TP-122-02
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U.S. DEPARTMENT OF TRANSPORTATION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

LABORATORY TEST PROCEDURE

FOR

FMVSS 122

Motorcycle Brake Systems

ENFORCEMENT
Office of Vehicle Safety Compliance
Room 6111, NVS-220
400 Seventh Street, SW
Washington, DC 20590

OVSC LABORATORY TEST PROCEDURE NO. 122

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REVISION CONTROL LOG
FOR OVSC LABORATORY TEST PROCEDURES

TP-122, Motorcycle Brake Systems

TEST PROCEDURE		FMVSS 122		DESCRIPTION
REV. No.	DATE	AMENDMENT	EFFECTIVE DATE	
01	3/30/92	_	1/1/74	Original release
02	8/01/06	66 FR 42617 8/14/01	8/14/02	Reduce minimum hand lever force and minimum foot pedal force requirements
03				

1. PURPOSE AND APPLICATION OF THIS TEST PROCEDURE

The Office of Vehicle Safety Compliance (OVSC) is providing this Laboratory Test Procedure (TP) for the use of its contractor laboratories. The purpose of this TP is to provide guidelines for obtaining data in OVSC compliance testing programs and a uniform data recording format. This TP does not limit a laboratory's testing methods to the procedures specified in the TP or specific brands of testing equipment. However, any deviation from the TP's testing procedures or recommended testing equipment must be approved by the Contracting Officer's Technical Representative (COTR).

The data obtained in an OVSC compliance test are used to determine if the test specimen, a specific vehicle or item of motor vehicle equipment, meets the requirements in the TP. In some cases the TP does not include all of the various minimum performance requirements that are part of the associated Federal Motor Vehicle Safety Standard (FMVSS). Recognizing applicable test tolerances, the TP may specify test conditions that are less severe than the minimum requirements specified in the FMVSS.

If a contract laboratory views any part of the TP to be in conflict with the associated FMVSS or observes deficiencies in the TP, the contract laboratory shall advise the COTR and resolve the discrepancy prior to the start or resumption of compliance testing.

Legal Note: The OVSC Test Procedures are prepared for the limited purpose of use by independent laboratories under contract to conduct compliance tests for the OVSC. The TP's are not rules, regulations or NHTSA interpretations regarding the FMVSS. The TP's are not intended to limit the requirements of the applicable FMVSS(s). In addition the TP's may be modified by the OVSC at any time without notice, and the COTR may direct or authorize contractors to deviate from these procedures, as long as the tests are performed in a manner consistent with the FMVSS itself and within the scope of the contract. TP's may not be relied upon to create any right or benefit in any person. Therefore, compliance of a vehicle or item of motor vehicle equipment is not guaranteed if the manufacturer limits its certification tests to those described in the TP.

2. GENERAL REQUIREMENTS

As a general rule, any motor vehicle type having a seat or saddle for the rider and designed to travel on not more than three wheels in contact with the ground is classified as a motorcycle. Federal Motor Vehicle Safety Standard (FMVSS) No. 122, "Motorcycle Brake Systems," specifies requirements for motorcycle brakes to ensure safe performance under normal and emergency conditions.

3. SECURITY

The contractor shall provide appropriate security measures to protect the OVSC test vehicles and parts during the entire compliance testing program. The contractor is also financially responsible for any acts of theft and/or vandalism which occur during the storage of test vehicles. Security problems which arise shall be reported by telephone to the COTR and the Industrial Property Manager (IPM), Office of Contracts and Procurement (OCP), within 2 working days after the incident. A letter containing specific details of the security problem shall be sent to the IPM (with copy to the COTR) within 4 working days. The contractor shall protect and segregate all photographs and data that evolve from compliance testing. No information concerning the vehicle safety compliance testing program shall be released to anyone except the COTR, unless specifically authorized by the COTR or the COTR's Branch or Division Chief.

NO INDIVIDUALS, OTHER THAN CONTRACTOR PERSONNEL DIRECTLY INVOLVED IN THE COMPLIANCE TESTING PROGRAM, SHALL BE ALLOWED TO WITNESS ANY VEHICLE COMPLIANCE TEST UNLESS SPECIFICALLY AUTHORIZED BY THE COTR.

4. GOOD HOUSEKEEPING

Contractors shall maintain the entire vehicle compliance testing area, test fixtures and instrumentation in a neat, clean and painted condition with test instruments arranged in an orderly manner consistent with good test laboratory housekeeping practices.

5. TEST SCHEDULING AND MONITORING

The contractor shall submit a vehicle test schedule to the COTR prior to conducting the first compliance test. Tests shall be completed as required in the contract. Scheduling shall be adjusted to permit vehicles to be tested to other FMVSSs as may be required by the OVSC. All compliance testing shall be coordinated with the COTR in order to allow monitoring by the COTR or other OVSC personnel.

6. TEST DATA DISPOSITION

The contractor shall make all preliminary compliance test data available to OVSC within four hours after the test, if requested. Final test data, including digital printouts and computer generated plots (if applicable), shall be furnished to the COTR within 5 working days. Additionally, the contractor shall analyze the preliminary test results as directed by the COTR. All backup data sheets, strip charts, recordings, plots, technician's notes etc., shall be either sent to the COTR or destroyed at the conclusion of each delivery order, purchase order, etc.

7. GOVERNMENT FURNISHED PROPERTY (GFP)

ACCEPTANCE OF TEST VEHICLES

The Contractor has the responsibility of accepting each test vehicle whether delivered by a new vehicle dealership or another vehicle transporter. In both instances, the contractor acts in the OVSC's behalf when signing an acceptance of the test vehicle delivery. When a vehicle is delivered, the contractor must check to verify the following:

A. All options listed on the "window sticker" are present,
B. Tires and wheels are new and the same as listed,
C. There are no dents or other exterior flaws,
D. The vehicle has been properly prepared and is in running condition, and
E. Owner's manual, warranty document, consumer information, and extra set of keys are present.

A Vehicle Condition form will be supplied to the contractor when the test vehicle is transferred from a new vehicle dealership or between test contracts. The contractor must complete a Vehicle Condition form for each vehicle and deliver it to the COTR with the Final Test Report or the report will not be accepted for payment.

NOTIFICATION OF COTR

The COTR must be notified within 24 hours after a vehicle has been delivered. In addition, if any discrepancy or damage is found at the time of delivery, a copy of the Vehicle Condition form shall be sent to the COTR immediately.

8. CALIBRATION OF TEST INSTRUMENTS

Before the contractor initiates the safety compliance test program, a test instrumentation calibration system shall be implemented and maintained in accordance with established calibration practices. The calibration system shall be set up and maintained as follows:

A. Standards for calibrating the measuring and test equipment will be stored and used under appropriate environmental conditions to assure their accuracy and stability.

B. All measuring instruments and standards shall be calibrated by the contractor, or a commercial facility, against a higher order standard at periodic intervals NOT TO EXCEED TWELVE (12) MONTHS! Records, showing the calibration traceability to the National Institute of Standards and Technology (NIST), shall be maintained for all measuring and test equipment.

C. All measuring and test equipment and measuring standards will be labeled with the following information:
   (1) Date of calibration
   (2) Date of next scheduled calibration
   (3) Name of the technician who calibrated the equipment

D. A written calibration procedure shall be provided by the contractor which includes as a minimum the following information for all measurement and test equipment:
   (1) Type of equipment, manufacturer, model number, etc.
   (2) Measurement range
   (3) Accuracy
   (4) Calibration interval
   (5) Type of standard used to calibrate the equipment (calibration traceability of the standard must be evident)

E. Records of calibration for all test instrumentation shall be kept by the contractor in a manner which assures the maintenance of established calibration schedules. All such records shall be readily available for inspection when requested by the COTR. The calibration system will need the acceptance of the COTR before the test program commences. Further guidance is provided in the International Standard ISO 10012-1, “Quality Assurance Requirements for Measuring Equipment” and American National Standard ANSI/NCSL Z540-1, “Calibration Laboratories and Measuring and Test Equipment - General Requirements”.

F. Daily pre and post test Instrumentation calibration sheets or equivalent, as shown in section **19**, are to be included in the final test report.

9. PHOTOGRAPHIC DOCUMENTATION

As a minimum the following photographs shall be included in the final test report, as applicable:

A. 3/4 frontal - left side view

B. 3/4 rear - right side view

C. Vehicle Certification label, and FMVSS 120 tire & rim information label if required information is not included on the Certification label

D. Other vehicle labeling (brake fluid reservoir, instruments, warnings, etc.)

E. Provisions for visual inspections of all brake lining thicknesses

F. Thermocouple installations in front and rear wheel brakes

G. Test instrumentation used in conducting this test with full description (may be a composite photograph with instrumentation removed from vehicle)

H. Test instrumentation installed on vehicle

I. Test track dimensions and layout (may be a scale drawing)

J. Condition of components after test

K. Any apparent test failure

NOTE: Parenthetical references that follow relate to sections in FMVSS 122.

10. DEFINITIONS

AVERAGE PEDAL FORCE (not defined in standard)

Average value taken from the initiation of force application until completion of the stop. **(60 FR 6434, Feb. 2, 1995, page 6431)**

Initiation of the force application is the point at which brake application can be detected and data acquisition begun without false triggering, e.g. 5 - 10 Newtons (1 - 2 Lbs.)

AVERAGE DECELERATION (not defined in standard -see above)
Average value taken from the initiation of the force application until completion of the stop.

NOTE: The recorded deceleration is acquired from the moment the service brake is moved until the vehicle reaches zero speed. Therefore, the time needed to achieve the target deceleration (rise time) and the time the vehicle goes from the target deceleration to zero (fall time) will be included in the average deceleration calculation. Hence the recorded average deceleration values will be slightly less than the required/target values even if the driver maintains the correct deceleration for the majority of the stop.

BRAKING INTERVAL (S4)
The distance measured from the start of one brake application to the start of the next brake application.

COMBINED BRAKING SYSTEM (not defined in standard)
Where at least two brakes on different axles are actuated by the operation of a single control.

INITIAL BRAKE TEMPERATURE (S4)
The temperature of the hottest service brake of the vehicle 0.2 mile before any brake application.

MOTORCYCLE
A motor vehicle with motive power having a seat or saddle for the use of the rider and designed to travel on not more than three (3) wheels in contact with the ground.

MOTOR-DRIVEN CYCLE
A motorcycle with a motor that produces 5-brake horsepower or less.

SCOOTER (As defined in MVSS 123)
(1) Has a platform for the operator's feet or has integrated footrests, and (2) Has a step-through architecture, meaning that the part of the vehicle forward of the operator's seat and between the legs of an operator seated in the riding position, is lower in height than the operator's seat.

SKID NUMBER (S4)
The frictional resistance of a pavement measured in accordance with American Society for Testing and Materials (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.

STOPPING DISTANCE (S4)
The distance traveled by a vehicle from the start of the brake application to the point where the vehicle stops.

SPLIT SERVICE BRAKE SYSTEM (S4)
A brake system consisting of two or more subsystems actuated by a single control designed so that a leakage-type failure of a pressure component in a single subsystem (except structural failure of a housing that is common to all subsystems) shall not impair the operation of the other subsystems.

UNLOADED VEHICLE WEIGHT
The weight of a vehicle with maximum capacity of all fluids necessary for operation of the vehicle, but without cargo, occupants, or accessories that are ordinarily removed from the vehicle when they are not in use.

VEHICLE TEST WEIGHT (S6.1)
Motorcycle test weight is unloaded vehicle weight plus 200 pounds (including driver and instrumentation), with the added weight distributed in the saddle or carrier if so equipped.

WHEEL LOCKUP (FMVSS 135 –S4 Definitions)
100 Percent Wheel Slip

11. SUGGESTED TEST EQUIPMENT

The following instrumentation, or equivalent, shall be used when testing per this procedure:

A. Fifth wheel to measure vehicle velocity, 150 fps range with accuracy of ± .7 fps at 88 fps, and maximum non-linearity of ± 1.5 fps over the range.

B. Instrumentation to measure stopping distance, 2,000 ft range with accuracy of ± 10 ft in 1,000 ft, maximum non-linearity of ± 20 ft, per 2,000 ft increment.

C. Load cells to measure pedal force on foot brake pedal and hand brake lever (perpendicular to line of travel). 500 Newtons (112 lb) range with accuracy of ± 1 percent at 300 Newtons, and maximum non-linearity of ± 2 percent over the range.

D. Iron-constantan thermocouple, plug type. Maximum wire resistance variation ± 10% pyrometer calibrated value for non-compensated pyrometers.

E. Instrumentation (pyrometer) to measure brake lining temperatures, 1,200 degree F (650 C) range with ± 10 degree accuracy at 300 degrees, and maximum non-linearity of ± 20 degrees over the range.

F. Decelerometer to measure vehicle deceleration rate, 1G range with ± 0.5 fpsps accuracy at 32.2 fpsps, and maximum non-linearity of ± 0.5 fpsps over the range.

G. Ambient temperature gauge and stopwatch.

H. Platform scales to measure tire-road interface load on each wheel individually.

I. Anemometer to measure wind velocity, 25 mph range with ± 1 mph accuracy at 15 mph, and maximum non-linearity of ± 2 mph over the range.

J. Continuous recorder to provide supplemental records of service brake force, parking brake force, deceleration, distance and speed versus time. The recorder chart shall be calibrated at the same values and with the same accuracies as the previously discussed visual output meters.

K. Certified motorcycle helmet and other appropriate safety items for the rider.

L. Wheel lockup detector providing an electrical indication of wheel rotation (or wheel lockup) to a continuous recorder or digital data recorder with data acquisition software.

12. PRETEST REQUIREMENTS

Every contractor is required to submit a detailed in-house test procedure to the COTR before initiating the compliance test program. The procedure must include a step-be-step description of the methodology to be used. The contractor's test procedure shall contain a detailed check-off sheet and a complete listing of test equipment with makes and model numbers. The list of test equipment shall include instrument accuracy and calibration dates. There shall be no contradictions between the OVSC Laboratory Test Procedure and the contractor's in-house procedure without COTR agreement. Written approval of the in-house test procedure and all subsequent revisions shall be obtained from the COTR.

TEST DATA LOSS

A compliance test is not to be conducted unless all of the various test conditions specified in the applicable OVSC Laboratory Test Procedure have been met. Failure of a contractor to obtain the required test data and to maintain acceptable limits on test parameters in the manner outlined in the applicable OVSC Laboratory Test Procedure may require a retest at the expense of the contractor. The retest costs will include the cost of a replacement sample and all costs associated with conducting the retest. The original test specimen (vehicle or equipment item) used for the invalid test shall remain the property of OVSC, and the retest specimen shall remain the property of the contractor. If there is a retest failure, the contractor shall retain the retest specimen for at least 180 days. If there is not a retest failure, the contractor may dispose of the specimen upon notification from the COTR that the final test report has been accepted.

The Contracting Officer of NHTSA is the only NHTSA official authorized to notify the contractor that a retest is required. The retest shall be completed within two weeks after receipt of notification by the Contracting Officer that a retest is required. If a retest is conducted, no test report is required for the original test.

13. GENERAL TEST CONDITIONS (S6)

Each vehicle must be tested (Section 14) under the following general test conditions unless otherwise specified: (where a range of conditions is specified, the vehicle must meet the requirements at all points within the range)

GENERAL:
The test track shall be under exclusive control of the contractor at time of test. Use of public roads is prohibited for performance testing.
Travel to and from the test track shall be minimal and entail only moderate braking. Dusty or muddy road surfaces shall be avoided.

AMBIENT CONDITIONS:
Ambient Temperature (S6.5) —
Ambient temperature shall be between 32 and 100 degrees F.

Wind Velocity (S6.6) —
Under no circumstances shall tests be conducted with the wind velocity exceeding 15 mph. Tests shall not be conducted either into or with winds exceeding 10 mph whose directions are within 45 degrees (left or right - front and rear) of the vehicle longitudinal centerline.

ROAD TEST SURFACE:
Road Surface (S6.7) —
Road tests are conducted on level roadway with a skid number of 81. The roadway is 8 feet wide for two-wheeled motorcycles, and overall vehicle width plus 5 feet for three-wheeled motorcycles. The parking brake test surface is clean, dry, smooth Portland cement concrete.

VEHICLE CONDITIONS:
Vehicle Weight (S6.1) —
The weight of the driver, test equipment, and ballast shall equal 200 lb. Added weight should be distributed in the saddle or carrier if so equipped

Tire Inflation Pressure (S6.2) —
Tire inflation pressure is the pressure recommended by the manufacturer for the vehicle weight specified in S6.1 above.

Engine (S6.4)—
Set engine idle speed and ignition timing in accordance with the manufacturer's recommendations. If equipped with an adjustable engine speed governor, it too should be adjusted as recommended by the manufacturer

Thermocouples (S6.9) —
Install plug type thermocouples in the approximate center of the facing length and width of the most heavily loaded shoe or disc pad, one per brake, as shown in **Figure 1**.

Brake Fluid –
Check brake fluid reservoirs for proper amount of fluid. Note and correct any deficiency or condition of fluid.

Brake Actuation Forces (S6.10)–
Install instrumentation to measure forces applied to hand and foot-operated brake controls as shown in **Figure 2**.

TYPICAL PLUG TYPE THERMOCOUPLE INSTALLATION

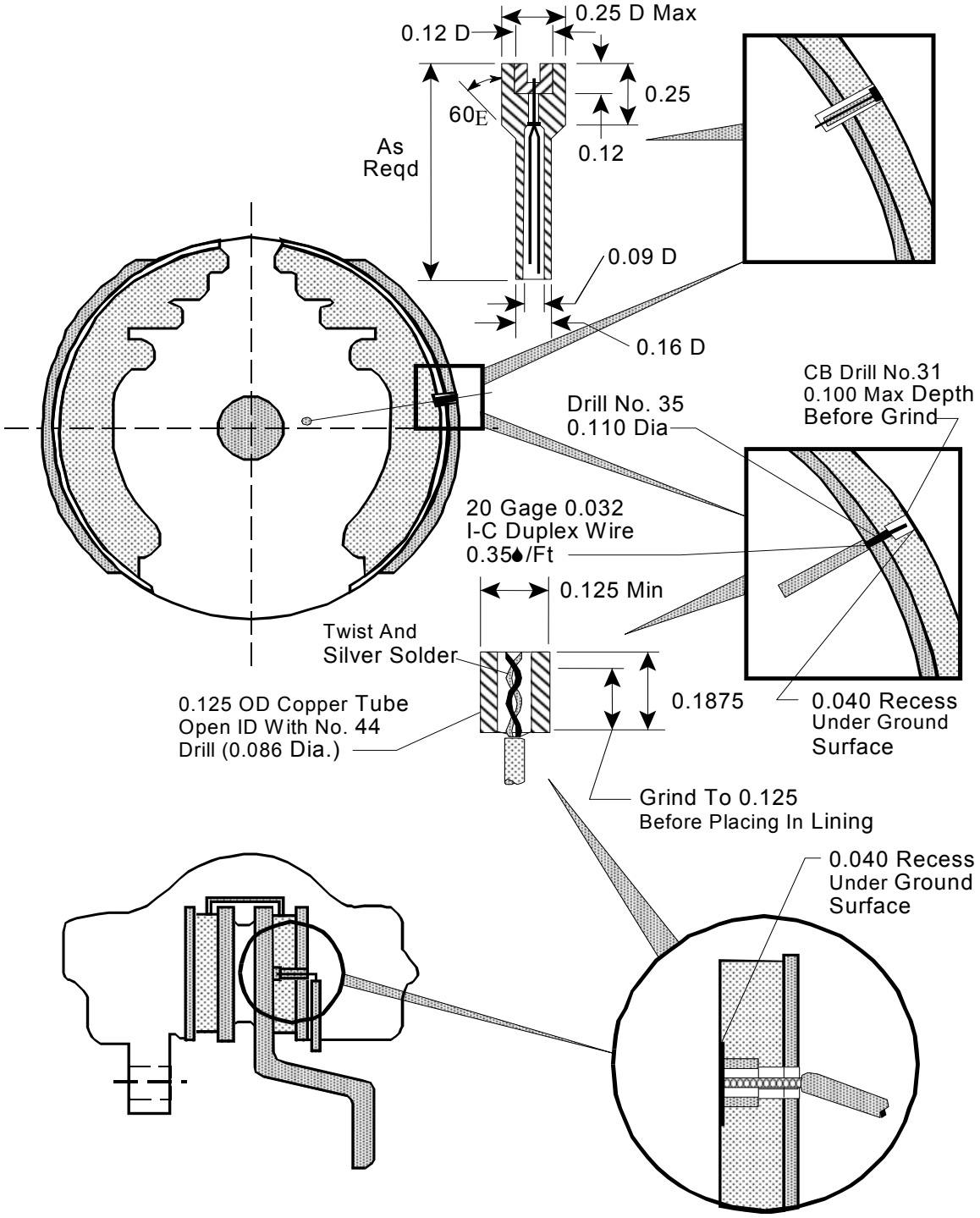

FIGURE 1

DIRECTION OF FORCE

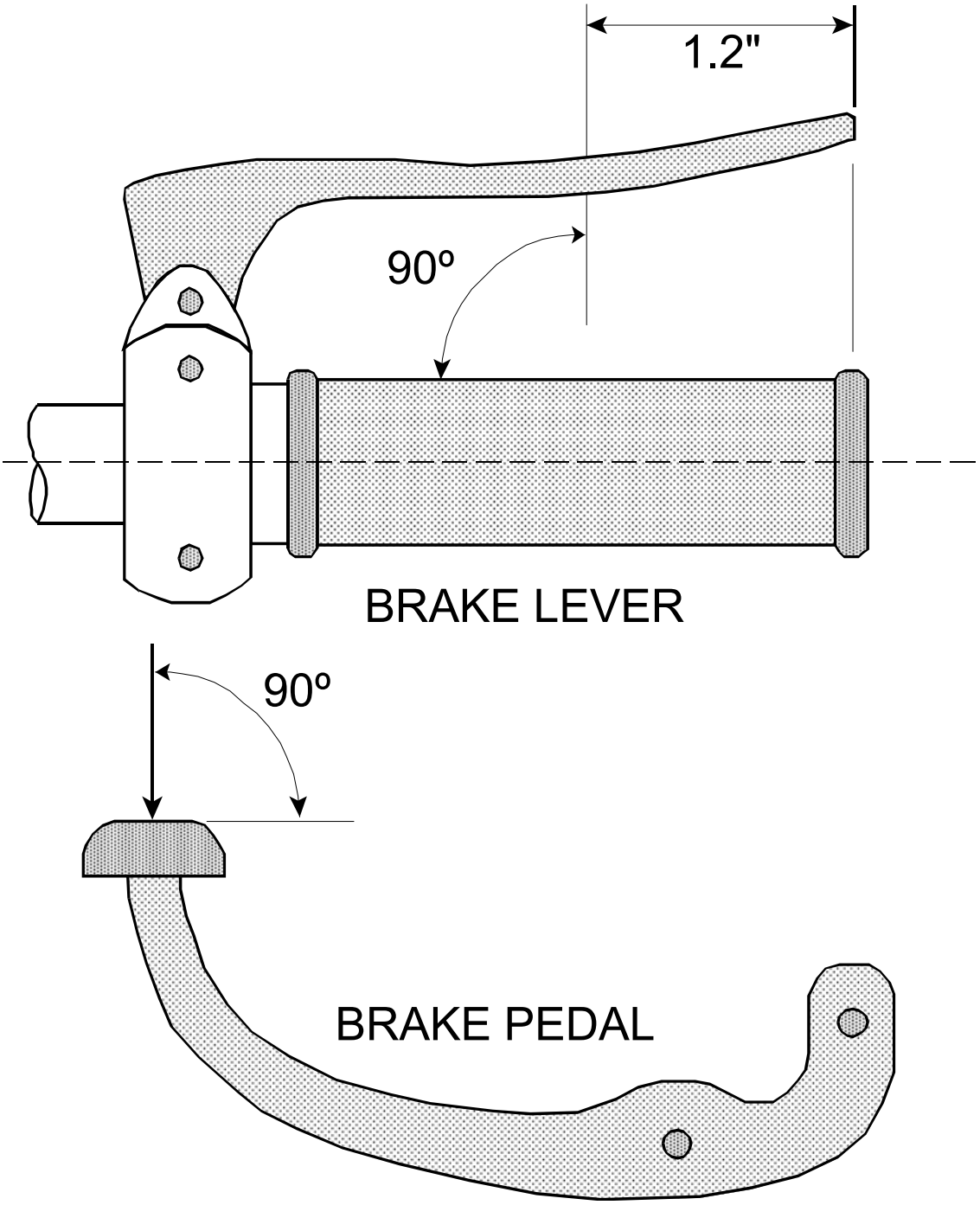

FIGURE 2

PROCEDURAL TEST CONDITIONS:

Brake Control —
All service brake system performance requirements, including the partial system requirements must be met solely by use of the service brake control.

Test speeds (S5) —
If a vehicle is incapable of attaining a specified speed, its service brakes shall be capable of of stopping the vehicle from the multiple of 5 mph that is 4 mph to 8 mph less than the speed attainable in 1 mile, within the stopping distances that do not exceed the stopping distances specified..

Stopping distance —
The braking performance of a vehicle is determined by measuring the stopping distance from a given initial speed.

Unless otherwise specified, the vehicle is stopped in the shortest distance achievable (best effort) on all stops. Where more than one stop is required 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..

NOTE: The exact target speeds specified for each test will, in most cases, not be achievable. As a result, all actual stopping distances are to be adjusted to represent the distances that would have been obtained had the exact test speed been achieved. These corrected distances are calculated using the Society of Automotive Engineers, Inc., "Stopping Distance Test Procedure – SAE J299", where the following expression is derived:

Corrected stopping distance =
[(Target initial speed)²/(Actual initial test speed)²] x Actual stopping distance

Transmission (S6.3)—
Unless otherwise specified, all stops are made with the clutch disengaged.

Vehicle Position (S6.8) —
The motorcycle is aligned in the center of the roadway at the start of each brake application. Stops are made without any part of the motorcycle leaving the roadway and ***without lockup*** of any wheel.

Brake Warming (S7.1) —
If the initial brake temperature required for the first stop in a test procedure (other than S7.10 of the FMSS) has not been reached, heat the brakes to the initial brake temperature by making up to 10 stops from 30 mph at a deceleration of not more than 10 fpsps. On independently operated brake systems, the coolest brake shall be within 10 degrees F of the hottest brake.

Brake Actuation Forces (S6.10)—
Unless otherwise specified (5^{th} stop in Fade and water recovery stops), the force applied to the hand lever is not less than 10 Newtons (2.3 pounds) and not more than 245 Newtons (55 pounds), and the foot pedal force is not less than 25 Newtons (5.6 pounds) and not more than 400 Newtons (90 pounds). The point of initial application of the lever force is 1.2 inches from the end of the brake lever grip. The direction of the force is perpendicular to the handle grip on the plane along which the brake lever rotates, and the point of application of the pedal force is the center of the foot contact pad of the brake pedal. The direction of the force is perpendicular to the foot contact pad on the plane along which the brake pedal rotates, as shown in **Figure 2.**

Stopping Procedure —
A. Attain a speed 4 to 8 mph greater that test speed.
B. Relax the throttle or fuel control.
C. When test speed is reached, disengage clutch and apply the brake pedal or lever as the specific test requirement dictates.

Speed (S5) —
Measure the speed that the motorcycle will attain in a distance of one mile from a standing start. Do not exceed 120 mph. If the maximum speed is less than specified for a particular test run, perform it at the multiple of 5 mph that is 4 to 8 mph less. Use the corresponding stopping distance requirement shown on the Stopping Distances Table in the attached appendix.

14. COMPLIANCE EXECUTION (S7)

Each motorcycle shall be capable of meeting the requirements of FMVSS 122 when tested according to the procedures and in the sequence set forth below without replacing any brake system part, or making any adjustments to the brake system other than permitted in S7.4. A motorcycle shall be deemed to comply if **at least one of the stops** specified in S7.3, S7.5 and S7.8 is made within the stopping distances specified in the Stopping Distance Table in the Appendix.

Testing Order	Test	Test Procedure Section	FMVSS 122 Section
1	Instrumentation Check (Use all brake controls)	14.1	S7.2
2	Speed Determination	14.2	S7.5
3	First Effectiveness Test –service brake system (30 mph/60 mph) (all brake controls)	14.3	S7.3
4	First Effectiveness Test – Partial service brake system (for independently actuated service brake systems - each service brake system tested independently @ 30/60 mph, i.e. hand lever/foot pedal) NOT FOR SPLIT-SERVICE BRAKE SYSTEMS	14.4	S7.3
5	Burnish Procedure (200 stops) – all brake controls	14.5	S7.4
6	Second Effectiveness Test – service brake system (30/60/80mph and high speed)-all brake controls	14.6	S7.5
7	Fade and Recovery Test – all brake controls	14.7	S7.6
8	Reburnish (35 stops)-all brake controls	14.8	S7.7
9	Final Effectiveness Test – service brake system (30/60/80mph and high speed) – all brake controls	14.9	S7.8
10	Final Effectiveness Test – Partial service brake system @ 30 and 60 mph (for Split-Service Brake Systems) Subsystem #1 then Subsystem #2	14.9	S7.8
11	Parking Brake Test (3-wheeled only)	14.10	S7.9
12	Water Recovery Test – service brake system – all brake controls	14.11	S7.10
13	Final Inspection/Durability	14.12	S7.11
14	Required Equipment – Reservoir/Indicators	14.13	S7.11 & S5.1

Prepare vehicle for testing according to test procedure sections **11,12, and 13**.
Data Sheet 1 – complete for vehicle information, weight and load conditions.
Data Sheet 2 - a testing summary sheet, is completed after testing is concluded.

14.1 INSTRUMENTATION CHECK (S7.2) —
(Use all brake controls)
Conduct a general check of test instrumentation by making not more than 10 stops from a speed of not more than 30 mph at a deceleration rate of not more than 10 fpsps. If test instrument repair, replacement, or adjustment is necessary, make not more than 10 additional stops after such repair, replacement or adjustment. Record the results on **Data Sheet 3.**

14.2 SPEED DETERMINATION (Max. Speed) **(S7.5)** —

Measure the speed that the motorcycle will attain in a distance of one mile from a standing start. Do not exceed 120 mph.
Record results on **Data Sheet 4.**

14.3 FIRST EFFECTIVENESS TEST — TOTAL SERVICE BRAKE SYSTEM (S7.3.1)
(Use all brake controls) (Initial brake temperature 130º F to 150º F.)
Make 6 stops from 30 mph. The requirement is that at least 1 stop is completed within 54 feet.

Make 6 stops from 60 mph. The requirement is that at least 1 stop is completed within 216 feet.

Record the results on **Data Sheet 5**.

14.4 FIRST EFFECTIVENESS — PARTIAL SERVICE BRAKE SYSTEM (S7.3.2)
(For motorcycles with two independently actuated service brake systems only)
(Utilize Hand control and Foot control separately)
Using each brake system individually make 6 stops from 30 mph. The requirement is that at least 1 stop is completed within 121 feet.

Using each brake system individually make 6 stops from 60 mph. The requirement is that at least 1 stop is completed within 484 feet.

Record the results on **Data Sheet 6.**

14.5 BURNISH PROCEDURE (S7.4)
(Use all brake controls)
Burnish the brakes by making 200 stops from 30 mph at 12 fpsps deceleration. The braking interval shall be either the distance necessary to reduce the brake temperature to between 130 and 150 degrees F or 1 mile, whichever occurs first.

Accelerate at maximum rate to 30 mph immediately and maintain that speed until making the next stop. Speed should not exceed 30 mph between stops. (The hand lever and foot pedal force limits do not apply during this procedure.)

Adjust brakes in accordance with manufacturer's recommendation.
Record observations on **Data Sheet 7.**

14.6 SERVICE BRAKE SYSTEM — SECOND EFFECTIVENESS TEST (S7.5)

(Use all brake controls)
Make 6 stops from 30 mph. The requirement is that at least 1 stop is completed within 43 feet.

Make 6 stops from 60 mph. The requirement is that at least 1 stop is completed within 185 feet.

Make 4 stops from 80 mph. The requirement is that at least 1 stop is completed within 345 feet.

Make 4 stops from the multiple of 5 mph that is 4 mph to 8 mph less than the maximum speed attainable in 1 mile if 95 mph or greater, but do not exceed 120 mph. The requirement is given in the Stopping Distance Table.

Record the results on **Data Sheet 8**.

14.7 SERVICE BRAKE SYSTEM — FADE AND RECOVERY TEST (S7.6)

(This procedure does NOT apply to a motor-driven cycle whose speed attainable in one mile is 30 mph or less)
(Use all brake controls)
BASELINE CHECK STOPS (S7.6.1)
Make 3 stops from 30 mph at 10 to 11 fpsps for each stop. Compute and record the average of the maximum brake pedal forces and the average maximum brake lever forces required for the stops.

FADE STOPS (S7.6.2)
Make 10 stops from 60 mph at not less than 15 fpsps for each stop. The initial brake temperature before the first brake application shall be between 130 and 150 degrees F. Initial brake temperatures before subsequent stops shall be those occurring at the distance intervals. Attain the required deceleration as quickly as possible and maintain at least this rate for not less than three-fourths of the total stopping distance for each stop. The interval between the starts of service brake applications shall be 0.4 mile. Drive 1 mile at 30 mph after the last fade stop and immediately conduct the recovery test.

RECOVERY TEST (S7.6.3)

Make 5 stops from 30 mph at 10 to 11 fpsps for each stop. The braking interval shall not be more than 1 mile. Immediately after each stop accelerate at maximum rate to 30 mph and maintain that speed until making the next stop. For the 5th stop, the average minimum and maximum pedal and lever forces must be within + 20 pounds (89 Newtons) and – 10 pounds (44 Newtons, but not less than 0 pounds.

Record results on **Data Sheet 9.**

14.8 SERVICE BRAKE SYSTEM — REBURNISH (S7.7)

(This procedure does NOT apply to a motor-driven cycle whose speed attainable in one mile is 30 mph or less.
(Use all brake controls)
Repeat S7.4 except make 35 burnish stops instead of 200 stops. Brakes may be adjusted after reburnish if no tools are used.
Record observations on **Data Sheet 10.**

14.9 SERVICE BRAKE SYSTEM — FINAL EFFECTIVENESS TEST (S7.8)

(This procedure does NOT apply to a motor-driven cycle whose speed attainable in one mile is 30 mph or less.)

SERVICE BRAKE SYSTEM (S7.8.1) (Use all brake controls)
Make 6 stops from 30 mph. The requirement is that at least 1 stop is completed within 43 feet.

Make 6 stops from 60 mph. The requirement is that at least 1 stop is completed within 185 feet.

Make 4 stops from 80 mph. The requirement is that at least 1 stop is completed within 345 feet.

Make 4 stops from the multiple of 5 mph that is 4 mph to 8 mph less than the speed attainable in 1 mile if that speed is 95 mph or greater, but do not to exceed 120 mph. See the Stopping Distance Table for the applicable total system effectiveness requirement.

Record the results on **Data Sheet 11.**

PARTIAL SERVICE BRAKE SYSTEM TEST (S7.8.2 & S5.5.2) (Use applicable brake control)

Alter the service brake system on motorcycles with split-service brake systems, which usually includes three-wheeled motorcycles (S7.8.2 & S 5.5.2), to induce a complete loss of braking in any 1 subsystem. Determine the line pressure or pedal force necessary to cause the brake system failure indicator to operate.

The application force shall not be more than 20 pounds of pedal force and not greater than the specified hand lever force, if applicable. Make 6 stops from 30 mph and then 6 stops from 60 mph with an initial brake temperature between 130 and 150 degrees F. The motorcycle shall stop within the respective distances specified in the Stopping Distance Table. Repeat for each subsystem. This is used to verify that in the event of a pressure component leakage failure, other than a structural failure of either a brake master cylinder body in a split integral body type master cylinder system or a service brake system failure indicator body, the remaining portion of the service brake system shall continue to operate and shall be capable of stopping the motorcycle from 30 mph and 60 mph within specified stopping distances.

Determine that the brake failure indicator is operating when the master cylinder fluid level is less than the recommended safe level specified by the manufacturer or to less than 1/2 the fluid reservoir capacity, whichever is the greater (S5.1.3). All failure indicator lamps shall be activated when the ignition switch is turned from the "off" to the "on" or to the "start" position. Each indicator lamp once activated, shall remain activated as long as the condition exits, whenever the ignition switch is in the "on" position. An indicator lamp activated when the ignition is turned to the "start" position shall be deactivated upon return of the switch to the "on" position unless a failure exists in the service brake system. Check for proper operation with each reservoir in turn at a low level.
Restore the system to normal at completion of this test.

Record results and observations on **Data Sheet 12.**

14.10 PARKING BRAKE TEST (S7.9)

(This procedure applies ONLY to 3-wheeled motorcycles)

Starting with an initial brake temperature of not more than 150 degrees F, drive the motorcycle downhill on a 30 percent grade with the longitudinal axis of the motorcycle in the direction of the grade. Apply the service brakes with a force not exceeding 90 pounds to stop the motorcycle and place the transmission in neutral. Apply the parking brake by exerting a force not more than 90 pounds for a foot-operated system and 55 pounds for a hand operated system. Release the service brake and allow the motorcycle to remain at rest (to the limit of traction of the braked wheels) for 5 minutes. Repeat the test with the motorcycle parked in the reversed (uphill) position on the grade.

Record observations on **Data Sheet 13**, if applicable.

14.11 SERVICE BRAKE SYSTEM - WATER RECOVERY TEST (S7.10)

(Use all brake controls)

BASELINE CHECK STOPS (S7.10.1)

Make 3 stops from 30 mph at 10 to11 fpsps for each stop within the brake actuation force limits specified in Section 13. Compute the average of the maximum brake pedal forces and of the average maximum brake lever forces required for the 3 stops.

WET BRAKE RECOVERY STOPS (S7.10.2)

Completely immerse the rear brake assembly of the motorcycle in water for 2 minutes with the brake fully released. Next completely immerse the front brake assembly of the motorcycle in water for 2 minutes with the brake fully released. Perform the entire wetting procedure in not more than 7 minutes. Immediately after removal of the front brake from water, accelerate at a maximum rate to 30 mph without a brake application. Immediately upon reaching that speed make 5 stops, each from 30 mph at 10 to 11 fpsps deceleration for each stop. After each stop (except the last) accelerate the motorcycle at a maximum rate to 30 mph and begin the next stop. The motorcycle shall make these 4 recovery stops with a pedal force that does not exceed 400 Newtons (90 pounds), and a hand lever force not exceeding 245 Newtons (55 pounds). For the fifth recovery stop, maximum forces shall be within plus 89 Newtons (20 pounds) and minus 44 Newtons (10 pounds) of the baseline check average force, but not less than 0 pounds.

Record data and observations on **Data Sheet 14**.

14.12 FINAL INSPECTION/DURABILITY (S7.11)

Upon completion of all the tests inspect the brake system in an assembled condition, for compliance with the brake lining inspection requirements. Disassemble all brakes and inspect:

A. The entire brake system for detachment or fracture of any component.
B. Brake linings for detachment from the shoe or pad.
C. Wheel cylinder, master cylinder, and axle seals for fluid or lubricant leakage.

Observations and data should be recorded on **Data Sheet 15**.

14.13 REQUIRED EQUIPMENT (S5.1) & (S7.11)

Split service brake system requirement (S5.1)

Motorcycle shall have either a split service brake system or two independently actuated service brake systems.

Mechanical service brake system (S5.1.1)

Failure of any component in a mechanical service brake system shall not result in a loss of braking ability in the other service brake system on the vehicle.

Hydraulic service brake system (S5.1.2)

A leakage failure in a hydraulic service brake system shall not result in a loss of braking ability in the other service brake system on the vehicle.

Master cylinder reservoirs (S5.1.2.1)

Each master cylinder shall have a separate reservoir for each brake circuit, with each reservoir filler opening having its own cover, seal and cover retention device. Each reservoir shall have a minimum capacity equivalent to one and one-half times the total fluid displacement resulting when all the wheel cylinders or caliper pistons serviced by the reservoir move from a new lining, fully retracted position to a fully worn, fully applied position. Where adjustment is a factor, the worst condition of adjustment shall be used for this measurement. Utilize Appendix procedure for calculating volume requirements and Data Sheet 17 to record results.

Reservoir labeling (S5.1.2.2)

Each motorcycle shall have a brake fluid warning statement that reads as follows, in letters at least 3/32 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 FMVSS 116, e.g., DOT 3)

The lettering shall be —

(1) Permanently affixed, engraved, or embossed

(2) Located so as to be visible by direct view, either on or within 4 inches of the brake-fluid reservoir filler plug or cap

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

For Split-Service Brake system (only) - Failure Indicator Lamp (S5.1.3.1)

(1) One or more electrically operated service brake system failure indicator lamps that is mounted in front of and in clear view of the driver, and that is activated —

(A) In the event of pressure failure in any part of the service brake system, other than a structural failure of either a brake master cylinder body in a split integral body type master cylinder system or a service brake system failure indicator body, before or upon application of not more than 20 pounds of pedal force upon the service brake.

(B) Without the application of pedal force, when the level of brake fluid in a master cylinder reservoir drops to less than the recommended safe level specified by the manufacturer or to less than one-half the fluid reservoir capacity, whichever is the greater.

(2) All failure indicator lamps shall be activated momentarily when the ignition switch is turned from the "off" to the "on" or to the "start" position.

(3) Except for the momentary activation required by switch-on activation as above, each indicator lamp once activated, shall remain activated as long as the condition exists, whenever the ignition switch is in the "on" position. An indicator lamp activated when the ignition is turned to the "start" position shall be deactivated upon return of the switch to the "on" position unless a failure exists in the service brake system.

(4) Each indicator lamp shall have a red lens with the legend "Brake Failure" on or adjacent to it in letters not less than 0.09375 inches high that shall be legible to the driver in daylight when lighted.

Parking Brake (S5.1.4)

Each three-wheeled motorcycle shall be equipped with a parking brake of a friction type with a solely mechanical means to retain engagement.

Other Requirements (S5.1.5)

The brake system shall be installed so that the lining thickness of the drum brake shoes may be visually inspected, either directly or by use of a mirror

without removing the drums, and so that disc brake friction lining may be visually inspected without removing the pads

Record results on **Data Sheet 16.**

15. POST TEST REQUIREMENTS

After the required tests are completed, the contractor shall:

1. Verify that all instrumentation, data sheets and photographs are satisfactory,

2. Complete the Vehicle Condition Report form including a word description of its post test condition,

3. Copy applicable pages of the motorcycle Owner's Manual for attachment to the final test report,

4. Move the test motorcycle to a secure area, and

5. Place all original records in a secure and organized file awaiting test data disposition.

16. INSTRUCTIONS FOR COMPLETING DATA SHEETS

Data is to be furnished in every data blank provided on the report forms, or if not applicable, insert “NA”. Corrections are to be made by drawing a line through the data, leaving it legible and adding the correct entry, initials, and date.

Record any unusual brake performance, such as pull, noise, smoke, wrap-up, or skid, that occurs during the testing.

Every sheet of any document relating to a test, including automatic continuous recorder data, will contain the NHTSA number of the vehicle, date, vehicle, and test identification.

NOTE: Average Pedal Force and Average Deceleration are calculated from the initiation of the pedal force until completion of the stop. **(60 FR 6434, Feb. 2, 1995, page 6431)**

NOTE: The exact target speeds specified for each test will, in most cases, not be achievable. As a result, all actual stopping distances are to be adjusted to represent the distances that would have been obtained had the exact test speed been achieved. These corrected distances are calculated using the Society of Automotive Engineers, Inc., “Stopping Distance Test Procedure – SAE J299”, where the following expression is derived:

$$\text{Corrected stopping distance} = \left[(\text{Target initial speed})^2/(\text{Actual initial test speed})^2\right] \times \text{Actual stopping distance}$$

17. REPORTS

17.1 Monthly Status Reports

The contractor shall submit a monthly Test Status Report and a Vehicle Status Report to the FMVSS 122 COTR. The Vehicle Status report shall be submitted until all FMVSS 122 vehicles are transferred to another FMVSS or otherwise disposed of. Samples of the required reports are found in the report forms section.

.

17.2 Apparent Test Failure

Any indication of an test failure shall be communicated by telephone or to the COTR within 24 hours with written notification mailed within 48 hours (Saturday and Sunday hours excluded). A Notice of Test Failure (see report forms section)

with a copy of the particular compliance test data sheet(s) and preliminary data plot(s) shall be included.

If possible, repeat that portion of the test where the failure was noted to ensure that there is a test failure.

In the event of a test failure, a post test calibration check of some critically sensitive test equipment and instrumentation (if applicable) may be required for verification of accuracy. The necessity for the calibration shall be at the COTR's discretion and shall be performed without additional costs to the OVSC.

17.3 Final Test Reports

17.3.1 Copies

In the case of an apparent test failure, 7 copies of the Final Test Report shall be submitted to the COTR for acceptance within 3 weeks of test completion.

Where there has been no indication of an apparent noncompliance, 3 copies of each Final Test Report shall be submitted to the COTR for acceptance within 3 weeks of test completion. No payment of contractor's invoices for conducting compliance tests will be made prior to the Final Test Report acceptance by the COTR. Contractors are requested to NOT submit invoices before the COTR is provided with copies of the Final Test Report.

Contractors are required to submit the first Final Test Report in draft form within 1 week after the compliance test is conducted. The contractor and the COTR will then be able to discuss the details of both test conduct and report content early in the compliance test program.
Contractors are required to PROOF READ all Final Test Reports before submittal to the COTR. The OVSC will not act as a report quality control office for contractors. Reports containing a significant number of errors will be returned to the contractor for correction, and a "hold" will be placed on invoice payment for the particular test.

17.3.2 Requirements

The Final Test Report, associated documentation (including photographs), are relied upon as the chronicle of the compliance test. The Final Test Report will be released to the public domain after review and acceptance by the COTR. For these reasons, each final report must be a complete document capable of standing by itself.

The contractor should use **detailed** descriptions of all compliance test events. Any events that are not directly associated with the standard but are of technical

interest should also be included. The contractor should include as much **detail** as possible in the report.

Instructions for the preparation of the first three pages of the final test report are provided for standardization.

17.3.3 First Three Pages

A. FRONT COVER
A heavy paperback cover (or transparency) shall be provided for the protection of the final report. The information required on the cover is as follows:

(1) Final Report Number such as 122-ABC-0X-001 where
122 is the FMVSS tested
ABC are the initials for the laboratory
0X is the Fiscal Year of the test program
001 is the Group Number (001 for the 1st test, 002 for the 2nd test, etc.)

(2) Final Report Title And Subtitle such as

COMPLIANCE TESTING FOR FMVSS 122
Motorcycle Brake Systems
* *
XYZ Motor Co.
200X Deluxe Wing Rider
NHTSA No. CX0101

(3) Contractor's Name and Address such as

ABC TESTING LABORATORIES, INC.
4335 West Dearborn Street
Detroit, Michigan 48090

NOTE: DOT SYMBOL WILL BE PLACED BETWEEN ITEMS (3) AND (4)

(4) Date of Final Report completion

(5) The words **"FINAL REPORT"**

(6) The sponsoring agency's name and address as follows

U. S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration

Enforcement
Office of Vehicle Safety Compliance
400 Seventh Street, SW
Room 6115 (NVS-220)
Washington, DC 20590

B. FIRST PAGE AFTER FRONT COVER

A disclaimer statement and an acceptance signature block for the COTR shall be provided as follows:

This publication is distributed by the U. S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof. If trade or manufacturers' names or products are mentioned, it is only because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

Prepared By: _____

Approved By: _____

Approval Date: _____

FINAL REPORT ACCEPTANCE BY OVSC:

Accepted By: _____

Acceptance Date: _____

C. SECOND PAGE AFTER FRONT COVER
A completed Technical Report Documentation Page (Form DOT F1700.7) shall be completed for those items that are applicable with the other spaces left blank. Sample data for the applicable block numbers of the title page follows.

Block 1 — REPORT NUMBER

122-ABC-0X-001

Block 2 — GOVERNMENT ACCESSION NUMBER

Leave blank

Block 3 — RECIPIENT'S CATALOG NUMBER

Leave blank

Block 4 — TITLE AND SUBTITLE

Final Report of FMVSS 122 Compliance Testing of 200X XYZ Deluxe Wing Rider Motorcycle, NHTSA No. CX0101

Block 5 — REPORT DATE

March 1, 200X

Block 6 — PERFORMING ORGANIZATION CODE

ABC

Block 7 — AUTHOR(S)

John Smith, Project Manager / Bill Doe, Project Engineer

Block 8 — PERFORMING ORGANIZATION REPORT NUMBER

ABC-DOT-XXX-001

Block 9 — PERFORMING ORGANIZATION NAME AND ADDRESS

ABC Laboratories
4335 West Dearborn Street
Detroit, Michigan 48090

Block 10 — WORK UNIT NUMBER
Leave blank

Block 11 — CONTRACT OR GRANT NUMBER

DTNH22-0X-D-12345

Block 12 — SPONSORING AGENCY NAME AND ADDRESS

US Department of Transportation
National Highway Traffic Safety Administration
Enforcement
Office of Vehicle Safety Compliance
400 Seventh Street, SW, Room 6115 (NVS-220)
Washington, DC 20590

Block 13 — TYPE OF REPORT AND PERIOD COVERED

Final Test Report
Feb. 15 to Mar. 15, 200X

Block 14 — SPONSORING AGENCY CODE

NVS-220

Block 15 — SUPPLEMENTARY NOTES

Leave blank

Block 16 — ABSTRACT

Compliance tests were conducted on the subject 200X XYZ Deluxe Wing Rider Motorcycle in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-122-02.

Test failures identified were as follows:

None

NOTE: Above wording must be shown with appropriate changes made for a particular compliance test. Any questions should be resolved with the COTR.

Block 17 — KEY WORDS

Compliance Testing
Safety Engineering
FMVSS 122

Block 18 — DISTRIBUTION STATEMENT

Copies of this report are also available from —
National Highway Traffic Safety Administration
Technical Information Services (NPO-405)
400 Seventh Street, SW, Room 2336
Washington, DC 20590

e-mail: tis@nhtsa.dot.gov
FAX: 202-493-2833

Block 19 — SECURITY CLASSIFICATION OF REPORT

Unclassified

Block 20 — SECURITY CLASSIFICATION OF PAGE

Unclassified

Block 21 — NUMBER OF PAGES

Add appropriate number

Block 22 — PRICE

Leave blank

17.3.4 Table of Contents

Final test report Table of Contents shall, at a minimum, include the following:

Section 1 — Purpose of Compliance Test

Section 2 — Test Procedure and Summary of Results

Section 3 — Compliance Test Data Sheets

Section 4 — Noncompliance Data (if applicable)

Section 5 — Photographs

Section 6 — Test Equipment List and Calibration Information

18. DATA SHEETS

Note: Attached data sheets are representative for conventional hand lever/foot pedal braked motorcycles.

DATA SHEET 1
VEHICLE INFORMATION

VEHICLE:		NHTSA NUMBER:		DATE:	
TIRE PRESSURE (FRONT):		TIRE PRESSURE (REAR):			
ODOMETER START:		ODOMETER FINISH:			

Date of Manufacture: _____

General Description:

VIN	
Engine Type	
Engine Displacement	
Fuel Delivery	
Transmission	
Final Drive	
Wheelbase	

Tires:

	Front	Rear
Manufacturer		
Type		
Size		
DOT Number		
Pressure (cold)		
Rim Label Information		

Weights:

	Front		Rear		Total
	Weight (lbs.)	**% of Total**	**Weight (lbs.)**	**% of Total**	**Weight (lbs.)**
Test Rider					
Curb Weight (UVW)					
Test Weight (UVW + rider + instrumentation)					
GVWR (label)					
GAWR (label)					

FMVSS 122 - DATA SHEET 1 (2 of 2)

Brakes:

	Front	Rear
Actuation Method: mechanical, hydraulic, electric		
System Type: Individual control, Combined Brake System, Split-Service		
Control		
Caliper Type		
Number of Calipers		
No. of Caliper Pistons		
Caliper Piston Diameters		
Rotor –Type/Number		
Rotor Diameter		
Rotor Thickness/Min. Allowable Thickness		
Swept Area		
Brake Pad Identification Numbers		

DATA SHEET 2
MOTYORCYCLE BRAKE TEST SUMMARY

VEH. NHTSA NO.: _____ ; LABORATORY:_____

TEST SUMMARY	SPEED (mph)	STOP. DIST. (ft) Actual	STOP. DIST. (ft) Corrected	MAX. BRAKE LEVER FORCE (Pounds)	MAX. BRAKE PEDAL FORCE (Pounds)	NUMBER OF TESTS	PASS/ FAIL
Instrumentation Check							
Speed Determination							
1st Effectiveness Test @30mph (Service Brake System)							
1st Effectiveness Test @ 60mph (Service Brake System)							
1st Effectiveness Test @ 30mph (Partial) Right Hand Lever Only							
1st Effectiveness Test @ 30mph (Partial) Foot Pedal Only							
1st Effectiveness Test @ 60mph (Partial) Right Hand Lever Only							
1st Effectiveness Test @ 60mph (Partial) Foot Pedal Only							
Burnish Procedure							
2nd Effectiveness Test@ 30mph (Service brake System)							
2nd Effectiveness Test@ 60mph (Service brake System)							
2nd Effectiveness Test@ 80mph (Service brake System)							
2nd Effectiveness Test@ >95mph (Service brake System)							
Fade and Recovery (Baseline)							
Fade and Recovery (Fade Test)							
Fade and Recovery (Baseline – Average Maximum Forces(Recovery)							
Fade and Recovery (Recovery- 5th stop)							
Reburnish Procedure							
Final Effect. Test @ 30mph (Service Brake System)							

TEST SUMMARY	SPEED (mph)	STOP. DIST. (ft) Actual	STOP. DIST. (ft) Corrected	MAX. BRAKE LEVER FORCE (Pounds)	MAX. BRAKE PEDAL FORCE (Pounds)	NUMBER OF TESTS	PASS/ FAIL
Final Effect. Test @ 60mph (Service Brake System)							
Final Effect. Test @ 80mph (Service Brake System)							
Final Effect. Test – Split Service Brake Systems (Partial Service Brake System) SUBSYSTEM #1 @ 30 mph							
Final Effect. Test – Split Service Brake Systems (Partial Service Brake System) SUBSYSTEM #1 @ 60 mph							
Final Effect. Test – Split Service Brake Systems (Partial Service Brake System) SUBSYSTEM #2 @ 30 mph							
Final Effect. Test – Split Service Brake Systems (Partial Service Brake System) SUBSYSTEM #2 @ 60 mph							
Parking Brake Test –**3-wheeled** motorcycles only							
Water Recovery (Baseline – Average Maximum Forces)							
Water Recovery (Recovery – 5th Stop)							
Final Inspection (Durability)							
Equipment Requirements							

FMVSS 122 - DATA SHEET 3
INSTRUMENTATION CHECK (S7.2)

VEHICLE:		NHTSA NUMBER:		DATE:		ROAD PFC:	
AMBIENT TEMPERATURE		WIND VELOCITY:		TIRE PRESSURE (FRONT):		TIRE PRESSURE (REAR):	
ODOMETER START:		ODOMETER FINISH:					

VEHICLE WEIGHT - FRONT REAR TOTAL

CURB WT: _____ lbs _____ lbs _____ lbs

TEST WT: _____ lbs _____ lbs _____ lbs

REQUIREMENTS: Check instrumentation by making not more than 10 stops from 30 mph at a deceleration of not more than 10 fpsps, record results, repeat if necessary.

Stop No.	Test Speed (mph)	Initial Brake Temp. (F)		Actual Stopping Distance (ft)	Corrected Stopping Distance (ft)	Lever Force (lb)		Pedal Force (lb)		Vehicle Decel. (fpsps)		Wheel Lockup	Stay In Lane
		Front	Rear			Max	Avg	Max	Avg	Max	Avg		
1													
2													
3													
4													
5													
6													

REMARKS: _____

RECORDED BY: _____ **DATE:** _____

APPROVED BY: _____

DATA SHEET 4
MAXIMUM SPEED

VEHICLE:		NHTSA NUMBER:		DATE:		ROAD PFC:	
AMBIENT TEMPERATURE		WIND VELOCITY:		TIRE PRESSURE (FRONT):		TIRE PRESSURE (REAR):	
ODOMETER START:		ODOMETER FINISH:					

Test Weight: Total =_____ lb; Front =_____ lb; Rear = _____ lb

MOTORCYCLE MAXIMUM SPEED DETERMINATION — Measure the speed that the motorcycle will attain in a distance of one mile from a standing start, but do not exceed 120 mph. If the speed is less than 60 mph, tests specified to commence at that speed shall be run at the multiple of 5 mph that is 4 to 8 mph less than the maximum speed measured.

TEST CONDITIONS:

Test Speed	Maximum speed attainable in 1 mile from a standing start on a level surface.
Initial Brake Temperature (IBT)	N/A
Runs Required	Two runs shall be made in opposite directions.

	DIRECTION	SPEED (mph)
Run No. 1		
Run No. 2		

Average = _____ mph

REMARKS: _____

RECORDED BY:_____ **DATE:**_____

APPROVED BY:_____

FMVSS 122 - DATA SHEET 5
FIRST (PREBURNISHED) EFFECTIVENESS TEST (S7.3.1)

VEHICLE:		NHTSA NUMBER:		DATE:		ROAD PFC:	
AMBIENT TEMPERATURE		WIND VELOCITY:		TIRE PRESSURE (FRONT):		TIRE PRESSURE (REAR):	
ODOMETER START:		ODOMETER FINISH:					

TEST CONDITIONS:

Test Speed	30 mph	60 mph
Initial Brake Temperature (IBT)	130°F to 150°F	130°F to 150°F
Runs Required	6	6
Maximum Stop Distance Allowed	54 feet	216 feet
Maximum Allowable Brake Actuation Forces	Hand Lever Force ≤ 55 lbs. Foot Pedal Force ≤ 90 lbs.	Hand Lever Force ≤ 55 lbs. Foot Pedal Force ≤ 90 lbs.
Wheel Lockup	No	No
Brakes Utilized	Hand and Foot	Hand and Foot

30 MPH DATA —

Stop No.	Test Speed (mph)	Initial Brake Temp. (F)		Actual Stopping Distance (ft)	Corrected Stopping Distance (ft)	Lever Force(lb)		Pedal Force (lb)		Vehicle Decel. (fpsps)		Wheel Lockup	Stay In Lane
		Front	Rear			Max	Avg	Max	Avg	Max	Avg		
1													
2													
3													
4													
5													
6													

60 MPH DATA —

Stop No.	Test Speed (mph)	Initial Brake Temp. (F)		Actual Stopping Distance (ft)	Corrected Stopping Distance (ft)	Lever Force (lb)		Pedal Force (lb)		Vehicle Decel. (fpsps)		Wheel Lockup	Stay In Lane
		Front	Rear			Max	Avg	Max	Avg	Max	Avg		
1													
2													
3													
4													
5													
6													

REMARKS: _____

RECORDED BY:_____ **DATE:**_____**APPROVED BY:**_____

FMVSS 122 - DATA SHEET 6 (1 of 2)
PARTIAL (PREBURNISHED) SERVICE BRAKE SYSTEM TEST (7.3.2)

VEHICLE:		NHTSA NUMBER:		DATE:		ROAD PFC:	
AMBIENT TEMPERATURE		WIND VELOCITY:		TIRE PRESSURE (FRONT):		TIRE PRESSURE (REAR):	
ODOMETER START:		ODOMETER FINISH:					

REQUIREMENTS FOR A MOTORCYCLE WITH TWO INDEPENDENTLY ACTIVATED SERVICE BRAKE SUBSYSTEMS.

TEST CONDITIONS:

Test Speed	30 mph	60 mph
Initial Brake Temperature (IBT)	130°F to 150°F	130°F to 150°F
Runs Required	6	6
Maximum Stop Distance Allowed	121feet	484 feet
Maximum Allowable Brake Actuation Forces	Hand Lever Force ≤ 55 lbs.	Hand Lever Force ≤ 55 lbs.
Wheel Lockup	No	No
Brakes Utilized	**Hand Lever Only**	**Hand Lever Only**

TEST CONDITIONS:

Test Speed	30 mph	60 mph
Initial Brake Temperature (IBT)	130°F to 150°F	130°F to 150°F
Runs Required	6	6
Maximum Stop Distance Allowed	121feet	484 feet
Maximum Allowable Brake Actuation Forces	Foot Pedal Force ≤ 90 lbs.	Foot Pedal Force ≤ 90 lbs.
Wheel Lockup	No	No
Brakes Utilized	**Foot Pedal Only**	**Foot Pedal Only**

30 MPH DATA — **Brake Subsystem 1**, Describe:_____

Stop No.	Test Speed (mph)	Initial Brake Temp. (F)		Actual Stopping Distance (ft)	Corrected Stopping Distance (ft)	Lever Force (lb)		Pedal Force (lb)		Vehicle Decel. (fpsps)		Wheel Lockup	Stay In Lane
		Front	Rear			Max	Avg	Max	Avg	Max	Avg		
1													
2													
3													
4													
5													
6													

FMVSS 122 - DATA SHEET 6 (2 of 2)

60 MPH DATA —— **Brake Subsystem 1**, Describe:_____

Stop No.	Test Speed (mph)	Initial Brake Temp. (F)		Actual Stopping Distance (ft)	Corrected Stopping Distance (ft)	Lever Force (lb)		Pedal Force (lb)		Vehicle Decel. (fpsps)		Wheel Lockup	Stay In Lane
		Front	Rear			Max	Avg	Max	Avg	Max	Avg		
1													
2													
3													
4													
5													
6													

30 MPH DATA — **Brake Subsystem 2**, Describe:_____

Stop No.	Test Speed (mph)	Initial Brake Temp. (F)		Actual Stopping Distance (ft)	Corrected Stopping Distance (ft)	Lever Force (lb)		Pedal Force (lb)		Vehicle Decel. (fpsps)		Wheel Lockup	Stay In Lane
		Front	Rear			Max	Avg	Max	Avg	Max	Avg		
1													
2													
3													
4													
5													
6													

60 MPH DATA —— **Brake Subsystem 2**, Describe:_____

Stop No.	Test Speed (mph)	Initial Brake Temp. (F)		Actual Stopping Distance (ft)	Corrected Stopping Distance (ft)	Lever Force (lb)		Pedal Force (lb)		Vehicle Decel. (fpsps)		Wheel Lockup	Stay In Lane
		Front	Rear			Max	Avg	Max	Avg	Max	Avg		
1													
2													
3													
4													
5													
6													

REMARKS: _____

RECORDED BY:_____ **DATE:**_____

APPROVED BY:_____

FMVSS 122 - DATA SHEET 7
BURNISH PROCEDURE (S7.4)

VEHICLE:		NHTSA NUMBER:		DATE:		ROAD PFC:	
AMBIENT TEMPERATURE		WIND VELOCITY:		TIRE PRESSURE (FRONT):		TIRE PRESSURE (REAR):	
ODOMETER START:		ODOMETER FINISH:					

TEST CONDITIONS:

Test Speed	30 mph
Initial Brake Temperature (IBT)	130°F to 150°F
Runs Required	200
Deceleration Rate	12fpsps
Actuation Forces	Hand Lever and foot pedal force limits do not apply during this procedure.
Cooling Speed	Accelerate at maximum rate to 30 mph immediately and maintain that speed until making the next stop
Stop Interval	The braking interval shall be either the distance necessary to reduce the brake temperature to between 130 and 150 degrees F or 1 mile, whichever comes first.
Post Burnish Adjustments	After burnishing adjust the brakes in accordance with the manufacturer's recommendation.
Wheel Lockkup	
Brakes Utilized	Hand Lever and Brake Pedal

Stop No.	Test Speed (mph)	Initial Brake Temp. (F)				Lever Force (lb)		Pedal Force (lb)		Vehicle Decel. (fpsps)		Wheel Lockup	Stay In Lane
		Front	Rear			Max		Max		Max	AVG		
1													
25													
50													
75													
100													
125													
150													
175													
200													

REMARKS: _____

RECORDED BY: _____ **DATE:** _____

APPROVED BY: _____

FMVSS 122 - DATA SHEET 8 (1 of 2)
SECOND EFFECTIVENESS TEST (S7.5)

VEHICLE:		NHTSA NUMBER:		DATE:		ROAD PFC:	
AMBIENT TEMPERATURE		WIND VELOCITY:		TIRE PRESSURE (FRONT):		TIRE PRESSURE (REAR):	
ODOMETER START:		ODOMETER FINISH:					

TEST CONDITIONS:

Test Speed	30 mph	60 mph
Initial Brake Temperature (IBT)	130°F to 150°F	130°F to 150°F
Runs Required	6	6
Maximum Stop Distance Allowed	43 feet	185 feet
Maximum Allowable Brake Actuation Forces	Hand Lever Force ≤ 55 lbs. Foot Pedal Force ≤ 90 lbs	Hand Lever Force ≤ 55 lbs. Foot Pedal Force ≤ 90 lbs
Wheel Lockup	No	No
Brakes Utilized	Hand and Foot	**Hand and Foot**

TEST CONDITIONS:

Test Speed	80 mph	> 95 mph
Initial Brake Temperature (IBT)	130°F to 150°F	130°F to 150°F
Runs Required	6	6
Maximum Stop Distance Allowed	43 feet	185 feet
Maximum Allowable Brake Actuation Forces	Hand Lever Force ≤ 55 lbs. Foot Pedal Force ≤ 90 lbs	Hand Lever Force ≤ 55 lbs. Foot Pedal Force ≤ 90 lbs
Wheel Lockup	No	No
Brakes Utilized	Hand and Foot	**Hand and Foot**

30 MPH DATA —

Stop No.	Test Speed (mph)	Initial Brake Temp. (F)		Actual Stopping Distance (ft)	Corrected Stopping Distance (ft)	Lever Force (lb		Pedal Force (lb		Vehicle Decel. (fpsps)		Wheel Lockup	Stay In Lane
		Front	Rear			Max	Avg	Max	Avg	Max	Avg		
1													
2													
3													
4													
5													
6													

FMVSS 122 - DATA SHEET 8 (2 of 2)

60 MPH DATA —

Stop No.	Test Speed (mph)	Initial Brake Temp. (F)		Actual Stopping Distance (ft)	Corrected Stopping Distance (ft)	Lever Force (lb		Pedal Force (lb		Vehicle Decel. (fpsps)		Wheel Lockup	Stay In Lane
		Front	Rear			Max	Avg	Max	Avg	Max	Avg		
1													
2													
3													
4													
5													
6													

80 MPH DATA —

Stop No.	Test Speed (mph)	Initial Brake Temp. (F)		Actual Stopping Distance (ft)	Corrected Stopping Distance (ft)	Lever Force (lb)		Pedal Force (lb)		Vehicle Decel. (fpsps)		Wheel Lockup	Stay In Lane
		Front	Rear			Max	Avg	Max	Avg	Max	Avg		
1													
2													
3													
4													
5													
6													

TOP SPEED ___ MPH DATA —

Stop No.	Test Speed (mph)	Initial Brake Temp. (F)		Actual Stopping Distance (ft)	Corrected Stopping Distance (ft)	Lever Force (lb)		Pedal Force (lb)		Vehicle Decel. (fpsps)		Wheel Lockup	Stay In Lane
		Front	Rear			Max	Avg	Max	Avg	Max	Avg		
1													
2													
3													
4													
5													
6													

REMARKS: _____

RECORDED BY:_____ **DATE:**_____

APPROVED BY:_____

FMVSS 122 - DATA SHEET 9 (1 of 3)
FADE AND RECOVERY TEST (S7.6)

VEHICLE:		NHTSA NUMBER:		DATE:		ROAD PFC:	
AMBIENT TEMPERATURE		WIND VELOCITY:		TIRE PRESSURE (FRONT):		TIRE PRESSURE (REAR):	
ODOMETER START:		ODOMETER FINISH:					

TEST CONDITIONS:

Test Speed	3 mph
Initial Brake Temperature (IBT)	130°F to 150°F
Runs Required	3
Deceleration Rate	10 – 11 fpsps
Maximum Allowable Brake Actuation Forces	Hand Lever Force ≤ 55 lbs. Foot Pedal Force ≤ 90 lbs
Wheel Lockup	No
Brakes Utilized	Hand lever and Brake pedal

30 MPH DATA — Fade and Recovery Baseline Data (S7.6.1)

Stop No.	Test Speed (mph)	Initial Brake Temp. (F)		Actual Stopping Distance (ft)	Corrected Stopping Distance (ft)	Lever Force (lb)		Pedal Force (lb)		Vehicle Decel. (fpsps)		Wheel Lockup	Stay In Lane
		Front	Rear			Max	Avg	Max	Avg	Max	Avg		
1													
2													
3													
Average Max. Actuation Forces (to be used in computing 5th recovery stop actuation force limits)													

TEST CONDITIONS:

Test Speed	60 mph
First Stop Initial Brake Temperature (IBT)	130°F to 150°F
IBT – Subsequent Stops	Temps. Occurring at distance intervals.
Number of Stops	10
Deceleration Rate	14-17 fpsps
Maximum Allowable Brake Actuation Forces	Hand Lever Force ≤ 55 lbs. Foot Pedal Force ≤ 90 lbs
Stop Interval	2112 feet
Wheel Lockup	No
Brakes Utilized	Hand lever and Brake pedal

DATA SHEET 9 (2 of 3)

60 MPH DATA — Fade Stops (S7.6.2)

Stop No.	Test Speed (mph)	Initial Brake Temp. (F)		Actual Stopping Distance (ft)	Corrected Stopping Distance (ft)	Lever Force (lb)		Pedal Force (lb)		Vehicle Decel. (fpsps)		Wheel Lockup	Stay In Lane
		Front	Rear			Max	Avg	Max	Avg	Max	Avg		
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													

TEST CONDITIONS:

Test Speed	30 mph
First Stop Initial Brake Temperature (IBT)	Temperature achieved at completion of fade stop procedure
IBT – Subsequent Stops	Temps. Occurring at distance intervals.
Number of Stops	5
Deceleration Rate	10-11 fpsps
Maximum Allowable Brake Actuation Forces for Stops 1 through 4	Hand Lever Force ≤ 55 lbs. Foot Pedal Force ≤ 90 lbs
Maximum Allowable Brake Actuation Forces for Stop 5	See Recovery Stop Actuation Force Limit computation Table Below
Stop Interval	1 mile
Wheel Lockup	No
Brakes Utilized	Hand lever and Brake pedal

REQUIREMENT: for the fifth recovery stop shall be within plus 20 pounds (89 Newtons) and minus 10 pounds (44 Newtons) of the baseline check average force, but not less than 0 pounds.

5th Recovery Stop Actuation Force Limit Computations (S5.4.3)			
Service Brake 1 (Front Brake)		Service Brake 2 (Rear Brake)	
Lower Limit – Average Max. Force (__lb) minus 10 pounds (44.5 N)	Upper Limit – Average Max. Force (__lb) Plus 20 pounds (89 N)	Lower Limit – Average Max. Force (__lb) minus 10 pounds (44.5 N)	Upper Limit – Average Max. Force (__lb) Plus 20 pounds (89 N)

DATA SHEET 9 (3 of 3)

30 mph Recovery Stop Data (S7.6.3) —

Stop No.	Test Speed (mph)	Initial Brake Temp. (F)		Actual Stopping Distance (ft)	Corrected Stopping Distance (ft)	Lever Force (lb)		Pedal Force (lb)		Vehicle Decel. (fpsps)		Wheel Lockup	Stay In Lane
		Front	Rear			Max	Avg	Max	Avg	Max	Avg		
1													
2													
3													
4													
5													

REMARKS: _____

RECORDED BY:_____ **DATE:**_____

APPROVED BY:_____

FMVSS 122 - DATA SHEET 10

REBURNISH PROCEDURE (S7.7)

VEHICLE:		NHTSA NUMBER:		DATE:		ROAD PFC:	
AMBIENT TEMPERATURE		WIND VELOCITY:		TIRE PRESSURE (FRONT):		TIRE PRESSURE (REAR):	
ODOMETER START:		ODOMETER FINISH:					

TEST CONDITIONS:

Test Speed	30 mph
Initial Brake Temperature (IBT)	130°F to 150°F
Runs Required	35
Deceleration Rate	12fpsps
Actuation Forces	Hand Lever and foot pedal force limits do not apply during this procedure.
Cooling Speed	Accelerate at maximum rate to 30 mph immediately and maintain that speed until making the next stop
Stop Interval	The braking interval shall be either the distance necessary to reduce the brake temperature to between 130 and 150 degrees F or 1 mile, whichever comes first.
Post Burnish Adjustments	After burnishing adjust the brakes in accordance with the manufacturer's recommendation.
Wheel Lockkup	No
Brakes Utilized	Hand Lever and Brake Pedal

Stop No.	Test Speed (mph)	Initial Brake Temp. (F)				Lever Force (lb)		Pedal Force (lb)		Vehicle Decel. (fpsps)		Wheel Lockup	Stay In Lane
		Front	Rear			Max		Max		Max			
1													
5													
10													
15													
20													
25													
30													
35													

REMARKS: _____

RECORDED BY:_____ **DATE:**_____

APPROVED BY:_____

FMVSS 122 - DATA SHEET 11 (1 of 2)
FINAL EFFECTIVENESS TEST (S7.8.1)

VEHICLE:		NHTSA NUMBER:		DATE:		ROAD PFC:	
AMBIENT TEMPERATURE		WIND VELOCITY:		TIRE PRESSURE (FRONT):		TIRE PRESSURE (REAR):	
ODOMETER START:		ODOMETER FINISH:					

TEST CONDITIONS:

Test Speed	30 mph	60 mph	80 mph	< Top Speed
Initial Brake Temperature (IBT)	130°F to 150°F	130°F to 150°F	130°F to 150°F	130°F to 150°F
Runs Required	6	6	4	4
Maximum Stop Distance Allowed	43 feet	185 feet	345 feet	TBD
Maximum Allowable Brake Actuation Forces	Hand Lever Force ≤ 55 lbs. Foot Pedal Force ≤ 90 lbs.	Hand Lever Force ≤ 55 lbs. Foot Pedal Force ≤ 90 lbs.	Hand Lever Force ≤ 55 lbs. Foot Pedal Force ≤ 90 lbs.	Hand Lever Force ≤ 55 lbs. Foot Pedal Force ≤ 90 lbs.
Wheel Lockup	No	No	No	No
Brakes Utilized	Hand and Foot	Hand and Foot	Hand and Foot	Hand and Foot

30 MPH DATA —

Stop No.	Test Speed (mph)	Initial Brake Temp. (F)		Actual Stopping Distance (ft)	Corrected Stopping Distance (ft)	Lever Force(lb)		Pedal Force (lb)		Vehicle Decel. (fpsps)		Wheel Lockup	Stay In Lane
		Front	Rear			Max	Avg	Max	Avg	Max	Avg		
1													
2													
3													
4													
5													
6													

DATA SHEET 11 (2 of 2)

60 MPH DATA —

Stop No.	Test Speed (mph)	Initial Brake Temp. (F)		Actual Stopping Distance (ft)	Corrected Stopping Distance (ft)	Lever Force (lb)		Pedal Force (lb)		Vehicle Decel. (fpsps)		Wheel Lockup	Stay In Lane
		Front	Rear			Max	Avg	Max	Avg	Max	Avg		
1													
2													
3													
4													
5													
6													

80 MPH DATA —

Stop No.	Test Speed (mph)	Initial Brake Temp. (F)		Actual Stopping Distance (ft)	Corrected Stopping Distance (ft)	Lever Force (lb)		Pedal Force (lb)		Vehicle Decel. (fpsps)		Wheel Lockup	Stay In Lane
		Front	Rear			Max	Avg	Max	Avg	Max	Avg		
1													
2													
3													
4													

HIGH SPEED MPH DATA —

Stop No.	Test Speed (mph)	Initial Brake Temp. (F)		Actual Stopping Distance (ft)	Corrected Stopping Distance (ft)	Lever Force (lb)		Pedal Force (lb)		Vehicle Decel. (fpsps)		Wheel Lockup	Stay In Lane
		Front	Rear			Max	Avg	Max	Avg	Max	Avg		
1													
2													
3													
4													
5													
6													

REMARKS: _____

RECORDED BY: _____ **DATE:** _____

APPROVED BY: _____

FMVSS 12 - DATA SHEET 12 (1 of 3)

PARTIAL SERVICE BRAKE SYSTEM TEST (S7.8.2)

VEHICLE:		NHTSA NUMBER:		DATE:		ROAD PFC:	
AMBIENT TEMPERATURE		WIND VELOCITY:		TIRE PRESSURE (FRONT):		TIRE PRESSURE (REAR):	
ODOMETER START:		ODOMETER FINISH:					

Alter the service brake system on motorcycles with split-service brake system which usually will include three-wheeled motorcycles, to induce a complete loss of braking in any one subsystem. Determine line pressure or pedal/lever force required to cause operation of the brake system failure indicator. Utilize the brake system not disabled and repeat procedure with each brake subsystem.

Test Speed	30 mph	60 mph
Initial Brake Temperature (IBT)	130°F to 150°F	130°F to 150°F
Runs Required	6	6
Maximum Stop Distance Allowed	97 feet	388 feet
Maximum Allowable Brake Actuation Forces	Hand Lever Force ≤ 55 lbs. Foot Pedal Force ≤ 90 lbs.	Hand Lever Force ≤ 55 lbs. Foot Pedal Force ≤ 90 lbs.
Wheel Lockup	No	No
Brakes Utilized	Hand / Foot	Hand / Foot

30 MPH DATA — Brake Subsystem #**1** _____

Stop No.	Test Speed (mph)	Initial Brake Temp. (F)		Actual Stopping Distance (ft)	Corrected Stopping Distance (ft)	Lever Force(lb)		Pedal Force (lb)		Vehicle Decel. (fpsps)		Wheel Lockup	Stay In Lane
		Front	Rear			Max	Avg	Max	Avg	Max	Avg		
1													
2													
3													
4													
5													
6													

Brake pedal/lever force required to cause brake failure indicator to operate: _____ lbs.

DATA SHEET 12 (2 of 3)

60 MPH DATA —– Brake Subsystem #**1** _____

Stop No.	Test Speed (mph)	Initial Brake Temp. (F)		Actual Stopping Distance (ft)	Corrected Stopping Distance (ft)	Lever Force (lb)		Pedal Force (lb)		Vehicle Decel. (fpsps)		Wheel Lockup	Stay In Lane
		Front	Rear			Max	Avg	Max	Avg	Max	Avg		
1													
2													
3													
4													
5													
6													

Brake pedal/lever force required to cause brake failure indicator to operate: _____ lbs.

30 MPH DATA — Brake Subsystem #**2** _____

Stop No.	Test Speed (mph)	Initial Brake Temp. (F)		Actual Stopping Distance (ft)	Corrected Stopping Distance (ft)	Lever Force(lb)		Pedal Force (lb)		Vehicle Decel. (fpsps)		Wheel Lockup	Stay In Lane
		Front	Rear			Max	Avg	Max	Avg	Max	Avg		
1													
2													
3													
4													
5													
6													

Brake pedal/lever force required to cause brake failure indicator to operate: _____ lbs.

DATA SHEET 12 (3 of 3)

60 MPH DATA —— Brake Subsystem #**2** _____

Stop No.	Test Speed (mph)	Initial Brake Temp. (F)		Actual Stopping Distance (ft)	Corrected Stopping Distance (ft)	Lever Force (lb)		Pedal Force (lb)		Vehicle Decel. (fpsps)		Wheel Lockup	Stay In Lane
		Front	Rear			Max	Avg	Max	Avg	Max	Avg		
1													
2													
3													
4													
5													
6													

Brake pedal/lever force required to cause brake failure indicator to operate: _____lbs.

REMARKS: _____

RECORDED BY:_____ **DATE:**_____

APPROVED BY:_____

FMVSS 122 - DATA SHEET 13

PARKING BRAKE TEST (S7.9)

VEHICLE:		NHTSA NUMBER:		DATE:		ROAD PFC:	
AMBIENT TEMPERATURE		WIND VELOCITY:		TIRE PRESSURE (FRONT):		TIRE PRESSURE (REAR):	
ODOMETER START:		ODOMETER FINISH:					

REQUIREMENTS APPLY TO **THREE-WHEELED MOTORCYCLES ONLY**:

A. Start with an initial brake temperature of not more than 150□F. Drive the motorcycle downhill on the 30 percent grade with the longitudinal axis of the motorcycle in the direction of the grade. Apply the service brakes with a force not exceeding 90 pounds to
stop the motorcycle and place the transmission in neutral.

B. Apply the parking brake with a force not exceeding 90 pounds for a foot-operated system, or 55 pounds for a hand-operated system. Release the service brakes and allow the motorcycle to remain at rest for 5 minutes.

C. The parking brake shall be of a friction type with a solely mechanical means of engagement and capable of holding the motorcycle stationary to the limit of traction of the braked wheels.

D. Repeat the test with the motorcycle parked uphill on the grade.

E. Record observations and results below:

REMARKS: _____

RECORDED BY:_____ **DATE:**_____

APPROVED BY:_____

FMVSS 122 - DATA SHEET 14 (1 of 2)

WATER FADE AND RECOVERY TEST (S7.10.1) & (S7.10.2)

VEHICLE:		NHTSA NUMBER:		DATE:		ROAD PFC:	
AMBIENT TEMPERATURE		WIND VELOCITY:		TIRE PRESSURE (FRONT):		TIRE PRESSURE (REAR):	
ODOMETER START:		ODOMETER FINISH:					

TEST CONDITIONS: Baseline Stops

Test Speed	30 mph
Initial Brake Temperature (IBT)	130°F to 150°F
Runs Required	3
Deceleration Rate	10 – 11 fpsps
Maximum Allowable Brake Actuation Forces	Hand Lever Force ≤ 55 lbs. Foot Pedal Force ≤ 90 lbs
Wheel Lockup	No
Brakes Utilized	Hand lever and Brake pedal

30 MPH DATA — Baseline Data (S7.10.1)

Stop No.	Test Speed (mph)	Initial Brake Temp. (F)		Actual Stopping Distance (ft)	Corrected Stopping Distance (ft)	Lever Force (lb)		Pedal Force (lb)		Vehicle Decel. (fpsps)		Wheel Lockup	Stay In Lane
		Front	Rear			Max	Avg	Max	Avg	Max	Avg		
1													
2													
3													
Average Max. Actuation Forces (to be used in computing 5th recovery stop actuation force limits)													

Immerse rear brake in water fully released for 2 minutes followed by immersion of the front brake in water fully released for 2 minutes.

Immediately after completion of the wetting, accelerate to initial test speed without applying the brakes. Upon reaching the initial test speed, immediately conduct the wet brake recovery stops.

DATA SHEET 14 (2 of 2)

TEST CONDITIONS: Wet Brake Recovery Stops

Test Speed	30 mph
First Stop Initial Brake Temperature (IBT)	Temperature achieved at completion of brake wetting.
IBT – Subsequent Stops	Temps. Occurring at end of each stop.
Number of Stops	5
Deceleration Rate	10-11 fpsps
Maximum Allowable Brake Actuation Forces for Stops 1 through 4	Hand Lever Force ≤ 55 lbs. Foot Pedal Force ≤ 90 lbs
Maximum Allowable Brake Actuation Forces for **Stop 5**	See Recovery Stop Actuation Force Limit computation Table Below
Stop Interval	Distance sufficient to accelerate to initial test speed.
Wheel Lockup	No
Brakes Utilized	Hand lever and Brake pedal

REQUIREMENT: for the **5th** recovery stop shall be within plus 20 pounds (89 Newtons) and minus 10 pounds (44 Newtons) of the baseline check average force, but not less than 0 pounds.

5th Recovery Stop Actuation Force Limit Computations (S5.4.3)			
Service Brake 1 (Front Brake)		Service Brake 2 (Rear Brake)	
Lower Limit – Average Max. Force (__lb) minus 10 pounds	Upper Limit – Average Max. Force (__lb) Plus 20 pounds	Lower Limit – Average Max. Force (__lb) minus 10 pounds	Upper Limit – Average Max. Force (__lb) Plus 20 pounds

30 mph Recovery Stop Data (S10.2) —

Stop No.	Test Speed (mph)	Initial Brake Temp. (F)		Actual Stopping Distance (ft)	Corrected Stopping Distance (ft)	Lever Force (lb)		Pedal Force (lb)		Vehicle Decel. (fpsps)		Wheel Lockup	Stay In Lane
		Front	Rear			Max	Avg	Max	Avg	Max	Avg		
1													
2													
3													
4													
5													

REMARKS: _____
RECORDED BY:_____ **DATE:**_____
APPROVED BY:_____

FMVSS 122 - DATA SHEET 15

FINAL INSPECTION – DURABILITY (S5.8/S7.11)

VEHICLE:		NHTSA NUMBER:		DATE:		ROAD PFC:	
AMBIENT TEMPERATURE		WIND VELOCITY:		TIRE PRESSURE (FRONT):		TIRE PRESSURE (REAR):	
ODOMETER START:		ODOMETER FINISH:					

Upon completion of all tests, perform the following:

Requirement – brake system disassembled	PASS/FAIL
Inspect the entire brake system for detachment or fracture of any component	
Inspect the brake linings for detachment from the shoe or pad.	
Inspect the wheel cylinder, master cylinder, brake hoses and axle seals for fluid or lubricant leakage	

REMARKS: _____

RECORDED BY:_____ **DATE:**_____

APPROVED BY:_____

FMVSS 122 –DATA SHEET 16 (1 of 2)

FINAL INSPECTION – EQUIPMENT REQUIREMENTS (S5.1)

BRAKE SYSTEM INSPECTION REQUIREMENTS	TEST VEHICLE COMPLIANCE	DATA	
		YES	NO
S5.1 - Motorcycle shall have either a split service brake system or two independently actuated service brake systems.	Motorcycle has split service brake system?		
	Motorcycle has two independently actuated service brake systems?		
S5.1.1 - Failure of any component in a mechanical service brake system shall not result in a loss of braking ability in the other service brake system on the vehicle.	If vehicle has a mechanical service brake system, would component failure result in loss of braking in other service brake system?		
S5.1.2 - Leakage failure in hydraulic service brake system shall not result in a loss of braking ability in other service brake system on the vehicle.	If vehicle has hydraulic service brake system, would leakage failure in one service brake system result in a loss of braking ability in other service brake system?		
S5.1.2.1 - Each master cylinder shall have a separate reservoir for each brake circuit, with each reservoir filler opening having its own cover, seal, and cover retention device. Each reservoir shall have a minimum capacity equivalent to one and one-half times the total fluid displacement resulting when all the wheel cylinders or caliper pistons serviced by the reservoir move from a new lining, fully retracted position to a fully worn, fully applied position. Where adjustment is a factor, the worst condition of adjustment shall be used for this measurement.	Vehicle meets master cylinder reservoir requirements? Attach annotated calculations for each reservoir capacity. (Data Sheet 17)		
S5.1.2.2 - Each motorcycle shall have a brake fluid warning statement that reads as follows, in letters at least three thirty-seconds of an 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 4 inches of the brake-fluid reservoir filler plug or cap (C) Of a color that contrasts with its background, if it is not engraved or embossed	Vehicle meets master cylinder warning statement requirements?		
	Recommended brake fluid type: _____		

(Continued on next page)

DATA SHEET 16 (2 of 2)

BRAKE SYSTEM INSPECTION REQUIREMENTS	TEST VEHICLE COMPLIANCE	DATA	
		YES	NO
S5.1.3 - (A) Each motorcycle equipped with a **split service brake system** shall have one or more electrically operated service brake system failure indicator lamps that is mounted in front of and in clear view of the driver, and that is activated — (1) In the event of pressure failure in any part of the service brake system, other than a structural failure of either a brake master cylinder body in a split integral body type master cylinder system or a service brake system failure indicator body, before or upon application of not more than 20 lb of pedal force upon the service brake. (2) Without the application of pedal force, when the level of brake fluid in a master cylinder reservoir drops to less than the recommended safe level specified by the manufacturer or to less than one-half the fluid reservoir capacity, whichever is the greater. (B) All failure indicator lamps shall be activated when the ignition switch is turned from the "off" to the "on" or to the "start" position. (C) Except for the momentary activation required by S5.1.3.1(b), each indicator lamp once activated, shall remain activated as long as the condition exists, whenever the ignition switch is in the "on" position. An indicator lamp activated when the ignition is turned to the "start" position will be deactivated upon return of the switch to the "on" position unless a failure exists in the service brake system. (D) Each indicator lamp shall have a red lens with the legend "Brake Failure" on or adjacent to it in letters not less than three thirty-seconds of an inch high that shall be legible to the driver in daylight when lighted.	Does vehicle have a brake system failure indicator lamp? Number of brake system failure indicator lamps: _____ Does failure indicator lamp conform to operational and physical requirements?		
S5.1.4 - Each three-wheeled motorcycle shall be equipped with a parking brake of a friction type with a solely mechanical means to retain engagement.	If a three-wheeled motorcycle, is it equipped with a parking brake?		
S5.1.5 - The brake system shall be installed so that the lining thickness of the drum brake shoes may be visually inspected, either directly or by use of a mirror without removing the drums, and so that disc brake friction lining may be visually inspected without removing the pads.	Can the drum brake lining thickness and disc brake lining thickness be inspected without removal of drum or disc brake pads? Is a mirror required?		

REMARKS: _____

RECORDED BY: _____ **DATE:** _____

APPROVED BY: _____

DATA SHEET 17

CALCULATION OF MINIMUM RESERVOIR VOLUME REQUIREMENTS

BRAKE		LINING		
LOCATION	**TYPE**	**DESCRIPTION**	**MINIMUM THICKNESS**	**THICKNESS TO FULLY WORN (1) in.**
Front Brake	Drum	Leading	Pretest	
		Primary	Post Test	
		Inboard	.	
	Disc	Trailing	Pretest	
		Secondary	Post Test	
		Outboard	.	
LINING CLEARANCE:	Diametral (2) -	Inboard -	Outboard -	
WHEEL CYLINDER DIAMETER (3)		CALIPER PISTON DIAMETER (3)		
SHOE CAGE DIAMETER (4) _____ ; CENTER POINT OF BRAKE ASSY TO CENTER POINT OF W.C.				
Rear Brake	Drum	Leading	Pretest	
		Primary	Post Test	
		Inboard	.	
	Disc	Trailing	Pretest	
		Secondary	Post Test	
		Outboard	.	
LINING CLEARANCE:	Diametral (2)	Inboard	Outboard	
WHEEL CYLINDER DIAMETER (3)		CALIPER PISTON DIAMETER (3)		
SHOE CAGE DIAMETER (4)		CENTER POINT OF BRAKE ASSY TO CENTER POINT OF W.C.		
SUBSYSTEM 1 CONSISTS OF:	LF	LR	RF	RR
SUBSYSTEM 2 CONSISTS OF:	LF	LR	RF	RR
(1) MFRS RECOMMENDATIONS - REAR - TOP OF RIVET HEADS - FRONT - 1/32 INCH -				
(2) DRUM BRAKES, MEASURED AT HORIZONTAL CENTERLINE				
(3) MFRS DATA				
(4) RESET POSITION				

19. FORMS

INSTRUMENT CALIBRATION (12 MONTH MAXIMUM INTERVAL) (SAMPLE)

INSTRUMENT	SERIAL NUMBER	CALIBRATION DATE	NEXT CALIBRATION
Data Acquisition System			
Computer			
Software			
Front Torque Wheel			
Rear Torque Wheel			
Front Slip Ring			
Rear Slip Ring			
Hand Lever Force Transducer			
Pedal Force Transducer			
Park Brake Force Transducer			
Front Hydraulic Pressure Transducer			
Rear Hydraulic Pressure Transducer			
Accelerometer			
Fifth Wheel			
Wind Velocity Gauge			
Ambient Temperature Gauge			
Front Brake Thermocouple			
Rear Brake Thermocouple			
Fifth Wheel Velocity			
Lock-up Detection System			

QUALITY ASSURANCE_____

DAILY INSTRUMENT CALIBRATION
(SAMPLE)

NOTE: A daily Pre and Post Test instrumentation calibration is required per section 8.

INSTRUMENT	(EXAMPLES) CALIBRATION PROCEDURE	DESIRED VALUE	INDICATED VALUE MORNING	INDICATED VALUE EVENING	ALLOWED DEVIATION
Velocity Meter	2.568 kHz Input				
5th Wheel Distance Meter	Drive Measured Distance				
5th Wheel Velocity Meter	Drive Measured Distance vs. Time				
Hand Lever Force Transducer	Dead Weight/Shunt				
Pedal Force Transducer	Dead Weight/Shunt				
Accelerometer	Known Accel. Or to Known Angles				
Brake Thermocouple	Known Temp.				
Lock-up Detector	Hand Spin Wheel - Vehicle Stopped				

Comments:

TECHNICIAN:_____ QUALITY ASSURANCE:_____

DATE: _____

LABORATORY NOTICE OF TEST FAILURE TO OVSC

FMVSS NO.: 122_____ TEST DATE: _____

LABORATORY: _____

CONTRACT NO.: DTNH22-_____ ; DELV. ORDER NO.: _____

LABORATORY PROJECT ENGINEER'S NAME: _____

TEST VEH. MAKE/MODEL: _____

VEHICLE NHTSA NO.: _____; VIN: _____

VEHICLE MODEL YEAR: _____; BUILD DATE: _____

TEST FAILURE DESCRIPTION:

S122 REQUIREMENT, PARAGRAPH ___ :

NOTIFICATION TO NHTSA (COTR):

DATE: _____ BY: _____

REMARKS:

20. APPENDIX

STOPPING DISTANCE TABLE

Test Speed	1st Effectiveness Total System (All brake controls utilized)	1st Effectiveness Partial Service Brake System (Brake controls tested independently)	2nd Effectiveness Total System (All brake controls utilized) & Final Effectiveness Total System (All brake controls utilized)	Final Effectiveness Partial Service System (Split-Service system) (Using applicable brake control)
(mph)	(feet)	(feet)	(feet)	(feet)
15	13	30	11	25
20	24	54	19	44
25	37	84	30	68
30	54	121	43	97
35	74	165	58	132
40	96	216	75	173
45	121	273	95	218
50	150	337	128	264
55	181	407	155	326
60	216	484	185	388
65	—	—	217	455
70	—	—	264	527
75	—	—	303	606
80	—	—	345	689
85	—	—	389	778
90	—	—	484	872
95	—	—	540	971
100	—	—	598	1,076
105	—	—	659	1,188
110	—	—	723	1,302
115	—	—	791	1,423
120	—	—	861	1,549

APPENDIX 2

Procedure for Determining Master Cylinder Volume Requirement

The procedure followed for determining the minimum volume requirements is outlined below and used in conjunction with Data sheet 17.

DETERMINATION OF MASTER CYLINDER MINIMUM VOLUME REQUIREMENTS

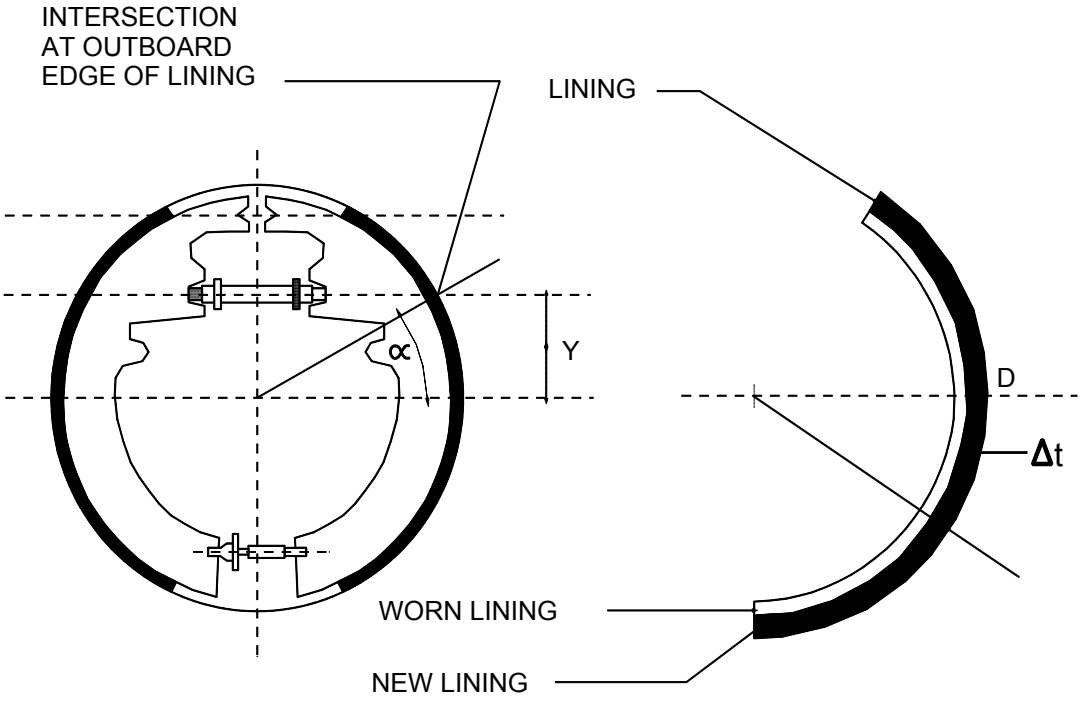

FIGURE 1A

DRUM BRAKES

Volume Required, $V_r = [(2C + \Delta t_s + \Delta t_p)/\cos\propto] \times A \times NWC$, where –

:	V_r =	Volume required per wheel
	C =	Manufacturer's recommended drum-to-lining clearance
	Δt_p =	Change in thickness of primary lining
	Δt_s =	Change in thickness of secondary lining
	Y =	Center point of wheel cylinder to center point of brake assembly
	A =	Cross sectional area of the wheel cylinder bore
	NWC =	Number of wheel cylinders serviced by the reservoir in question
	$\propto$ =	$Sin^{-1}(2Y/D)$
	D =	Cage diameter

DISC BRAKES

Volume Required, $V_v = (\Delta t_i + \Delta t_{ic} + \Delta t_o + t_{oc}) \times [\Pi(D^2)]/4$, where –

: V_v = Volume required per wheel
Δt = Change in thickness (average)
i = inboard
o = Outboard
D = Caliper cylinder diameter
c = Average clearance