foregoing burnish entirely as a way of making even greater cost savings.

B. Number of runs per test condition. Standard No. 105 generally specifies that six stops be made for each test condition. Prescribed performance must be achieved on at least one stop. The purpose of specifying multiple stops is to enable test drivers to achieve a vehicle's best performance. The proposed standard would specify four stops, thereby reducing testing costs. Testing experience indicates that it takes only three or four stops for a test driver to attain the best possible performance.

C. Wheel lockup. Standard No. 105 generally permits lockup of one wheel during stopping distance tests. The proposed standard, in line with the ECE draft harmonized test procedure, would prohibit all lockup (except during spike stops). A vehicle's stopping performance is usually at its best with a brake application just short of that which would cause wheel lockup to occur. A test driver attempting to obtain a vehicle's best performance may thus inadvertently lock one or more wheels. With four stops permitted, however, the agency believes test drivers can determine a vehicle's best performance on at least one stop while avoiding all lockup.

For anti-lock-equipped vehicles, Standard No. 105 permits controlled lockup during the stopping distance tests. The proposed standard, in line with the ECE draft harmonized test procedure, would prohibit all lockup. The agency believes this is appropriate, since a well-designed, anti-lock system would pervent all lockup during the specified tests.

D. Control forces. The proposed standard specifies a more stringent control force limit for the service brake test than Standard No. 105, in line with the harmonized test procedure. The agency believes that these more stringent control forces are justified based on human factors data. In a study by Ford Motor Company,[2] female test subjects, chosen to be a representative sample of the female population, were confronted with an actual emergency braking situation in which maximum braking force applied over a ½ second interval was measured. The results indicate that only 56 percent of the female driving population can be expected (with 95 percent confidence) to be able to generate the 150 pound pedal force (667 N) specified by Standard No. 105 during an actual panic stop. By decreasing the control force limit to 500 N, at least 86 percent of the female driving population can be expected (with 95 percent confidence) to be able to generate the specified force during an emergency brake application. Other human factor studies have reached similar but not identical conclusions.[3] The agency has greater confidence in the results of the Ford study, however, since the others were conducted under laboratory conditions rather than actual driving situations.

As noted above, these lower control forces may necessitate redesigning of brake components on some cars to provide a greater mechanical or hydraulic gain, particularly to meet the requirements for performance with a failed power assist unit.

E. Road Surface. Like Standard No. 105, the proposed standard would specify road surface friction in terms of skid number. This test condition has proven to be satisfactory over many years.

The agency recognizes, however, that skid number is not generally used for this purpose in Europe. During the ECE harmonization meetings, there was some discussion about specifying road surface friction in terms of peak coefficient of friction. However, no procedure was developed for that purpose.

Road surface friction is an important test condition which the agency believes should ideally be the same in harmonized brake standards. For this reason, the agency requests comments on whether it should consider a method other than skid number for the proposed standard. Depending on the comments, the agency could issue a supplemental NPRM proposing an alternative method or initiate separate rulemaking or research to develop such a method for the future.

The agency notes that the International Standards Organization (ISO) has developed two draft test procedures which are relevant to this issue. One procedure, ISO/DTR 8350, Road Vehicles—High Friction Test Track Surface—Specifications, provides specifications for constructing a road test surface. The other procedure, ISO/DTR 8349, Road Vehicles—Measurement of Road Surface Friction, provides a method for measuring road surface friction. The agency requests comments on whether it should consider using these ISO documents in developing a specification of road surface in terms of peak coefficient of friction. If the agency were to propose specifying test surface in terms of peak coefficient of friction, it would contemplate proposing a specific number. If any commenters favor using the ISO documents for this purpose, the agency would appreciate analysis concerning the specific peak coefficient of the ISO test surface, whether test tracks constructed to the ISO specifications may have varying peak coefficients of friction either on a particular track or between tracks, how the peak coefficient of friction changes over time and as the track is used for testing, and how the test surface compares with that specified by Standard No. 105.

The agency also requests comments on any other documents or research that should be considered for specifying road surface friction in terms of peak coefficient of friction, and on any methods other than skid number or peak coefficient of friction that should be considered for specifying road surface.

F. Brake Adjustment. Standard No. 105 permits automatic brake adjusters to be locked out during testing. The proposed standard, in line with the ECE draft harmonized test procedure, would require automatic brake adjusters to be operational. The agency believes this is reasonable. Since automatic adjusters are operational in vehicle use, it is reasonable to require that they be operational during testing.

Analyses; Costs and Benefits

The agency has analyzed this proposal and determined that it is neither "major" within the meaning of Executive Order 12291 nor "significant" within the meaning of the Department of Transportation regulatory policies and procedures. The agency's detailed analysis of the economic effects is set forth in a preliminary regulatory evalution, copies of which are available from the Docket Section.

The preliminary regulatory evaluation concludes that the current Standard No. 105 has been successful in substantially upgrading brake performance and that the proposed requirements would improve safety by ensuring an equivalent level of safety for those aspects of performance covered by Standard No. 105 and by addressing several additional areas of brake performance which are safety

[2] Eaton, Dennis A. and Dittmeier, Henry J., "Braking and Steering Effort Capabilities of Drivers," Ford Motor Company, Automotive Research Office, Dearborn, Michigan, 1970 (published as SAE paper #700363, 1970 International Safety Conference Compendium (P-30), New York, NY, 1970, pp. 153-158).

[3] Stoudt, H. W., et al., "Vehicle Handling: Force Capabilities for Braking and Steering," Harvard School of Public Health, May 1969 (DOT Contract FH-11-6810); Mortimer, R.G. et. al, "Brake Force Requirement Study: Driver-Vehicle Braking Performance as a Function of Brake System Design Variables," Highway Safety Research Institute, April 1970 (DOT Contract FH-11-6952).

significant. Moreover, compliance testing costs would be reduced by the shortened test procedure, and the proposed five-year leadtime would enable manufacturers to make any necessary changes to meet the proposed requirements as part of their regular design cycle, with little or no impact on cost.

In accordance with the Regulatory Flexibility Act, the NHTSA has evaluated the effects of this action on small entities. Based upon this evaluation, I certify that the proposed amendments would not have a significant economic impact on a substantial number of small entities. As discussed by the agency's preliminary regulatory evaluation, only relatively simple changes would generally be needed for all passenger cars to meet this proposed standard. These changes would not significantly affect the purchase price of a vehicle. No changes would be needed for many cars. While some reduction in compliance costs would occur, the reduction would not be of a magnitude which would significantly affect the purchase price of a vehicle. For these reasons, neither manufacturers of passenger cars, nor small businesses, small organizations, and small governmental units which purchase motor vehicles, would be significantly affected by the proposed standard. Accordingly, no regulatory flexibility analysis has been prepared.

Finally, the agency has considered the environmental implications of this proposed rule in accordance with the National Environmental Policy Act of 1969 and determined that the proposed rule would not significantly affect the human environment.

The brake fluid reservoir labeling requirements in this proposal are considered to be information collection requirements, as that term is defined by the Office of Management and Budget (OMB) in 5 CFR Part 1320. Accordingly, these proposed requirements are being submitted to the OMB for its approval, pursuant to the requirements of the Paperwork Reduction Act (44 U.S.C. 3501 *et seq.*). Comments on the proposed information collection requirements should be submitted to: Office of Management and Budget, Office of Information and Regulatory Affairs, Washington, D.C. 20503, Attention: Desk Officer for NHTSA. It is requested that comments sent to the OMB also be sent to the NHTSA rulemaking docket for this proposed action.

Leadtime

While only relatively simple changes would be needed for virtually all passenger cars to meet the proposed standard, with no changes needed for many cars, any brake system redesign involves a certain amount of leadtime. The proposed standard's test procedure is sufficiently different from that of Standard No. 105 that implementation of the standard could require substantial testing by manufacturers before they could be sure what components would require redesign. In order to keep the costs of implementation low, a long leadtime is being proposed. Thus, manufacturers could incorporate any necessary changes into their normal design cycles, minimizing cost impacts.

Accordingly, the agency is proposing a mandatory effective date of September 1, 1991. It is contemplated that this would provide a leadtime of approximately five years after issuance of a final rule. The agency proposes an optional effective date for certifying passenger cars to the new standard instead of Standard No. 105 beginning 30 days after publication of a final rule in the **Federal Register**. The agency finds good cause for a short leadtime on an optional basis since the new standard would result in safety benefits over those of Standard No. 105, and, since compliance would be optional, there would be no imposition of mandatory new requirements during that time period.

Interested persons are invited to submit comments on the proposal. It is requested but not required that 10 copies be submitted.

All comments must be limited not to exceed 15 pages in length. (49 CFR 553.21) Necessary attachments may be appended to these submissions without regard to the 15-page limit. This limitation is intended to encourage commenters to detail their primary arguments in a concise fashion.

If a commenter wishes to submit certain information under a claim of confidentiality, three copies of the complete submission, including purportedly confidential information, should be submitted to the Chief Counsel, NHTSA, at the street address given above, and seven copies from which the purportedly confidential information has been deleted should be submitted to the Docket Section. A request for confidentiality should be accompanied by a cover letter setting forth the information specified in the agency's confidential business information regulation (49 CFR Part 512).

All comments received before the close of business on the comment closing date indicated above will be considered, and will be available for examination in the docket at the above address both before and after that date. To the extent possible, comments filed after the closing date will also be considered. However, the rulemaking action may proceed at any time after that date, and comments received after the closing date and too late for consideration in regard to the action will be treated as suggestions for future rulemaking. The NHTSA will continue to file relevant material as it becomes available to the docket after the closing date, and it is recommended that interested persons continue to examine the docket for new material.

Those persons desiring to be notified upon receipt of their comments in the rules docket should enclose, in the envelope with their comments, a self-addressed stamped postcard. Upon receiving the comments, the docket supervisor will return the postcard by mail.

List of Subjects in 49 CFR Part 571

Imports, Motor vehicle safety, Motor vehicles, Rubber and rubber products, Tires.

PART 571—[AMENDED]

In consideration of the foregoing, 49 CFR Part 571 would be amended as follows:

1. The authority citation for Part 571 would be revised to read as follows:

Authority: 15 U.S.C. 1392, 1401, 1403, 1407; delegation of authority at 49 CFR 1.50.

§ 571.105 [Amended]

1. Section 571.105 would be amended by revising S3 to read as follows:

* * * * *

S3. *Application.* This standard applies to multipurpose passenger vehicles, trucks, and buses with hydraulic brake systems, and to passenger cars manufactured before September 1, 1991, with hydraulic brake systems. At the option of the manufacturer, passenger cars manufactured before September 1, 1991, may comply with the requirements of Federal Motor Vehicle Safety Standard No. 135, *Passenger Car Brake Systems*, instead of the requirements of this standard.

* * * * *

1. Section 571.135—Federal Motor Vehicle Safety Standard No. 135 would be added to read as follows:

§ 571.135 Federal Motor Vehicle Safety Standard No. 135.

Passenger Car Brake Systems

S1. *Scope.* This standard specifies requirements for service brake and associated parking brake systems.

S2. *Purpose.* The purpose of this standard is to ensure safe braking

performance under normal and emergency driving conditions.

S3. *Application.* This standard applies to passenger cars manufactured on or after September 1, 1991. In addition, passenger cars manufactured before September 1, 1991, may, at the option of the manufacturer, meet the requirements of this standard instead of Federal Motor Vehicle Safety Standard No. 105, *Hydraulic Brake Systems.*

S4. *Definitions.*

"Adhesion utilization curves" of a vehicle means curves showing, for specified load conditions, the adhesion utilized by each axle plotted against the braking ratio of the vehicle.

"Anti-lock system" means a portion of a vehicle's service brake system that automatically controls the degree of rotational wheel slip of one or more road wheels of the vehicle during braking.

"Backup system" means a portion of a service brake system, such as a pump, that automatically supplies energy in the event of a primary brake power source failure.

"Brake power assist unit" means a device installed in a hydraulic brake system that reduces the amount of muscular force that a driver must apply to actuate the system, and that, if inoperative, does not prevent the driver from braking the vehicle by a continued application of muscular force on the service brake control.

"Brake power unit" means a device installed in a brake system that provides the energy required to actuate the brakes, either directly or indirectly through an auxiliary device, with driver action consisting only of modulating the energy application level.

"Braking ratio" means the deceleration of the vehicle divided by the gravitational acceleration constant.

"Hydraulic brake system" means a system that uses hydraulic fluid as a medium for transmitting force from a service brake control to the service brake, and that may incorprate a brake power assist unit, or a brake power unit.

"Initial brake temperature" means the average temperature of the service brakes on the hottest axle of the vehicle 0.32 km (0.2 miles) before any brake application.

"Lightly loaded vehicle weight" or "LLVW" means unloaded vehicle weight plus 180 kg (396 pounds), including driver and instrumentation.

"Maximum speed" of a vehicle means the highest speed attainable by accelerating at a maximum rate from a standing start for a distance of 3.2 km (2 miles) on a level surfaces, with the vehicle at its lightly loaded vehicle weight.

"Parking mechanism" means a component or subsystem of the drive train that locks the drive train when the transmission control is placed in a parking or other gear position and the ignition key is removed.

"Pressure component" means a brake system component that contains the brake system fluid and controls or senses the fluid pressure.

"Skid number" means the frictional resistence of a pavement measured in accordance with American Society for Testing and Material (ASTM) Method E-274-70 (as revised July, 1974) at 40 mph, omitting water delivery as specified in paragraphs 7.1 and 7.2 of that method.

"Snub" means the braking deceleration of a vehicle from a higher reference speed to a lower reference speed that is greater than zero.

"Spike stop" means a stop resulting from the application of 900 N (202.3 pounds) of force on the service brake control in 0.08 second.

"Split service brake system" means a brake system consisting of two or more subsystems actuated by a single control designed so that a leakage-type failure of the pressure component in a single subsystem (except structural failure of a housing that is common to two or more subsystems) does not impair the operation of any other subsystem.

"Stopping distance" means the distance traveled by a vehicle from the point of application of force to the brake control to the point at which the vehicle reaches a full stop.

"Variable proportioning brake system" means a system that automatically adjusts the braking force at the axles to compensate for vehicle static axle loading and/or dynamic weight transfer between axles during deceleration.

S5. *Requirements.* Each vehicle shall meet the requirements of this section, under the conditions prescribed in S6, when tested according to the procedures and in the sequence set forth in S7. If a vehicle is incapable of attaining the specified test speed, it is tested at the speed that is a multiple of 5 Km/h (3.1 mph) and is 4 to 8 km/h (2.5 to 5.0 mph) less than its maximum speed, and its performance shall be within a stopping distance given by the formula provided for the specific requirement.

S5.1. *Full service brake system performance.*

S5.1.1. *Stopping performance.* The service brakes shall stop each vehicle in four series of effectiveness tests within the distances and from the speeds specified in S5.1.1.1 through S5.1.1.4.

S5.1.1.1. *Preburnished effectiveness.* In the preburnished effectiveness test, the vehicle shall stop, with its transmission in neutral, from 100 km/h (62.1 mph) within a distance of 72 m (236 ft). If the vehicle is incapable of attaining 100 km/h, it shall stop within a distance given by $S=0.05V+0.006V^2$, where S is the maximum stopping distance in m, and V is the test speed in km/h.

S5.1.1.2. *Cold effectiveness.* In the cold effectiveness tests, the vehicle shall stop, with its transmission in neutral, from 100 km/h (62.1 mph) within a distance of 65 m (214 ft). If the vehicle is incapable of attaining 100 km/h, it shall stop within a distance given by $S=0.05V+0.006V^2$, where S is the maximum stopping distance in m, and V is the test speed in km/h.

S5.1.1.3. *High speed effectiveness.* In the high speed effectiveness test, the vehicle shall stop, with its transmission in gear, from a speed which is 80% of the maximum speed of the vehicle, within a distance given by $S=0.05V+0.006V^2$, where S is the maximum stopping distance in m, and V is the test speed in km/h.

S5.1.1.4. *Final effectiveness.* In the final effectiveness test, the vehicle shall stop, with its transmission in neutral, from 100 km/h (62.1 mph) within a distance of 72 m (236 ft). If the vehicle is incapable of attaining 100 km/h, it shall stop within a distance given by $S=0.05V+0.006V^2$, where S is the maximum stopping distance in m, and V is the test speed in km/h.

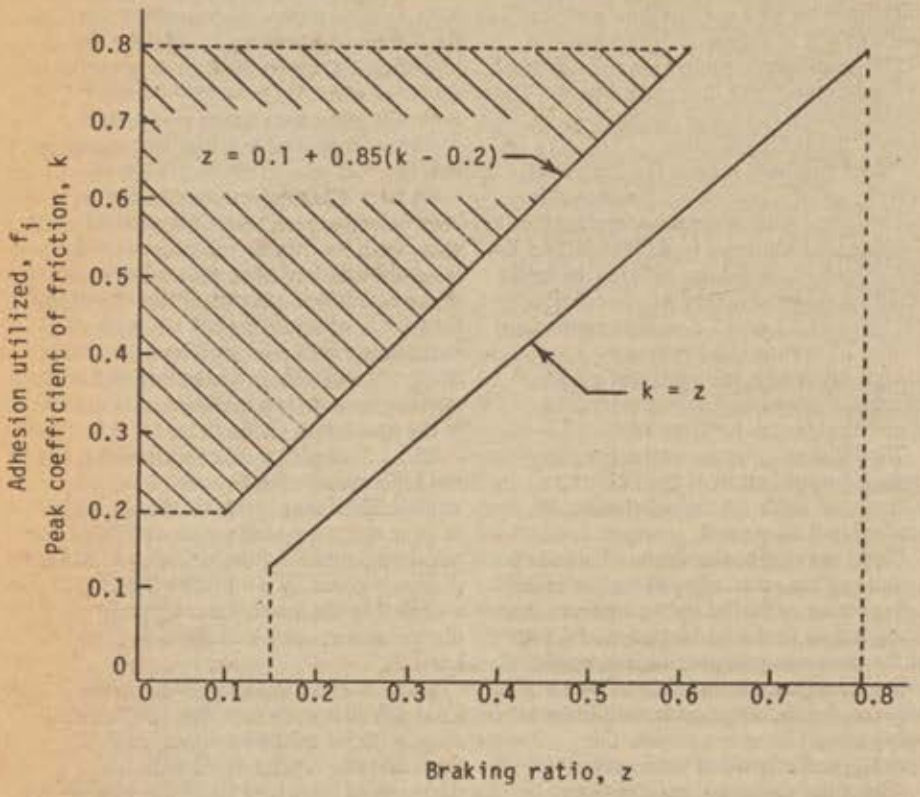
S5.1.2. *Adhesion Utilization.* Adhesion utilization curves for both front and rear axles of the vehicle are generated for a speed of 50 km/h (31.1 mph), in gear, for both GVWR and LLVW conditions. If the vehicle is not equipped with an anti-lock systems, the adhesion utilization curves shall meet the requirements of S5.1.2.1 and S5.1.2.2, as shown in Figure 1. If the vehicle is equipped with an anti-lock system, the curves are generated with the anti-lock system disabled, and only the requirement of S5.1.2.1 shall be met.

S5.1.2.1. *Braking efficiency of individual axles.* For all values of peak coefficient of friction, k, between 0.2 and 0.8, each adhesion utilization curve shall be situated to the right of a line defined by $z = 0.1 + 0.85 (k - 0.2)$, where z is the braking ratio.

S5.1.2.2. *Wheel lockup sequence.* For all braking ratios between 0.15 and 0.8, each adhesion utilization curve for a front axle shall be situated above the corresponding curve for the rear axle.

Figure 1

Adhesion Utilization Requirements



S5.1.3. *Fade and recovery.*

S5.1.3.1. *Hot performance.* After heating according to the procedure specified in S7.11.1, the vehicle shall stop, from 100 km/h (62.1 mph), with its transmission in neutral and with a pedal force equal to the average pedal force on the shortest cold effectiveness stop at GVWR, within a distance equal to the shorter of:

(a) 91 m (298 ft), or

(b) The shortest stopping distance achieved in the cold effectiveness test at GVWR divided by 60%.

If the vehicle is incapable of attaining 100 km/h, it is tested at the same speed used for the cold effectiveness test at GVWR, and the distance in (a) is given by $S=0.05V+0.0086V^2$, where S is the maximum stopping distance in m and V is the test speed in km/h.

S5.1.3.2. *Recovery performance.* After conducting the cooling stops according to procedure specified in S7.11.3, the vehicle shall stop from 100 km/h (62.1 mph), with its transmission in neutral and with a pedal force equal to the average pedal force on the shortest cold effectiveness stop at GVWR, in a distance that is:

(a) Not longer than the shortest stopping distance achieved in the cold effectiveness test at GVWR divided by 70%, and

(b) Not shorter than the shortest stopping distance achieved in the cold effectiveness test at GVWR divided by 120%.

If the vehicle is incapable of attaining 100 km/h, it is tested at the same speed used for the cold effectiveness test at GVWR.

S5.1.4. *Spike stops.* Each vehicle shall make 10 spike stops from 50 km/h (31.1 mph).

S5.2. *Partial service brake system performance.*

S5.2.1. *Hydraulic circuit failure.*

S5.2.1.1. For vehicles manufactured with a split service brake system, in the event of any rupture or leakage type of failure in a single subsystem, other than a structural failure of a housing that is common to two or more subsystems, the remaining portions of the service brake system shall continue to operate and shall stop the vehicle from 100 km/h (62.1 mph) within a distance of 155 m (509 ft). If the vehicle is incapable of attaining 100 km/h, it shall stop within a distance given by $s=0.05V+0.015V^2$, where S is the maximum stopping distance in m, and V is the test speed in km/h.

S5.2.1.2. For vehicles not manufactured with a split service brake system, in the event of any one rupture or leakage type of failure in any component of the service brake system and after activation of the brake system indicator as specified in S5.4.5.1, the vehicle shall, by operation of the service brake control, stop 10 times consecutively from 100 km/h (62.1 mph) within a distance of 155 m (509 ft.) If the vehicle is incapable of attaining 100 km/h, it shall stop within a distance given by $S=0.05V+0.015V^2$, where S is the maximum stopping distance in m, and V is the test speed in km/h.

S5.2.2. *Inoperative brake power assist unit or brake power unit.*

S5.2.2.1. *Engine failure (system charged).* The service brakes on a vehicle equipped with one or more brake power assist units or brake power units, with all such systems fully charged at the beginning of the stop but the vehicle's engine not running, shall stop the vehicle once from 100 km/h (62.1 mph) within a distance of 72m (236 ft). If the vehicle is incapable of attaining 100 km/h, it shall stop within a distance given by $S=0.05V+0.0067V^2$, where S is the maximum stopping distance in m and V is the test speed in km/h.

S5.2.2.2. *Unit failure (system depleted).* The service brakes on a vehicle equipped with one or more brake power assist units or brake power units, with one such unit inoperative and depleted of all reserve capability, shall stop the vehicle from 100 km/h (62.1 mph) within a distance of 155 m (509 ft). If the vehicle is incapable of attaining 100 km/h, it shall stop within a distance given by $S=0.05V+0.0015V^2$, where S is the maximum stopping distance in m, and V is the test speed in km/h.

S5.2.3. *Failed anti-lock or variable proportioning system.* The service brakes on a vehicle equipped with one or more anti-lock or variable proportioning systems, in the event of any single failure (structural or functional) in any one such system, shall stop the vehicle from 100 km/h (62.1 mph) within a distance of 80 m (263 ft). If the vehicle is incapable of attaining 100 km/h, it shall stop within a distance given by $S=0.005V+0.0075V^2$, where S

is the maximum stopping distance in m, and V is the test speed in km/h.

S5.3. *Parking brake system performance.* The requirements of S5.3.1 and S5.3.2 shall be met with a force applied to the parking brake control not exceeding 500 N (113 lb) for a foot-operated system or 320 N (72 lb) for a hand-operated system.

S5.3.1. *Gradient holding.* The parking brake system shall hold the vehicle stationary for 5 minutes in both a forward and reverse direction on a 20 percent grade, with the vehicle's transmission in neutral.

S5.3.2. *Dynamic performance.* The parking brake system shall stop the vehicle, with its transmission in neutral, from 60 km/h (37.3 mph) within a distance of 73 m (238 ft). In addition, the final deceleration rate just prior to stopping shall be at least 1.5m/sec^2 (4.92 ft/sec^2).

S5.4. *Equipment requirements.*

S5.4.1. *Service brake system.* Each vehicle shall be equipped with a service brake system acting on all wheels. Wear of the brakes shall be compensated for by means of a system of automatic adjustment.

S5.4.2. *Parking brake system.* Each vehicle shall be equipped with a parking brake system of a friction type with solely mechanical means to retain engagement.

S5.4.3. *Controls.* The service brakes shall be activated by means of a foot control. The control of the parking brake shall be independent of the service brake control, and may be either a hand or foot control. All service brake system requirements, including the partial system requirements of S5.2, shall be met solely by use of the service brake control.

S5.4.4. *Reservoirs.*

§ 5.4.4.1. *Master cylinder reservoirs.* A master cylinder shall have a reservoir compartment for each service brake subsystem serviced by the master cylinder. Loss of fluid from one compartment shall not result in a complete loss of brake fluid from another compartment.

§ 5.4.4.2. *Reservoir capacity.* Reservoirs, whether for master cylinders or other type systems, shall have a total minimum capacity equivalent to the fluid displacement resulting when all the wheel cylinders or caliper pistons serviced by the reservoirs move from a new lining, fully retracted position (as adjusted initially to the manufacturer's recommended setting) to a fully worn, fully applied position, as determined in accordance with § 7.15(c) of this standard. Reservoirs shall have completely separate compartments for each subsystem except that in reservoir systems utilizing a portion of the reservoir for a common supply to two or more subsystems, individual partial compartments shall each have a minimum volume of fluid equal to at least the volume displaced by the master cylinder piston servicing the subsystem, during a full stroke of the piston. Each brake power unit reservoir servicing only the brake system shall have a minimum capacity equivalent to the fluid displacement required to charge the system piston(s) or accumulator(s) to normal operating pressure plus the displacement resulting when all the wheel cylinders or caliper pistons serviced by the reservoir or accumulator(s) move from a new lining fully retracted position (as adjusted initially to the manufacturer's recommended setting) to a fully worn, fully applied position.

§ 5.4.4.3. *Reservoir labeling.* Each vehicle shall have a brake fluid warning statement that reads as follows, in letters at least 3.2 mm (1/8 inch) high: "WARNING, Clean filler cap before removing. Use only _____ fluid from a sealed container." (Inserting the recommended type of brake fluid as specified in 49 CFR 571.116, e.g., "DOT 3".) The lettering shall be:

(a) Permanently affixed, engraved or embossed;

(b) Located so as to be visible by direct view, either on or within 100 mm (3.94 inches) of the brake fluid reservoir filler plug or cap; and

(c) Of a color that contrasts with its background, if it is not engraved or embossed.

§ 5.4.4.4. *Fluid level indication.* Brake fluid reservoirs shall be so constructed that the level of fluid can be checked without need for the reservoir to be opened. This requirement is deemed to have been met if the vehicle is equipped with a brake fluid level indicator meeting the requirements of § 5.4.5.1(b).

§ 5.4.5. *Brake system warning indicator.* Each vehicle shall have one or more visual brake system warning indicators, mounted in front of and in clear view of the driver, which meet the requirements of § 5.4.5.1 through § 5.4.5.5. In addition, a vehicle manufactured without a split service brake system shall be equipped with an audible warning signal that activates under the conditions specified in § 5.4.5.1(a).

S5.4.5.1. *Activation.* An indicator shall be activated when the ignition (start) switch is in the "on" ("run") position and whenever any of conditions (a), (b) or (c) occur.

(a) A gross loss of fluid or fluid pressure (such as caused by rupture of a brake line but not by a structural failure of a housing that is common to two or more subsystems) as indicated by one of the following conditions (chosen at the option of the manufacturer):

(1) A drop in the level of the brake fluid in any master cylinder reservoir compartment to less than the recommended safe level specified by the manufacturer or to one-fourth of the fluid capacity of that reservoir compartment, whichever is greater.

(2) For vehicles equipped with a split service brake system, a differential pressure of 1.5 MPa (218 psi) between the intact and failed brake subsystems, measured at a master cylinder outlet or a slave cylinder outlet.

(3) A drop in the supply pressure in a brake power unit to a one-half of the normal system pressure.

(b) A total functional electrical failure in an anti-lock or variable proportioning brake system.

(c) Application of the parking brake.

S5.4.5.2. *Function check.* All indicators shall be activated as a check of function either when the ignition (start) switch is turned to the "on" ("run") position when the engine is not running, or when the ignition (start) switch is in a position between "on" ("run") and "start" that is designated by the manufacturer as a check position, and the transmission shift lever is in a position other than a forward or reverse drive position.

S5.4.5.3. *Duration.* Each indicator activated due to a condition specified in S5.4.5.1. shall remain activated as long as the condition exists, whenever the ignition (start) switch is in the "on" ("run") position, whether or not the engine is running.

S5.4.5.4. *Function.* When a visual warning indicator is activated, it may be continuous or flashing, except that the visual warning indicator on a vehicle not equipped with a split service brake system shall be flashing. The audible warning required for a vehicle manufactured without a split service brake system may be continuous or intermittent.

S5.4.5.5. *Labeling.* (a) Each visual indicator shall display a word or words, in accordance with the requirements of Standard No. 101 (49 CFR 571.101) and/or this section, which shall be legible to the driver under all daytime and nighttime conditions when activated. Unless otherwise specified, the words shall have letters not less than 3.2 mm (⅛ inch) high and the letters and background shall be of contrasting colors, one of which is red. Words or symbols in addition to those required by Standard No. 101 and/or this section may be provided for purposes of clarity.

(b) Vehicles manufactured with a split service brake system may use a single common brake warning indicator. If a single common indicator is used, it shall display the word "Brake"

(c) A vehicle manufactured without a split service brake system shall use a separate indicator to indicate the failure condition in S5.4.1(a). This indicator shall display the words "STOP—BRAKE FAILURE" in block capital letters not less than 6.4 mm (¼ inch) in height.

(d) If separate indicators are used for one or more than one of the functions described in S5.4.5.1(a) to S5.4.5.1(c), the indicators shall display the following wording:

(1) If a separate indicator is provided for the low brake fluid condition in S.5.4.5.1(a)(1), the words "Brake Fluid" shall be used except for vehicles using hydraulic system mineral oil.

(2) If a separate indicator is provided for the gross loss of pressure condition in S5.4.5.1(a)(2), the words "Brake Pressure" shall be used.

(3) If a separate indicator is provided for anti-lock failure as specified in S5.4.5.1(b), the single word "Antilock" or "Anti-Lock" may be used. The letters and background of a separate indicator for an antilock system shall be of contasting colors, one of which is yellow.

(4) If a separate indicator is provided for application of the parking brake as specified for S5.4.5.1(c), the single word "Park" may be used.

(5) If a separate indicator is provided for any other function, the display shall include the word "Brake" and appropriate additional labeling.

S5.5. *Brake system integrity.* Each vehicle shall meet the complete performance requirements of S5 without:

(a) Detachment or fracture of any component of the braking system, such as brake springs and brake shoe or disc pad facing, other than minor cracks that do not impair attachment of the friction facing. All mechanical components of the braking system shall be intact and functional. Friction facing tearout (complete detachment of lining) shall not exceed 10 percent of the lining on any single frictional element.

(b) Any visible brake fluid or lubricant on the friction surface of the brake, or leakage at the master cylinder or brake power unit reservior cover, seal, and filler openings.

S6. *Test Conditions.* The performance requirements of S5 shall be met under the following conditions. Where a range of conditions is specified, the vehicle shall meet the requirements of all points within the range.

S6.1. *Ambient conditions.*

S6.1.1. *Ambient temperature.* The ambient temperature is any temperature between 0 °C (32 °F) and (40 °F).

S6.1.2. *Wind speed.* The wind speed is not greater than 5m/sec (11.2 mph).

S6.2. *Road test surface.*

S6.2.1. *Skid number.* The road test surfact has a skid number of 81.

S6.2.2. *Gradient.* Except for the parking brake gradient holding test, the test surface has no more than a 1% gradient in the direction of testing and no more than a 2% gradient perpendicular to the direction of testing.

S6.2.3. *Lane width.* Road tests are conducted on a test lane 3.5m (11.5ft) wide.

S6.3. *Vehicle conditions.*

S6.3.1. *Vehicle weight.* Except for the test at LLVW in S7.7, S7.8 and S7.9, the vehicle is loaded to its GVWR such that the weight on each axle as measured at the tire-ground interface is in proportion to its GAWR, except that the fuel tank is filled to 100 percent of capacity at the beginning of testing (corresponding to full GVWR loading) and may not be less than 75 percent of capacity during any part of the testing. However, if the weight on any axle of a vehicle at lightly loaded vehicle weight exceeds the axle's proportional share of the gross vehicle weight rating, the load required to reach GVWR is placed so that the weight on that axle remains the same as at lightly loaded vehicle weight.

For the tests at LLVW specified in S7.7, S7.8 and S7.9, the vehicle is loaded to its lightly loaded vehicle weight, with the added weight distributed in the front passenger seat area.

S6.3.2. *Lining preparation.* At the beginning of preparation for the road test in S7.1, the brakes of the vehicle are in the same condition as when the vehicle is manufactured. No burnishing or other special preparation is allowed, unless all vehicles sold to the public are similarly prepared as a part of the manufacturing process

S6.3.3. *Adjustment and repairs.* the requirements must be met without replacing any brake system part or making any adjustments to the brake system except as specified in this standard. Where a brake adjustment is specified in this standard, adjust the brakes, including the parking brakes, in accordance with the manufacturer's recommendation. Automatic adjusters are operational throughout the entire test sequence and are adjusted manually or by making stops, as recommended by the manufacturer. The brakes are adjusted in this manner prior to the beginning of the road test sequence.

S6.3.4. *Tire iniflation pressure.* Tires are inflated to the pressure recommended by the vehicle manufacturer for the GVWR of the vehicle.

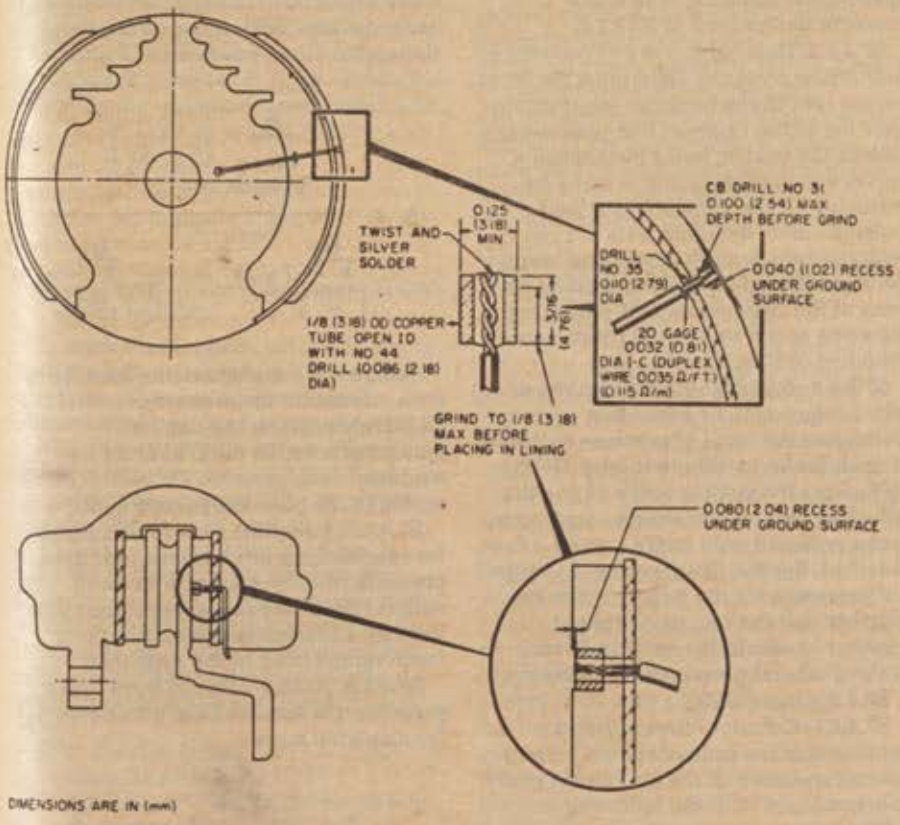
S6.3.5. *Engine.* Engine idle speed and ignition timing settings are according to the manufacturer's recommendations. If the vehicle is equipped with an adjustable engine speed governor, it is adjusted according to the manufacturer's recommendation.

S6.3.6. *Vehicle openings.* All vehicle openings (doors, windows, hood, trunk, convertible top, cargo doors, etc.) are closed except as required for instrumentation purposes.

S6.4. *Instrumentation—Brake temperature.* The brake temperature is measured by plug-type thermocouples installed in the approximate center of the facing length and width the most heavily loaded shoe or disc pad, one per brake, as shown in Fiqure 2. A second thermocouple may be installed at the beginning of the test sequence if the lining wear is expected to reach a point causing the first thermocouple to contact the metal rubbing surface of a drum or rotor. For center-grooved shoes or pads, thermocouples are installed within 3 mm (.12 in) to 6 mm (.24 in) of the groove and as close to the center as possible.

Figure 2

Typical Plug-Type Thermocouple Installations



S6.5. *Procedural conditions.*

S6.5.1. *Vehicle position and attitude.* The vehicle is aligned in the center of the lane at the start of each brake application. Stops are made without any part of the vehicle leaving the lane and without rotation of the vehicle about its vertical axis of more than ±15° from the center line of the test lane at any time during any stop. Steering corrections are permitted.

S6.5.2. *Transmission selector control.* For tests in neutral, the transmission selector control is in neutral for all decelerations. For tests in gear, the transmission selector is in the control position recommended by the manufacturer for driving on a level surface at the applicable test speed. To avoid engine stall during tests required to be run in gear, a manual transmission may be shifted to neutral (or the clutch disengaged) when the vehicle speed is below 30 km/h (18.6 mph).

S6.5.3. *Wheel lockup.* Unless otherwise specified, stops are made without lockup of any wheel at speeds greater than 15 km/h (9.3 mph).

S6.5.4. *Control forces.* Unless otherwise specified, the force applied to a service brake control is not more than 500 N (172.4 lb) nor less than 65 N (14.6 lb).

S6.5.5. *Initial brake temperature.* Unless otherwise specified, the initial brake temperature is 50 °C (122 °F) to 100 °C (212 °F). If the lower limit of initial brake temperature for the first stop in a test sequence (other than a parking brake grade holding test) has not been reached, the brakes are heated to the initial brake temperature by making one or more brake applications from a speed not exceeding 100 km/h (62.1 mph), at a deceleration not greater than 3 m/sec^2 (9.8 ft/sec^2).

S6.5.6. *Stopping distance.* The braking performance of a vehicle is determined by measuring the stopping distance from a given initial speed. Unless otherwise specified and subject to the constraints above, the vehicle is to be stopped in the shortest distance achievable (best effort) on all stops. Where more than one stop is allowed for a given set of test conditions, a vehicle is deemed to comply with the corresponding stopping distance requirements if at least one of the stops is made within the prescribed distance.

S7 *Test procedures and sequence.* Each vehicle shall meet all the applicable requirements of S5 when tested according to the procedures and in the sequence set forth below.

When the transmission selector control is required to be in neutral for a deceleration, a stop or snub is made in accordance with the following procedures: (1) Exceed the test speed by 6 to 12 km/h (3.7 to 7.5 mph); (2) close the throttle and coast in gear to approximately 3 km/h (1.9 mph) above the test speed; (3) shift to neutral; and (4) when the test speed is reached, apply the brakes.

S7.1. *Preparation*

S7.1.1. *Instrumentation.* Install shut-off valves and pressure transducers in the hydraulic system to allow the front and rear brakes to be operated independently and to allow measurement of front and rear brake line pressures. Valves and transducers are located downstream of any proportioning valves.

S7.1.2. *Load vehicle.* Load the vehicle to its GVWR, with the load distributed between the axles in proportion to the GAWR's.

S7.1.3. *Pretest instrumentation check.* Conduct a general check of instrumentation by making 10 stops from a speed of not more than 50 km/h (31.1 mph), at a deceleration of not more than 3 m/sec^2 (9.8 ft/sec^2). The lower force limit of S6.5.4 does not apply to these stops. If instrument repair, replacement, or adjustment is necessary, make not more than 10 additional stops after such repair, replacement, or adjustment.

S7.2. *Service brake system—preburnish effectiveness test.* Make four stops from 100 km/h (62.1 mph).

S7.3. *Service brake system—cold effectiveness test at GVWR.*

S7.3.1. *Burnish.* At the option of the manufacturer, the brakes may be burnished by making 36 stops from 80 km/h (49.7 mph) at a deceleration rate of 3 m/sec^2 (9.8 ft/sec^2), with the transmission selector control in gear.

The lower force limit of S6.5.4 does not apply to these stops. The internal from the start of one service brake application to the start of the next is either the time necessary to reduce the initial brake temperature to 100 °C (212 °F), or the distance of 2 km (1.24 mi), whichever occurs first. Accelerate to 80 km/hr (49.7 mph) after each stop and maintain that speed until making the next stop. After burnishing, adjust the brakes as specified in S6.3.3.

S7.3.2 *Cold effectiveness stops.* Make four stops from 100 km/h (62.1 mph).

S7.3.3. *Reburnish.* At the option of the manufacturer, the brakes may be given an additional burnish of 50 stops according to the procedure specified in S7.3.1.

S7.3.4. *Cold effectiveness stops—retest.* If the optional reburnishing is selected, the four stops from 100 km/hr specified in S7.3.2 are also repeated. For purposes of determining required performance on the hot performance and recovery stops of the fade and recovery sequence, the best performance achieved of all stops in S7.3.2 and S7.3.4 and the corresponding mean pedal force is used as a baseline.

S7.4. *Adhesion utilization tests.*

S7.4.1. *Test procedure.*

S7.4.1.1 *Coast downs in neutral and in gear.* Coast in neutral and determine the time required to decelerate from 55 to 45 km/h (34.2 to 28.0 mph). Make six runs starting from 65 km/h (40.4 mph). Repeat with the transmission in gear appropriate for decelerating from 65 to 45 km/h (40.4 to 28.0 mph).

S7.4.1.2. *Preliminary snubs to determine front and rear brake pressures needed to achieve 6.4 m/sec² (21 ft/sec²) with all brakes operational.* With an initial brake temperature of 50–100 °C (122–212 °F) in each case, make four preliminary snubs to determine the front and rear brake pressures when the vehicle deceleration is 6.4 m/sec² (21 ft/sec²). Accelerate the vehicle to 70 km/h (43.5 mph), coast in gear to 65 km/h (40.4 mph), shift to neutral and apply the brakes at a constant front brake pressure until the vehicle reaches 45 km/h (28.0 mph). For subsequent snubs, adjust the brake pressure so that the deceleration time from 55 to 45 km/h (34.2 to 28.0 mph), is between .40 seconds and .46 seconds. The front and rear brake pressures for the snub having a deceleration time closest to 0.43 seconds are used in the front-only and rear-only brake tests which follow.

S7.4.1.3 *Front brake only test.* Make six snubs, in neutral, at the constant front brake pressure determined in S7.4.1.2, using the same initial brake temperatures. Determine the average value of the brake pressure actually maintained between 55 and 45 km/h (34.2 and 28.0 mph) for each snub, by recording brake pressure versus time. Record deceleration times from 55 to 45 km/h (34.2 to 28.0 mph) for each snub.

S7.4.1.4. *Rear brake only test.* Repeat S7.4.1.3 with only the rear brakes operational using the rear brake pressure determined in S7.4.1.2.

S7.4.1.5. *Determination of front versus rear brake pressure.* Determine the front versus rear brake pressure relationship over the entire range of line pressures. Unless the vehicle has a load sensing valve, this determination is made by static test. If the vehicle has a load sensing valve, dynamic tests are run with the vehicle both empty and loaded. Between 20 and 25 snubs are made for each of the two load conditions, using the same speed and initial conditions specified in S7.4.1.2.

S7.4.1.6. *Determination of front and rear brake push-out pressures.* Determine the level of pressure required at each brake to initiate torque. Do this by jacking the vehicle and rotating the wheel by hand while slowly increasing brake pressure until brake torque is first detected. Record the pressure. Average the pressures for the two front brakes together and the two rear brakes together to obtain the front and rear brake push-out pressures respectively.

S7.4.2. *Calculations.*

S7.4.2.1. Calculate the coastdown deceleration for each of the six runs in neutral and each of the six runs in gear in accordance with the following formula:

$$Z = \frac{2.778}{tg}$$

Where Z = deceleration (g), g = 9.8 m/sec² and t = time (seconds) to decelerate from 55 to 45 km/h (34.2 to 28.0 mph). Average the six coastdown decelerations in neutral (= coast in neutral) and the six coast-down decelerations in gear (= coast in gear).

S7.4.2.2. Determine the decelerations as in S7.4.2.1 for the front brakes only tests and the rear brakes only tests. Subtract the average coastdown deceleration in neutral from each of the six decelerations in each test series.

S7.4.2.3. Determine the front and rear braking forces from each of the six decelerations in each test series by:

$T = PZ$

Where T = braking force (N), P = total vehicle weight (N), and Z is the deceleration (g).

S7.4.2.4. Determine the braking force versus brake pressure relationship for the front brakes and for the rear brakes as follows:

Fit a straight line through the push-out pressure, zero force point and the group of six pressure, force data points determined in the snubs. The group of six data points is fit using the method of least squares. With this method, the slope of the line is defined as follows:

$$s = \frac{\sum_{i=1}^{6} (T_i x_i)}{\sum_{i=1}^{6} (x_i)^2 - x_0 \sum_{i=1}^{6} x_i}$$

Where s is the slope of the braking force versus brake pressure relationship (N/MPa), T_i is the braking force measured on snub i (N), x_i is the average brake pressure for snub i (MPa) and x_0 is the push-out pressure (MPa).

S7.4.2.5. Using the linear relationship for rear braking force versus rear brake pressure from S7.4.2.4 and the front versus rear brake pressure relationship from S7.4.1.5, determine rear braking force versus front brake prsessure.

S7.4.2.6. At any value of front brake pressure, the total vehicle deceleration is calculated from:

$$Z_T = \frac{T_1 + T_2}{P} + Z_{\text{coast in gear}}$$

Where Z_T = total vehicle deceleration (g), T_1 = front braking force (N) at the given front brake pressure, T_2 = rear braking force corresponding to the same front brake pressure, P = total vehicle weight (N), and $Z_{\text{coast in gear}}$ is the average coastdown deceleration in gear.

S7.4.2.7. At any level of front brake pressure, the adhesion utilization of the brakes on both axles is calculated from:

$$f_1 = \frac{T_1 + D}{P_1 + Z_T \frac{h}{E} P}$$

$$f_2 = \frac{T_2 + D}{P_2 - Z_T \frac{h}{E} P}$$

Where f_1 = adhesion utilization of the front axle, f_2 = adhesion utilization of the rear axle, P_1 = static weight on the front

axle (N), P_2 = static weight on the rear axle (N), h = center of gravity height (mm), E = vehicle wheelbase (mm), D = engine and drive train drag such that:

For non-driving axle: D = O
For the driving axle:
$D = P[Z_{coast\ in\ gear} - Z_{neutral}]$

S7.4.2.8. The adhesion utilization for all other states of load is determined by repeating S7.4.2.6 and S7.4.2.7 using appropriate values of P, P_1, P_2 and h, and adjusting the coastdown deceleration in gear by multiplying it by the ratio:

$$\frac{P_s \text{test weight}}{P_{desired\ weight}}$$

(Values of T_1, T_2, D and E are independent of vehicle loading).

S7.4.2.9. Plot f_1 and f_2 versus Z_T for both the laden and the unladen condition. These are the adhesion utilization curves for the in-gear case.

S7.5. *Service brake system—high speed effective tests at GVWR.* Make 4 stops from 80 percent of the maximum speed of the vehicle, in gear.

S7.6 *Stops with engine off.* (For vehicles equipped with one or more brake power units or brake power assist units). Make four stops from 100 km/h (62.1 mph), in neutral, with the engine not running. All reservoirs are fully charged prior to the beginning of each stop.

S7.7. *Service brake system—cold effectiveness tests at LLVW.*

S7.7.1. *Unload vehicle.* Decrease the vehicle load to LLVW.

S7.7.2. *Cold effectiveness stops.* Make four stops from 100 km/h (62.1 mph).

S7.8. *Service brake system—high speed effectiveness tests at LLVW.* Make 4 stops from 80 percent of the maximum speed of the vehicle, in gear.

S7.9. *Partial system test at LLVW.*

S7.9.1. *Circuit failure.* Alter the service brake system to produce any one rupture or leakage type of failure, other than a structural failure of a housing that is common to two or more subsystems. Determine the control force, pressure level, or fluid level (as appropriate for the indicator being tested) necessary to activate the brake warning indicator. After the brake warning indicator has activated, make four stops if the vehicle is equipped with a split service brake system or 10 stops if the vehicle is not so equipped, each from 100 km/h (62.1 mph) in neutral, by a continuous application of the service brake control. Restore the service brake system to normal at the completion of this test. Repeat the entire sequence for each of the other subsystems.

S7.9.2. *Failed anti—lock or variable proportioning system.* (For vehicles equipped with anti-lock and/or variable proportioning brake systems). Disconnect the functional power source, or otherwise render the anti-lock system inoperative, or disconnect the variable proportioning brake system. Make four stops, each from 100 km/h (62.1 mph). Determine whether the brake system indicator is activated when any electrical power source to the ant-lock or variable proportioning unit is disconnected. Restore the system to normal at the completion of this test. If more than one anti-lock or variable proportioning brake subsystem is provided repeat for each subsystem provided.

S7.10. *Partial system tests at GVWR.*

S7.10.2. *Load vehicle.* Restore the vehicle to its GVWR loading.

S7.10.2. *Circuit failure.* Repeat S7.9.1.

S7.10.3. *Failed anti-lock or variable proportioning system.* Repeat S7.9.2.

S7.10.4. *Inoperative brake power assist unit or brake power unit.* (For vehicles equipped with one or more brake power units or brake power assist units). Disconnect the primary source of power for one brake power assist unit or brake power unit, or one of the brake power unit or brake power assist unit subsystems if two or more subsystems are provided. If the brake power or brake power assist unit operates in conjunction with a backup system and the backup system is automatically activated in the event of a primary power source failure, the backup system is operative during this test. Exhaust any residual brake power reserve capability of the disconnected system. On vehicles with brake power units, disconnect the primary source of power. Make four stops, each from 100 km/h (62.1 mph) by a continuous application of the service brake control. Restore the system to normal at completion of this test. For vehicles equipped with more than one brake power unit or brake power assist unit, conduct tests for each in turn.

S7.11. *Fade and recovery tests (GVWR).*

S7.11.1. *Heating snubs.* [Proposed alternative 1] Make 80 snubs from 55 km/h to 25 km/h (34.2 to 15.6 mph), at a constant deceleration rate of 2.4 m/sec² (7.9 ft/sec²). The lower force limit in S6.5.4 does not apply to these snubs. Establish and initial brake temperature before the first brake application of 55 to 65°C (131 to 149°F). Initial brake temperatures before brake applications for subsequent stops are those occurring at the distance intervals. Attain the required deceleration within one second and, as a minimum, maintain it for the remainder of the snub. Maintain an interval of 15 seconds between the start of brake applications. Accelerate as rapidly as possible to the initial test speed immediately after each snub. Immediately after the 80th snub, accelerate to 100 km/h (62.1 mph) to commence the hot performance test.

[Proposed alternative 2] Make 15 snubs from 120 km/h (74.6 mph) or 80% of the maximum speed of the vehicle, whichever is slower, to one-half the initial speed. Maintain a constant deceleration rate of 3.0 m/sec² (9.8 ft/sec²). The lower force limit in S6.5.4 does not apply to these snubs. Establish an initial brake temperature before the first brake application of 55 to 65°C (131 to 149°F). Initial brake temperatures before brake applications for subsequent stops are those occurring at the distance intervals. Attain the required deceleration within one second and, as a minimum, maintain it for the remainder of the snub. Maintain an interval of 30 seconds between the start of brake applications. Accelerate as rapidly as possible to the initial test speed immediately after each snub. Immediately after the 15th snub, accelerate to 100 km/h (62.1 mph) to commence the hot performance test.

S7.11.2 *Hot performance test.* Make one stop from 100 km/h (62.1 mph), in neutral, at a pedal force not greater than the mean pedal force actually measured on the best cold performance stop in either S7.3.2 or S7.3.4. Immediately after the stop, drive 1.5 km (.93 mi) at 50 km/h (31.1 mph) before the first cooling stop.

S7.11.3. *Brake cooling.* Make four stops from 50 km/h (31.1 mph), in gear, at a constant deceleration rate of 3.0 m/sec² (9.8 ft/sec²). The lower force limit in S6.5.4 does not apply to these stops. Immediately after the first through third stops, the vehicle shall be accelerated at the maximum rate to 50 km/h (31.1 mph) and that speed maintained until beginning the next stop at a distance of 1.5 km (0.95 mi) since the beginning of the previous stop. Immediately after the fourth stop, accelerate the vehicle at the maximum rate to 100 km/h (62.1 mph) and maintain that speed until beginning the recovery performance stop at distance of 1.5 km (0.93 mi) after the beginning of the fourth cooling stop.

S7.11.4. *Recovery performance test.* Make one stop from 100 km/h (62.1 mph), under the same conditions as for the hot performance test in S7.11.2.

S7.12. *Parking brake performance.*

S7.12.1. *Conditions.*

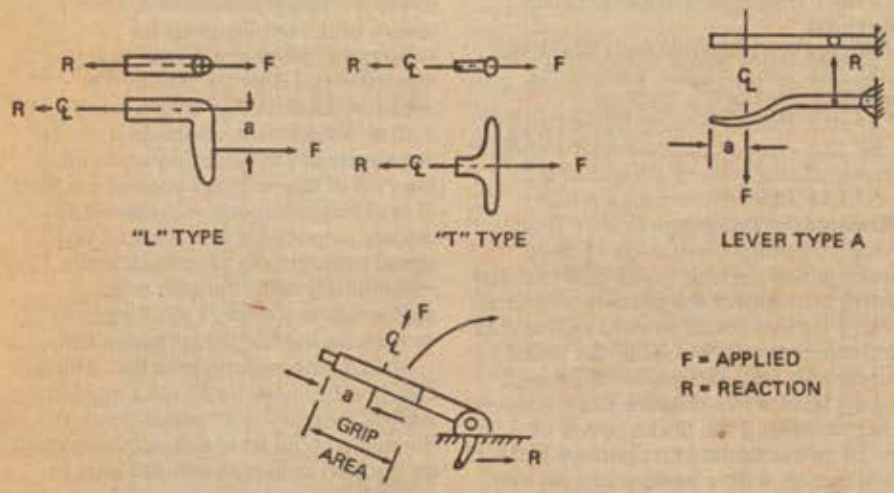
S7.12.1.1. *Application force.* The parking brake shall be actuated by a single application not exceeding the limits specified in S5.3, except that a series of applications to achieve the

specified force may be made in the case of a parking brake system design that does not allow the application of the specified force in a single application. The force required for actuation of a hand-operated brake system shall be measured at the center of the hand grip area or at a distance of 40 mm (1.57 in) from the end of the actuation level, as illustrated in Figure 3.

Figure 3

Location for Measuring Brake Application Force

(Hand Brake)



Dimension a = 40mm (1.57 in)

S7.12.1.2. The lower temperature limit of S6.5.5 does not apply to the test in S7.12.2 and S7.12.3.

S7.12.1.3. For vehicles with parking brake systems not utilizing the service brake friction elements, the friction elements of such a system are burnished prior to the parking brake tests, according to the published recommendations furnished to the purchaser by the manufacturer. If no recommendations are furnished, the vehicle's parking brake is tested in an unburnished condition.

S7.12.2. *Gradient Hold.* Drive the vehicle onto a 20 percent grade with the longitudinal axis of the vehicle in the direction of the slope of the grade, stop the vehicle and hold it stationary by application of the service brake control, and place the transmission in neutral. With the service brake applied sufficiently to just keep the vehicle from rolling, apply the parking brake as specified in S7.12.1.1. Following the application of the parking brake, release all force on the service brake control and, if the vehicle remains stationary, start the measurement of time. If the vehicle does not remain stationary, reapplication of a force to the parking brake control at the level specified in S7.12.1.1 as appropriate for the vehicle being tested (without release of the ratcheting or other holding mechanism of the parking brake) may be used twice to attain a stationary position. Verify the operation of the parking brake application indicator. Following observation of the vehicle in a stationary condition for the specified time in one direction, repeat the same test procedure with the vehicle orientation in the opposite direction on the same grade.

S7.12.3. *Dynamic test.* Make one stop from 60 km/h (37.3 mph), in neutral, with a force applied to the parking brake control not exceeding the values specified in S7.12.1.1. If the required performance is not achieved, a second attempt is permitted.

S7.13. *Spike stops.* Make 10 successive spike stops from 50 km/h (31.1 mph) with the transmission in neutral, with no reverse stops. Make the spike stops by applying a control force of 900 N (202.3 lb) while recording control force versus time. Maintain the control force until the vehicle has stopped. The prohibition of wheel lockup in S6.5.3 does not apply to this test.

S7.14. *Service brake system-Final effectiveness test.* Make four stops from 100 km/h (62.1 mph).

S7.15. *Final inspection.* Inspect—

(a) The service brake system for detachment or fracture of any components, such as brake springs and brake shoes or disc pad facing.

(b) The friction surface of the brake, the master cylinder or brake power unit reservoir cover, and seal and filler openings, for leakage of brake fluid or lubricant.

(c) The master cylinder or brake power unit reservoir for compliance with the volume and labeling requirements of S5.4.4.2 and S5.4.4.3. In determining the fully applied worn condition, assume that the lining is worn to (1) rivet or bolt heads on riveted or bolted linings or (2) within 0.8 mm (1/32 inch) of shoe or pad mounting surface on bonded linings, or (3) the limit recommended by the manufacturer, whichever is larger relative to the total possible shoe or pad movement. Drums or rotors are assumed to be at nominal design drum diameter or rotor thickness. Linings are assumed adjusted for normal operating clearance in the released position.

(d) The brake system indicators, for compliance with operation in various key positions, lens color, labeling, and location, in accordance with S5.4.5.

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Barry Felrice,

Associate Administrator for Rulemaking.

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