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U.S. DEPARTMENT OF TRANSPORTATION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

LABORATORY TEST PROCEDURE

FMVSS No. 223 Rear Impact Guards

Office of Vehicle Safety Compliance
1200 New Jersey Avenue, SE
Washington, DC 20590

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FOR OVSC LABORATORY
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REV. No.	DATE	AMENDMENT	EFFECTIVE DATE	
00	Oct. 20, 1997	63 FR 3654		Original Issue
01	Dec. 19, 2023	87 FR 42366		Incorporates final rule 87 FR 42366. Updated format and content in test data sheets. Other updates throughout, to clarify and modernize the document.
02				

1. PURPOSE AND APPLICATIONS

The Office of Vehicle Safety Compliance (OVSC) provides contractor laboratories with Laboratory Test Procedures as guidelines for obtaining compliance test data. The data are used to inform OVSC if there is a potential noncompliance of a specific vehicle or item or motor vehicle equipment based on a failure to meet the minimum requirements of the applicable Federal Motor Vehicle Safety Standard (FMVSS). The purpose of the OVSC Laboratory Test Procedures is to present a uniform testing and data recording format and provide suggestions for the use of specific equipment and procedures. If any contractor views any part of an OVSC Laboratory Test Procedure (TP) to be in conflict with a FMVSS or observes deficiencies in a TP, the contractor is required to advise the Contracting Officer's Representative (COR) and resolve the discrepancy prior to the start of compliance testing.

The TP is not intended to limit or restrain a contractor from developing or utilizing any testing techniques or equipment that will assist in procuring the required compliance test data. However, the application of any such testing technique or equipment is subject to prior approval of the COR.

NOTE: This TP, prepared for the limited purpose of use by contracted independent laboratories conducting tests for the OVSC, are not rules, regulations, or NHTSA interpretations regarding the meaning of a FMVSS. Neither is the TP intended to limit the requirements of the applicable FMVSS(s). In some cases, the TP does not include all of the various FMVSS minimum performance requirements. Recognizing applicable test tolerances, the TP may specify test conditions that are less severe than the minimum requirements of the standard. In addition, the TP may be modified by the OVSC at any time without notice, and the COR may direct or authorize contractors to deviate from these procedures, as long as the tests are performed in a manner consistent with the standard itself and within the scope of the contract. Laboratory Test Procedures 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 necessarily guaranteed if the manufacturer limits its certification tests to those described in the TP. The test reports produced as a result of OVSC’s testing are likely insufficient to serve as a basis for certification of a product.

2. GENERAL REQUIREMENTS

The test procedures, methods, and associated equipment are based on the requirements of the following documents to the extent referenced herein.

49 CODE OF FEDERAL REGULATIONS (CFR) 571 FEDERAL MOTOR VEHICLE SAFETY STANDARDS (FMVSS)

FMVSS 223 – Rear Impact Guards

ENVIRONMENTAL CONDITIONS

The environmental conditions specific to each test and measurement procedure is described in the relevant portion of this test procedure. However, if environmental conditions are not specified, all tests and measurements shall be conducted under the following environmental conditions:

Temperature 15.5 °C (60 °F) to 32.2 °C (90 °F)[1]

All data on environmental conditions required throughout this procedure shall be continuously monitored and recorded in analog or electronic format which shall be produced on the applicable data sheet or at the discretion of the COR.

TEST SEQUENCE

The following test series may be performed in the following sequential order. Ground clearance measurement can take place after any of the other test series.

INSPECTION OF PHYSICAL FEATURES (see section 13.B & 13.C of this test procedure)

POINT LOAD FORCE APPLICATION TESTS (see section 13.D of this test procedure)

UNIFORM DISTRIBUTED LOAD & ENERGY ABSORPTION TEST (see section 13.D of this test procedure)

GROUND CLEARANCE MEASUREMENT (see section 13.D of this test procedure)

[1] FMVSS No. 223 specifies no environmental test conditions. Therefore, tests performed on RIGs that are tested outside of the environmental conditions specified in this TP may be considered valid tests, at the COR's discretion.

3. SECURITY

The contractor shall provide appropriate security measures to protect the OVSC test items from unauthorized personnel during the entire compliance testing program. The contractor is financially responsible for any acts of theft and/or vandalism which occur during the storage of test equipment. Any security problems, which arise, shall be reported by e-mail to the COR within one business day of the contractor becoming aware of the problem. An account containing specific details of the security problem will be sent to the COR within 72 hours of becoming aware of the problem.

The contractor is required to protect and segregate the data that is collected during compliance testing before and after each test. No information concerning the compliance testing program may be released to anyone except the COR, unless specifically authorized by the COR, the COR's Division Chief, the COR's Office Director, or by the Contracting Officer.

NOTE: NO INDIVIDUALS, OTHER THAN CONTRACTOR PERSONNEL, ARE REQUIRED TO BE ALLOWED TO WITNESS ANY COMPLIANCE TEST UNLESS SPECIFICALLY AUTHORIZED BY THE COR.

4. GOOD HOUSEKEEPING

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

5. TEST SCHEDULING AND MONITORING

The contractor is required to submit a test schedule to the COR prior to testing. Tests are required to be completed as required in the contract. All testing is required to be coordinated to allow monitoring by the COR. The contractor may receive a guard or a full trailer for a compliance test, at the COR’s discretion.

6. TEST DATA DISPOSITION

A. AVAILABILITY

The contractor shall make all preliminary compliance test data available to the COR on location within four hours after the test. Final test data, including digital printouts and computer-generated plots (if applicable), shall be furnished to the COR within five working days. Additionally, the contractor shall analyze the preliminary test results as directed by the COR.

B. DISPOSITION

All backup data sheets, data files, reports, photos, recordings, plots, technicians' notes, etc., shall be either sent to the COR or retained by the contractor for a minimum of 3 years after conclusion of each delivery order, purchase order, etc. The COR shall direct final disposition at that time.

C. INVALID TESTS

For contractual purposes, an invalid compliance test is one which does not conform precisely to all requirements/specifications of the OVSC Laboratory Test Procedure and Statement of Work applicable to the test. Any action or plan which deviates from the OVSC Laboratory Test Procedure shall be discussed with the COR.

The contractor shall notify the COR of any test not meeting all requirements/specifications of the OVSC Laboratory Test Procedure and Statement of Work applicable to the test, by e-mail, within 24 hours of the test and send written notice to the Contracting Officer within 48 hours of the test completion.

The Contracting Officer of NHTSA is the only NHTSA official authorized to notify the contractor that a retest for an invalid test is required. The retest shall be completed within 2 weeks after receipt of notification by the Contracting Officer that a retest is required.

NHTSA, in its sole discretion, reserves the right to waive the retest requirement. This provision shall not constitute a basis for dispute over NHTSA's waiving or not waiving any requirement.

No test report is required for any test that is determined to be invalid unless NHTSA specifically decides, in writing, to require the contractor to submit such report. The test data from the invalid test must be safeguarded until the data from the retest has been accepted by the COR. The report and other required deliverables for the retest are required to be submitted to the COR in accordance with the terms of the contract.

The contractor is subject to the default and subsequent reprocurement costs for non-delivery of valid or conforming tests (pursuant to the Termination for Default clause in the contract).

None of the requirements herein stated shall diminish or modify the rights of NHTSA to determine that any test submitted by the contractor does not conform precisely to all requirements/specifications of the OVSC Laboratory Test Procedure and Statement of Work applicable to the test.

7. CONTRACTOR PURCHASED TEST ITEMS (CPTI) & GOVERNMENT FURNISHED TEST ITEMS (GFTI)

All equipment items shall be inventoried upon receipt and checked against the shipping documents. Any missing or broken parts shall immediately be reported to the COR. A running inventory list shall be maintained until the complete matrix list of test items is received. The contractor is financially responsible for any acts of theft and/or vandalism that occur during the storage of CPTI/GFTI.

The contractor is required to verify that each guard that is received at the laboratory contains the following:

A. Printed instructions in English for installing the guard, as well as a diagram or schematic depicting proper guard installation.

B. All attachment hardware necessary for installation of the guard on the chassis of the motor vehicle for which it is intended.

If either of these items are missing, notify the COR.

If the trailer is damaged, take photographs of the damaged areas, and promptly notify the COR.

An inventory is required to be made of the quantity, make, model, and condition of all GFTI/CPTI received. The test items are required to be stored in a dry, clean, area specifically designated by the Laboratory Project Manager. Each guard shall be assigned a laboratory report number by the COR and is required to also be tagged with the make, model, and part number.

8. GOVERNMENT FURNISHED PROPERTY (GFP)

GFP consist of full vehicle trailers. The GFP is authorized by contractual agreement.

The contractor has the responsibility of accepting each GFP test item whether delivered. The contractor acts on behalf of the OVSC when signing an acceptance of the GFP trailer delivery order. When a GFP trailer is delivered, the contractor must verify:

A. There is no damage to the trailer.

B. The warranty, owner’s manual, and any other information available from the manufacturer is included.

An inventory is required to be made of the quantity, make, model, and condition of all GFP received. The trailers are required to be stored in a dry, clean, area specifically designated by the Laboratory Project Manager. Each trailer shall be assigned a

laboratory report number by the COR and is required to also be tagged with the make, model, and part number.

9. CALIBRATION OF TEST INSTRUMENTS

Before the contractor initiates the test program, a test instrumentation calibration system will be implemented and maintained in accordance with established calibration practices. The calibration system shall include the following as a minimum:

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 are required to be calibrated by the contractor, or a commercial facility, against a higher order standard at periodic intervals NOT TO EXCEED TWELVE (12) MONTHS except for static types of measuring devices such as rulers, weights, etc., which are required to be calibrated at periodic intervals not to exceed two years. Records, showing the calibration traceability to the National Institute of Standards and Technology (NIST), are required to 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 is required to be provided by the contractor which includes the following information for all measurement and test equipment as a minimum (unless the calibration is performed by a licensed commercial facility).

   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 are required to be kept by the contractor in a manner which assures the maintenance of established calibration schedules. All such records are required to be readily available for inspection when requested by the COR. The calibration system will need the acceptance of the COR before the test program commences.

F. Further information is available in the International Standard ISO 10012:2003,

“Quality Assurance Requirements for Measuring Equipment” and American National Standard ANSI/NCSL Z540-1, “Calibration Laboratories and Measuring and Test Equipment General Requirements.”

NOTE: In the event of a failure to meet the Standard's minimum performance requirements additional calibration checks of some critically sensitive test equipment and instrumentation may be required for verification of accuracy. The necessity for the calibration will be at the COR's discretion and shall be performed without additional cost.

10. PHOTOGRAPHIC DOCUMENTATION

The contractor shall take digital photographs of the test execution procedures. Photographs shall be taken in color and contain clear images. A tag, label or placard identifying the test item as pretest or posttest, the lab test number, the OVSC number (if applicable) and date shall appear in each photograph and must be legible. The required resolution for digital photographs is a minimum of 1,600 x 1,200 pixels and shall have the same labeling requirements as still photographs. The digital photographs shall be included in the test report as a clear printed image measuring 102 mm x 152 mm (4 x 6 inch) in size or its digital equivalent format. Digital photographs are required to be saved in color and in a JPG format. Glare or light from any illuminated or reflective surface shall be minimized while taking photographs.

The test reports shall include enough photographs to describe the testing in detail and shall be organized in a logical succession of consecutive pictures. Upon request, the photographs shall be sent to the COR on a flash drive, CD, or DVD. Upon approval by the COR, other electronic means, including a OVSC designated file transfer site, can also be utilized.

At a minimum, the following test photographs shall be included in each final test report submitted by the contractor:

1. The guard in the condition it was received (front, rear, and both sides).
2. The guard certification label.
3. The test setup.
4. Pretest and posttest side views of the force application device against the guard at each test location.
5. Pretest and posttest views of the guard attachments (front, rear, and both sides).
6. Posttest view of damage to the guard’s members and/or parts.

11. DEFINITIONS

CHASSIS

The load supporting frame structure of a motor vehicle.

CONTRACTING OFFICER'S REPRESENTATIVE (COR)

A technical representative designated by the Contracting Officer to assist in monitoring the work under a contract. The Contracting Officer's Representative serves as the technical liaison between the Government and the Contractor. Abbreviated as "COR"

GROUND CLEARANCE

The vertical distance from the bottom edge of a horizontal member to the ground.

GUARD WIDTH

The maximum horizontal guard dimension that is perpendicular to the longitudinal vertical plane passing through the longitudinal centerline of the vehicle when the guard is installed on the vehicle according to the installation instructions provided by the manufacturer.

HORIZONTAL MEMBER

The structural member of the guard that meets the configuration requirements of S5.1.1 through 5.1.3 of 571.224, Rear Impact Protection, when the guard is installed on a vehicle according to the guard manufacturer's installation instructions.

HYDRAULIC GUARD

A guard designed to use fluid properties to provide resistance force to deformation.

LOAD PATH

A route of force transmission between the horizontal member and the chassis.

REAR IMPACT GUARD

A device installed on or near the rear of a vehicle so that when the vehicle is struck from the rear, the device limits the distance that the striking vehicle's front-end slides under the rear end of the impacted vehicle.
Abbreviated as "RIG"

RIG

Rear Impact Guard

RIGID TEST FIXTURE

A supporting structure on which a rear impact guard can be mounted in the same manner it is mounted to a vehicle. The rigid test fixture is designed to resist the forces applied to the rear impact guard without significant deformation, such that a performance requirement of this standard must be met no matter how small an amount of energy is absorbed by the test fixture.

SECURE LARGE FILE TRANSFER SOLUTION

A U.S. Government information system intended as a temporary means of securely transferring files between authorized parties. This information system is provided for U.S. Government-authorized use only.
Abbreviated as “SLFTS”

TEST FAILURE

A test that the contractor conducted that is within the applicable requirements of FMVSS No. 223, this test procedure, and the test contract, resulting in data or an issue that indicates the RIG may not meet FMVSS No. 223.

TEST ITEMS

Rear impact guards and associated fixtures/trailers that are either acquired by the Government and furnished to a contractor (GFTI), or acquired by the contractor using contract funds in accordance with the contract or delivery order (CPTI), for use in the performance of a contract.

12. PRETEST REQUIREMENTS

12.1 OPERATING TEST PROCEDURE

Following contract award or when a new OVSC laboratory test procedure is published, the contractor shall submit a detailed test procedure that demonstrates concurrence with the OVSC laboratory test procedure and the applicable FMVSS to the COR prior to conducting the compliance testing. The COR shall provide written approval of the in-house test procedures before initiating the compliance test program.

The contractor's in-house test procedure shall not contradict the OVSC TP in the compliance testing. The contractor's in-house test procedure shall contain or discuss each the following:

a) Step-by-step test procedures
b) Detailed check-off sheets
c) Complete list of test equipment with make and model numbers
d) Test instrument accuracy
e) Test instrument calibration dates
f) Test item tagging or marking system
g) Testing setup
h) Data recording
i) Failure description
j) Sample stowage
k) Sample disposal

12.2 TEST DATA LOSS

All test conditions specified in this OVSC Laboratory Test Procedure shall met prior to compliance testing.

A retest may be required at the expense of the contractor if there is a failure of a contractor to obtain the required test data and to maintain acceptable limits on test parameters in the manner outlined in this OVSC Laboratory Test Procedure. The retest costs will include the cost to replace the test item and all costs associated with conducting the retest. The original test item used for the invalid test shall remain the property of OVSC, and the sample procured for the retest shall remain the property of the contractor. If there is a test failure, the contractor shall retain the retest sample until disposal is approved by the COR, up to a period not exceeding two years. If there is no test failure, the contractor may dispose of the test sample upon agreement by the COR, typically when 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 order for a replacement test item (if required) shall be placed within 5 days after receiving notification of a retest from the Contracting Officer. Testing shall be initiated within 2 weeks of receipt of CPTI, completed within 5 days of initiating the test, and a draft report shall be provided to the COR within 2 weeks

of completing the test. If a retest is conducted, no test report is required for the original test unless OVSC specifically decides to require the contractor to submit such report. See contract for more information.

12.3 TEST CONDITIONS

Unless otherwise specified, all tests and measurements shall be conducted at a temperature of 15.5 °C to 32.2 °C (60 °F to 90 °F). Record the environmental temperature of the testing area during all tests. Stabilize test items unless otherwise authorized by the COR at a temperature of 15.5 °C to 32.2 °C (60 °F to 90 °F) for a period of at least 24 hours immediately prior to testing.

12.4 TEST PERSONNEL PERFORMANCE

Technicians assigned to the OVSC test program shall be thoroughly familiar with the requirements and test conditions for each test to be performed. Each technician shall be specifically instructed in the proper operation of all equipment employed in conducting these tests.

Personnel supervising the compliance test program shall be thoroughly familiar with the requirements, test conditions, and equipment for the test to be conducted.

12.5 RECORDING OF TEST DATA

Record environmental data and test data in analog or electronic format and produce each on the applicable data sheet, or as the COR directs. If changes or corrections need to be made to the data, note the original data and a reason for the change.

Unless otherwise directed by the COR, data will be submitted in the format described in the Test Data Sheet forms specified for use in the final test report. Type handwritten data before the report is submitted. Retain original versions of the data on file, if handwritten.

13. COMPLIANCE TEST EXECUTION

13.A TEST ITEMS

The items to be tested under FMVSS 223 consist of rear impact guards (RIGs). Test items will either be provided to the contractor by NHTSA as GFTI or acquired by the contractor as CPTI using contract funds as provided in the contract and/or delivery order. Test items are subject to change at the discretion of the COR, provided that the cost for the substitute test item does not exceed the funds available for procuring the CPTI and that the contractor has not begun fulfilling the initial order.

13.A.1 RIG INSTALLATION

Test labs shall mount the RIGs for the strength and energy absorption tests described in Section 13.D. The test device utilized for the compliance test will be directed by the COR. Typically, the method of attachment will reflect the method the manufacturer used as a basis for its certification of the RIG.

(1) RIGID TEST FIXTURE TEST METHOD

One (1) RIG is used for EACH force application test, unless otherwise instructed by the COR. The contractor will consult the manufacturer’s installation instructions or procedures to determine the surface or structure that the RIG is to be mounted to and mount it to the rigid test fixture in the same way. Upon request of the COR, the contractor will show to the COR and discuss the mounting of the RIG prior to the initiation of the compliance test.

(2) COMPLETE TRAILER TEST METHOD

One (1) RIG is used for EACH force application test, unless otherwise instructed by the COR. The RIG is mounted to a complete trailer for which the installation of the RIG is suitable, as provided in the manufacturer's installation instructions or procedures required by S5.5 of FMVSS No. 223 The trailer chassis is secured so that it behaves as a fixed object during the test.

(3) ADDITIONAL TEST or RETEST

Pending availability of funds, one (1) RIG will be procured as a spare unit in the event that an additional test is required. Use of the spare unit is at the COR’s discretion.

13.A.2 RIG INSPECTION

Inspection of labeling, printed instructions, and physical features, described in Sections 13.B & 13.C, shall be performed on one of the procured RIGs prior to the testing as described in Section 13.D.

13.A.3 GUARD STRENGTH TEST

Labs shall procure the RIGs directed by OVSC for the guard strength tests described in Section 13.D.

13.A.4 GUARD ENERGY ABSORPTION TEST

Labs shall procure the RIGs directed by OVSC for the guard energy absorption tests described in Section 13.D.

13.A.5 GROUND CLEARANCE MEASUREMENT

Test labs shall inspect the RIGs per the methods described in Section 13.D.

13.A.6 TEST ITEM INSPECTION, INVENTORY, IDENTIFICATION, AND STORAGE

Store all RIGs and associated extra materials and parts upon receipt in a clean, dry, secure storage area to prevent any damage or deterioration that might affect test results. Within one week of receipt, inspect all samples, and record the date of receipt and condition of the samples. Each sample shall also be marked or labeled with a systematic item-coding scheme to indicate the following:

1. Sequential OVSC number for entire sample set, YYZZZZZ in example
2. Rear Impact Guard model number, XYZ in example
3. Sequential sample number within set, 03 in example

EXAMPLE: YYZZZZZ-XYZ-03

Record this item code on all data sheets applicable to the test item.

13.B RIG INSTALLATION

13.B.1 GUARD ATTACHMENT HARDWARE (S5.4)

Each RIG, other than a RIG that is to be installed on a vehicle manufactured by the manufacturer of the RIG, is required to be accompanied by all attachment hardware necessary for installation of the RIG on the chassis of the motor vehicle for which it is intended.

13.B.2 INSTALLATION (S6.2)

For OVSC compliance testing, attach the RIG to either a rigid test fixture or a complete trailer for which the RIG is suitable in accordance with the manufacturer's instructions required by S5.5. The test device will be whichever of the two options the manufacturer used as a basis for its certification of the RIG. If the manufacturer did not use one of these device options or does not specify a device, OVSC may choose which test device to use.

13.C RIG INSPECTION

When required, the contractor shall coordinate with the COR to inspect the RIGs to verify their dimensions and design prior to the compliance test. The contractor shall spend a maximum two hours verifying that the test item is consistent with the manufacturer's production drawings. This includes the design and dimensions of the horizontal member, structural support members, and features such as braces, plates, openings, fasteners, and weld seams. See Rig Pre-Inspection Form in Section 17.

With the RIG installed on the rigid test fixture or applicable trailer for the OVSC compliance test, complete the RIG inspection data sheets for the inspection sections below. See Data Sheets 3, 4, and 5.

13.C.1 LABELING (S5.3)

Each RIG shall be permanently labeled with the information specified in (a) through (c) below. The information shall be in English and in letters that are at least 2.5 mm high. The label shall be placed on the forward or rearward facing surface of the horizontal member of the RIG, provided that the label does not interfere with the retroreflective sheeting required by FMVSS No. 108 and is readily accessible for visual inspection.

(a) The guard manufacturer's name and address.

(b) The statement: "Manufactured in _____" (inserting the month and year of guard manufacture).

(c) The letters "DOT", constituting a certification by the guard manufacturer that the guard conforms to all requirements of this standard.

13.C.2 PRINTED INSTRUCTIONS (S5.5)

The manufacturer of the RIG is required to include printed instructions and figures for how to properly install the RIG. The instructions or procedures shall have the following:

(a) Printed instructions, in English, detailing the installation procedure for the RIG.

(b) A diagram or schematic depicting the proper installation of the RIG.

(c) Vehicles on which the guard can be installed. Designated by the make and model of the vehicles for which the guard is suitable.

(d) A description of the chassis surface to which the guard will be attached, including frame design types with dimensions, material thickness, and tire track width.

(e) An explanation of the method of attaching the guard to the chassis.

(f) The maximum allowable vertical distance between the bottom edge of the horizontal member of the guard and the ground to ensure post-test ground clearance requirements are met.

(g) If the chassis strength is inadequate for the RIG design, the instructions shall specify methods for adequately reinforcing the vehicle chassis.

(h) Instructions specifying that the guard is to be mounted so that all portions of the horizontal member are located not more than 305 mm forward of the vehicle's rear extremity.

NOTE: OVSC may request a copy of the installation procedures for each vehicle/guard combination from the manufacturer of a RIG.

13.C.3 PROJECTED VERTICAL HEIGHT (S223, S5.1)

The horizontal member of each RIG[2], when installed on a trailer in accordance with the installation instructions required by S5.5, shall have a vertical height of at least 100 mm at each point across the RIG width, when projected horizontally on a transverse vertical plane. See Figure 1.

[2] If multiple horizontal members are present on the RIG, the required measurements must be met with the RIG's lowest member.

13.D TEST CONDITIONS AND PROCEDURES (S6)

A. GUARD STRENGTH (S5.2.1)

When tested in accordance with S6 of FMVSS No. 223, each RIG must resist the force levels specified in (a) through (c) below without deflecting by more than 125 mm and without eliminating any load path that existed before the test was initiated.

(a) A force of 50,000 N (+ 0, - 2500 N) applied at Point Load Test Location 1 (P1) on either the left or the right side of the RIG.

(b) A force of 50,000 N (+ 0, - 2500 N) applied at Point Load Test Location 2 (P2).

(c) A uniform distributed force of at least 350,000 N (+ 8750, - 0 N) applied across the horizontal member.

TABLE 1. GUARD STRENGTH POINT LOAD APPLICATION

TEST LOCATION	FORCE
P1	50,000 N (+0, -2500 N)
P2	50,000 N (+0, -2500 N)
Uniform	350,000 N (+0, -8750 N)

B. GUARD ENERGY ABSORPTION (S5.2.2)

A RIG, other than a hydraulic guard or one installed on a tanker trailer, when tested with a uniform distributed load applied in accordance with S6 of FMVSS No. 223 shall meet the follow requirements:

(a) Absorb by plastic deformation at least 20,000 J of energy within the first 125 mm of deflection without eliminating any load path that existed before the test was initiated.

(b) Have a ground clearance not exceeding 560 mm, measured at each support to which the horizontal member is attached, as shown in Figure 4, after completion of the load application.

Alternatively, a RIG, other than a hydraulic guard or one installed on a tanker trailer, that demonstrates resistance to a uniform distributed load greater than 700,000 N, need not meet the energy absorption requirements but must have a ground clearance not exceeding 560 mm at each vertical support to which the horizontal member is attached after completion of the 700,000 N load application.

13.D.1 GUARD STRENGTH AND ENERGY ABSORPTION TEST LOCATIONS

13.D.1.1 POINT LOAD TEST LOCATIONS (S6.4)

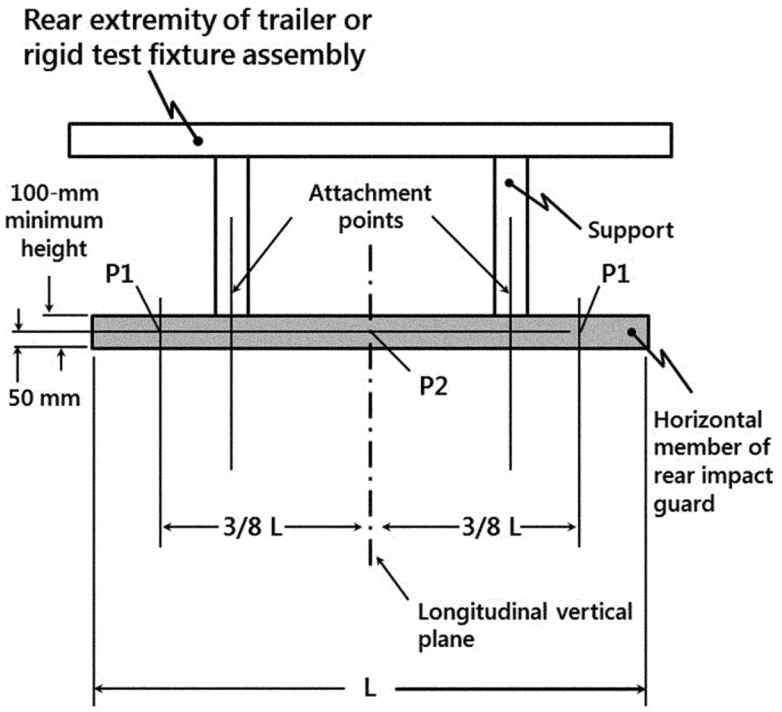
Two test locations are used for the guard point load strength test at location P1 and P2.

These test locations are determined with the RIG mounted to the rigid test fixture or complete trailer. The orientation of the test locations are with respect to the RIG's orientation as it would be mounted to a complete trailer. Both test locations are located vertically 50 mm above the bottom of the RIG on the rearmost surface of the horizontal member. The horizontal locations for test locations P1 and P2 are described below.

P1 - Located at a distance of 3/8's of the guard width from the vertical longitudinal plane passing through the center of the guard and lies on either side of the center of the guard's horizontal member.

P2 – Located in the longitudinal vertical plane passing through the center of the guard's horizontal member.

Label these test locations on the RIG prior to testing. See Figure 1.

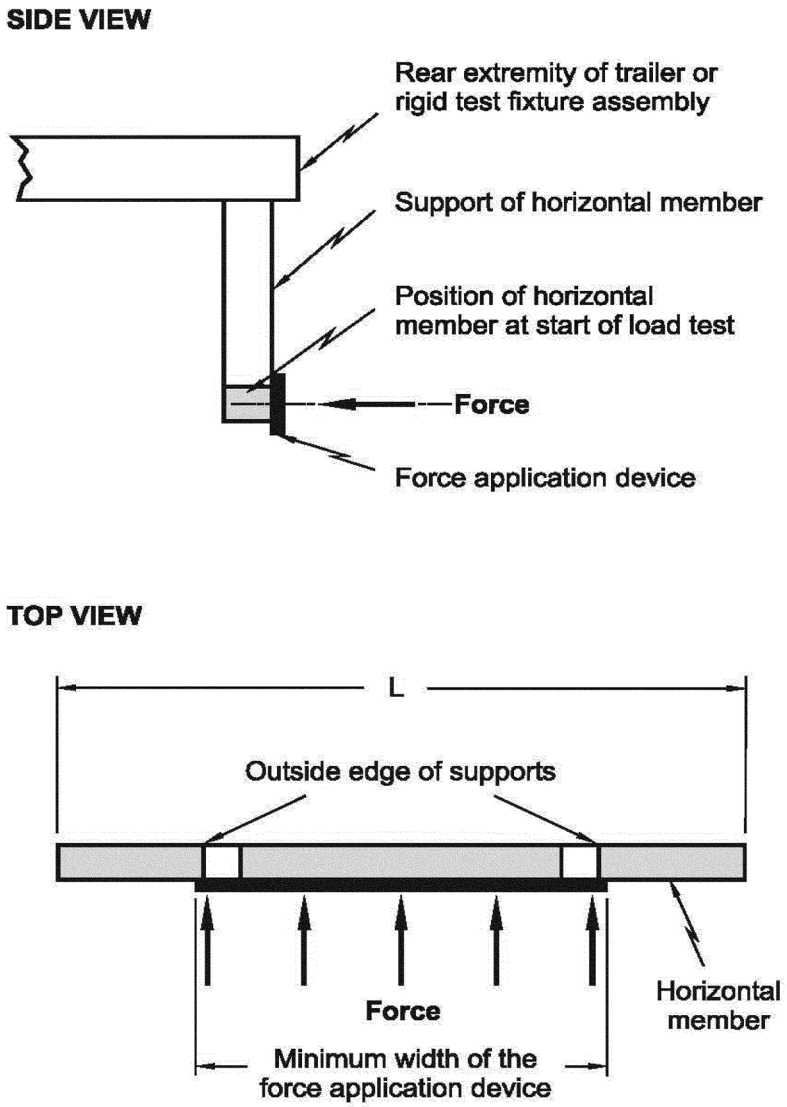


(Note: Drawing is not to scale)

FIGURE 1. REAR VIEW OF THE REAR IMPACT GUARD

13.D.1.2 UNIFORM DISTRIBUTED LOAD TEST LOCATION (S6.8)

A uniformly distributed load is used in the guard strength and energy absorption tests. This test location is determined with the RIG mounted to the rigid test fixture or to a complete trailer. It is located on the rearmost surface of the horizontal member of the RIG, centered vertically in the longitudinal vertical plane passing through the center of the RIG's horizontal member, and centered horizontally 50 mm above the bottom of the RIG. See Figure 2.



(Note: Drawings are not to scale)

FIGURE 2. UNIFORM DISTRIBUTED LOAD APPLICATION TEST

13.D.2 GUARD STRENGTH AND ENERGY ABSORPTION TEST EQUIPMENT

A. POINT LOAD FORCE APPLICATION DEVICE (S6.3)

The force application device for the point load tests shall consist of a rectangular solid made of rigid steel. The steel solid is 203 mm in height, 203 mm in width, and 25 mm in thickness.

The 203 mm square face of the block is used as the contact surface for application of the forces at locations P1 and P2. Each edge of the contact surface of the block has a radius of curvature of 5 mm (± 1 mm).

B. UNIFORM DISTRIBUTED LOAD FORCE APPLICATION DEVICE (S6.7)

The force application device for the uniform distributed load test shall be unyielding, have a height of 203 mm, and have a width that exceeds the distance between the outside edges of the outermost supports to which the tested portion of the horizontal member is attached, as shown in Figure 2 above.

C. LOAD MEASUREMENT DEVICE

Use a load cell of proper capacity with an accuracy of ± 1% for measuring the load. Place the load cell on the loading system so that it measures the actual load being transmitted into the RIG. Record the value of force at least ten times per every 25 mm of displacement of the force application device.

D. DEFLECTION MEASUREMENT DEVICE

Use a linear displacement device, such as a potentiometer, to measure the deflection of the force application device to ± 3 mm.

Verify equipment calibration immediately following an apparent noncompliance unless otherwise approved by the COR.

Test fixtures and attachments may be subject to OVSC approval.

13.D.3 PRE-TEST SETUP (S6.5)

Before applying any force to the RIG, position the force application device such that:

(a) The center point of the contact surface is aligned with and touching the applicable RIG test location

(b) The longitudinal axis of the device passes through the test location and is perpendicular to the transverse vertical plane that is tangent to the rearmost surface of the RIG’s horizontal member.

13.D.4 GUARD STRENGTH AND ENERGY ABSORPTION TEST (S5.2.1, S6.6)

A. POINT LOAD TESTS

For each test, guide the force application device so that it does not rotate. The location of the longitudinal axis of the force application device shall remain constant at all times during the application of force.

1. Apply a force of 50,000 N (+0, - 2500 N) to the RIG at location P1 in a forward direction such that the displacement rate of the force application device is within the manufacturer's specified rate, as designated by the COR. If the manufacturer does not specify a displacement rate, then the COR may specify a rate within the following range:

    - Between 2.0 cm per minute and 9.0 cm per minute
    - Steady – not varying by more than 5% of the set rate provided by the COR.
    - The displacement rate of the force application device is constant and not less than 2 cm per minute and not more than 9 cm per minute until the force specified for each test location below has been met, or until the displacement of the force application device has reached 130 mm (+0, -5 mm), whichever comes first.

2. Record the maximum force and maximum displacement for each test on Data Sheet 6.

3. Include a force vs. displacement plot on Data Sheet 7.

4. Repeat the test at location P2 on the current test RIG or a new RIG at the COR's discretion.

NOTE: Hydraulic guards are to be compressed before application of force to the RIG and remain compressed throughout the guard strength tests. The horizontal member of the RIG is deflected in a forward direction until the hydraulic unit(s) have reached the full extent of their designated travel, or 610 mm, whichever occurs first.

B. UNIFORM DISTRIBUTED LOAD TEST (S5.5.1(c), S5.5.2)

For this test, guide the force application device so that it does not rotate. The location of the longitudinal axis of the force application device shall remain constant at all times during the application of force.

1. Apply a steady force of 350,000 N (+0, -8750 N) to the RIG at the uniform distributed load test location such that the displacement rate of the force application device is within the manufacturer's specified rate, as designated by the COR. If the manufacturer does not specify a displacement rate, then the COR may specify a rate within the following range:

    - Between 2.0 cm per minute and 9.0 cm per minute
    - Steady – not varying by more than 5% of the set rate provided by the COR.
    - The displacement rate of the force application device is constant and not less than 2 cm per minute and not more than 9 cm per minute until the force specified for each test location has been met, or until the displacement of the force application device has reached 130 mm (+0, -5 mm), whichever comes first.

    NOTE: For calculation of guard energy absorption, the value of force is recorded at least ten times per 25 mm of displacement of the contact surface of the loading device.

2. Reduce the force until the RIG no longer offers resistance to the force application device.

3. Record the maximum force and maximum displacement for each test on Data Sheet 6.

4. Include a force vs. displacement plot on Data Sheet 7.

5. Determine the energy absorbed by the RIG by calculating the shaded area bounded by the curve in the force vs. deflection diagram and the abscissa (X-axis). See Figure 3.

6. Record the energy absorbed, the maximum load, and the maximum deflection on Data Sheet 6. Include the force vs. deflection plot on Data Sheet 8.

7. Measure the ground clearance from the bottom edge of the horizontal member to the ground[3] at each vertical support and record the values on Data Sheet 6.

[3] RIGs installed on a rigid test fixture may have a virtual ground depending on test setup.

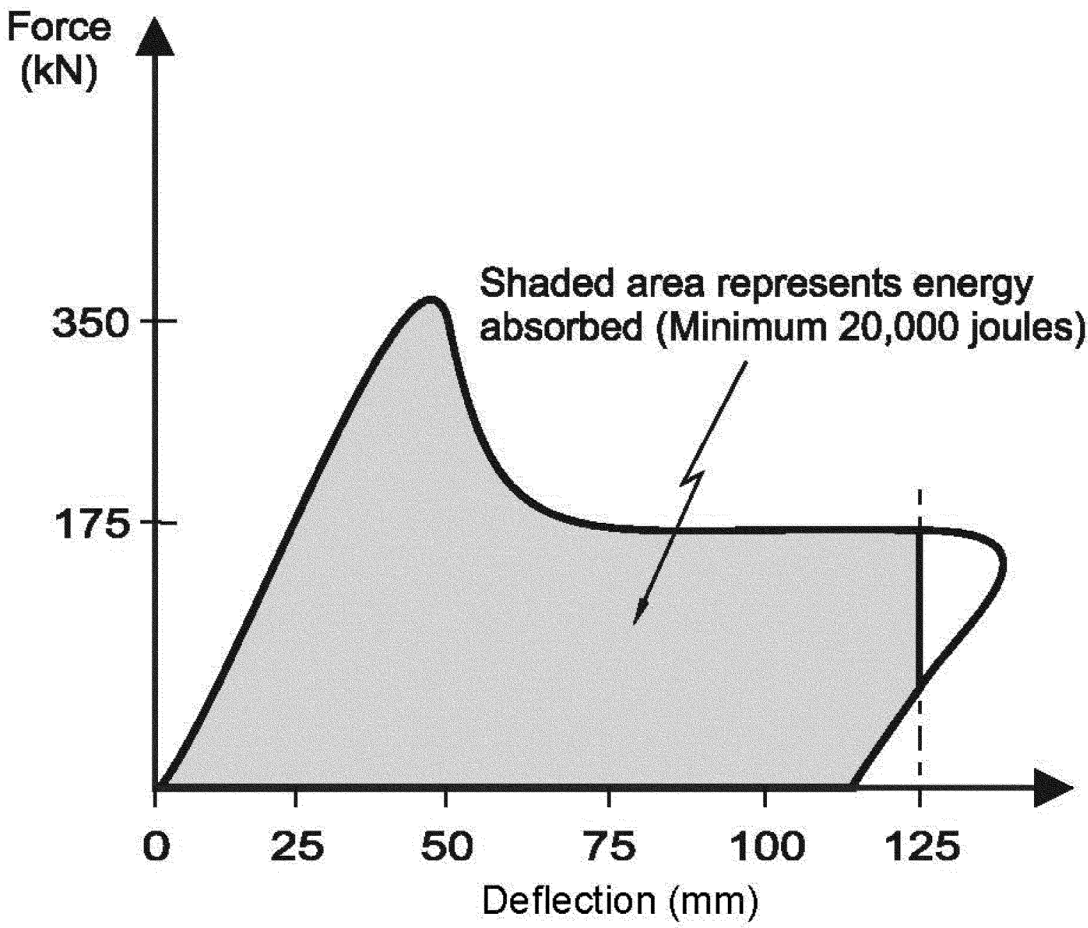


FIGURE 3. TYPICAL FORCE DEFLECTION DIAGRAM

Alternatively, a RIG, other than a hydraulic guard or one installed on a tanker trailer, may demonstrate resistance to a uniform distributed load greater than 700 kN instead of meeting the energy absorption requirements of the FMVSS No. 223, providing it also has a ground clearance not exceeding 560 mm after the load is applied.

1. Apply force to the guard in a forward direction such that the displacement rate of the force application device is constant and not less than 2 cm per minute and not more than 9 cm per minute until a uniform distributed load of 700,000 N (+0, -17500 N) has been met, or until the displacement of the force application device has reached 130 mm +0, -5 mm, whichever comes first.

2. Record the maximum force and maximum displacement for each test on Data Sheet 6.

3. Include a force vs. displacement plot on the Data Sheet 7.

4. Measure the ground clearance from the bottom edge of the horizontal bar in mm and record the values on Data Sheet 6.

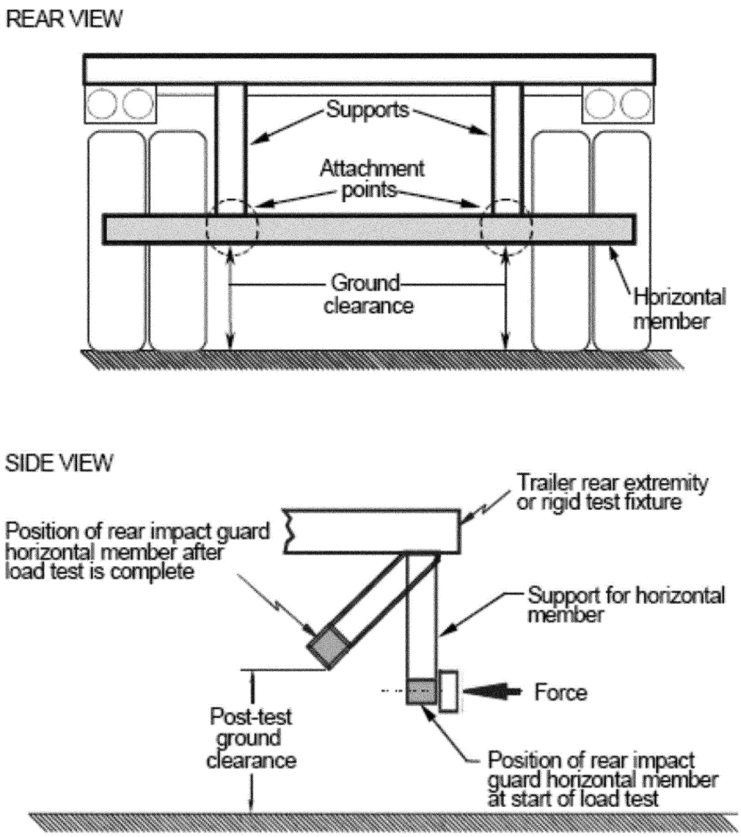
C. GROUND CLEARANCE MEASUREMENT (S6.9)

For each test, once the force application requirements have been met:

1. Reduce the force until the guard no longer offers resistance to the force application device.

2. Measure the vertical distance from the bottom edge of the horizontal bar and the ground at each vertical support. See Figure 4.

3. Record the post-test ground clearance[4] measurement(s) in mm on Data Sheet 6.



(Note: Drawings are not to scale)

FIGURE 4. POST-TEST GROUND CLEARANCE MEASUREMENT

NOTE: Hydraulic guards are to be compressed before application of force to the RIG and remain compressed throughout the guard strength tests. The horizontal member of the RIG is deflected in a forward direction until the hydraulic unit(s) have reached the

[4] RIGs installed on a rigid test fixture may have a virtual ground depending on test setup.

full extent of their designated travel, or 610 mm, whichever occurs first.

14. POST TEST REQUIREMENTS

At the completion of each test:

i) Confirm the test was valid
ii) Confirm there are no malfunctions of the test equipment and/or test items
iii) Re-verify all instrumentation is within calibration
iv) Check data sheets and photographs for completeness
v) Ensure data are recorded in all applicable data blocks on every compliance test data sheet.

15. REPORTS

15.1 MONTHLY STATUS REPORTS

The contractor shall submit, in accordance with the contract delivery schedule or as otherwise agreed to by the COR, a monthly Test Status Report and an Inventory Status Report to the COR. The Inventory Status Report shall be submitted until all RIGs are disposed of. Samples of the required Monthly Status Reports (for tests and inventory) are contained in the report forms section.

15.2 APPARENT TEST FAILURE

Any indication of a test failure shall be communicated by email to the COR within 24 hours with written notification sent within 48 hours (Saturdays and Sundays excluded). If the COR is unresponsive, the notification may be submitted to the ACOR. A Laboratory Notice of Test Failure (see Section 16) with a copy of the particular compliance test data sheet(s) and preliminary data plot(s) shall be included. In the event of a test failure, a post-test calibration check of some critically sensitive test equipment and instrumentation may be required for verification of accuracy. The necessity for the calibration shall be at the COR's discretion and shall be performed without additional costs to the OVSC.

15.3 FINAL TEST REPORTS

15.3.1 COPIES

One electronic copy (compatible with Microsoft Word format) of the Final Test Report shall be submitted to the COR via email or at the COR’s option, the DOT Secure Large File Transfer Solution (SLFTS) or another OVSC authorized system for providing deliverables for acceptance within two weeks of test completion. The Final Test Report format to be used by all contractors is specified below.

contractors are required to submit the first Final Test Report in draft form within two weeks after the compliance test is conducted. The contractor and the COR will then be able to discuss the details of both the test itself, and the report content early in the compliance test program.

Contractors are required to PROOFREAD all Final Test Reports before submitting them to the COR. 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.

Payment of contractor's invoices for completed compliance tests may be withheld until the Final Test Report is accepted by the COR. Contractors are requested to NOT submit invoices before the COR is provided copies of the Final Test Report.

As stated in the test report: the opinions, findings, and conclusions that are published in the Final Test Report are those of the author(s) and not necessarily those of the Department of Transportation or the NHTSA. The United States Government assumes no liability for its contents or use thereof. Trade names, manufacturers, and products are mentioned 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.

15.3.2 REQUIREMENTS

The Final Test Report, associated documentation (including photographs) is 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 COR. 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.

In addition, test data shall be submitted, at the discretion of the COR, either via the DOT SLFTS or another OVSC authorized system for submitting deliverables.

15.3.3 FIRST THREE PAGES

Instructions for the preparation of the first three pages of the final test report are provided for the purpose of standardization. A template of the test report in MS Word format is available from OVSC for standardization of the final reports.

A. FRONT COVER

The information required on the cover is as follows:

(1) FINAL REPORT NUMBER as 223-YYZZZZZ-TEST, where:

223	FMVSS No.
YY	is the Calendar Year determined by the COR
ZZZZZ	is a Unique number determined by the COR

(2) Final Report Title and Subtitle such as

SAFETY COMPLIANCE TESTING FOR FMVSS No. 223
Rear Impact Guards

RIG Manufacturer Name
RIG Model Name
RIG Model Designation

(3) Contractor's Name and Address such as:

ABC LABORATORIES, INC.
123 Fake Street
Springfield, Illinois 62701-1234

NOTE: DOT TRISKELION 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
Mail Code: NEF-220, W45-304
1200 New Jersey Avenue, SE
Washington, DC 20590

B. FIRST PAGE AFTER FRONT COVER

A disclaimer statement and an acceptance signature block for the COR 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 No. 1 -- REPORT NUMBER

223-YYZZZZZ-TEST

Note: the report number is provided by the COR

Block No. 2 -- GOVERNMENT ACCESSION NUMBER

Leave blank

Block No. 3 -- RECIPIENT'S CATALOG NUMBER

Leave blank

Block No. 4 -- TITLE AND SUBTITLE

SAFETY COMPLIANCE TESTING FOR FMVSS 223
RIG MANUFACTURER AND RIG MODEL NAME

Block No. 5 -- REPORT DATE

Month XX, 20XX

Block No. 6 -- PERFORMING ORGANIZATION CODE

ABC

Block No. 7 -- AUTHOR(S)

John Smith, Project Manager
Bill Doe, Project Engineer

Block No. 8 -- PERFORMING ORGANIZATION REPORT NUMBER

ABC-DOT-223-001

Block No. 9 -- PERFORMING ORGANIZATION NAME AND ADDRESS

COMPLIANCE TESTING LABORATORIES, INC.
4335 West Dearborn Street
Detroit, Michigan 48090-1234

Block No. 10 -- WORK UNIT NUMBER

Leave blank

Block No. 11 -- CONTRACT OR GRANT NUMBER

DTNH22-XX-D-12345

Block No. 12 -- SPONSORING AGENCY NAME AND ADDRESS

U.S. Department of Transportation
National Highway Traffic Safety Administration
Office of Vehicle Safety Compliance
Mail Code: NEF-220
1200 New Jersey Avenue, SE
Washington, DC 20590

Block No. 13 -- TYPE OF REPORT AND PERIOD COVERED

Final Test Report
Feb. 15 to Mar. 15, 20XX

Block No. 14 -- SPONSORING AGENCY CODE

NEF-220

Block No. 15 -- SUPPLEMENTARY NOTES

Leave blank

Block No. 16 -- ABSTRACT

Compliance tests were conducted on ABC Guard rear impact guards in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-223-01 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 COR.

Block No. 17 -- KEY WORDS

Compliance Testing
Impact Guard, Trailer, Guard, Rear Impact (as appropriate)
Safety Engineering
FMVSS 223

Block No. 18 -- DISTRIBUTION STATEMENT

Copies of this report are available from--

National Highway Traffic Safety Administration
Technical Information Services Division- NIO120 -
1200 New Jersey Avenue, SE, (Room W51-221)
Washington, DC 20590

e-mail: tis@nhtsa.dot.gov
Phone: 202-366-6982

Block No. 19 -- SECURITY CLASSIFICATION OF REPORT

Unclassified

Block No. 20 -- SECURITY CLASSIFICATION OF PAGE

Unclassified

Block No. 21 -- NUMBER OF PAGES

Add appropriate number

Block No. 22 – PRICE

Leave blank

15.3.4 TABLE OF CONTENTS

Final test report Table of Contents shall include the following sections (as appropriate), proceeded by section number, and followed by the corresponding page number:

Section 1 – Purpose and Test Procedure
Section 2 – Introduction and Summary
Section 3 – Test Results Data Summary
Section 4 – Data
List applicable data sheets by title
Section 5 – Interpretations and/or Deviations from FMVSS 223
Section 6 – Instrumentation Calibration
Section 7 – Photographs

15.3.5 PURPOSE AND TEST PROCEDURE

Final test reports shall include the following:

PURPOSE

The purpose of the testing was to inform OVSC's enforcement program by means of audit testing a RIG. The data recorded in this report is the opinion of the test laboratory and may not be sufficient to ensure the RIG meets the requirements set by FMVSS No. 223. Therefore, the results of this testing are insufficient to serve as a basis of certification for a RIG.

TEST PROCEDURE

The "ABC Laboratories Test Procedure for FMVSS 223," submitted and approved by the Office of Vehicle Safety Compliance, National Highway Traffic Safety Administration, contains the specific procedures used to conduct this test. This procedure shall not be interpreted to be in conflict with any portion of FMVSS 223 and amendments in effect as noted in the applicable contract.

15.3.6 INTRODUCTION AND SUMMARY

Provide a brief summary of the testing conducted.

15.3.7 TEST RESULTS DATA SUMMARY

Provide a summary table including each item tested, test number, and test type, and an indication of pass or fail.

15.3.8 DATA

Include all completed Compliance Data Sheets in this section. Supplemental data sheets shall only be included if requested by the COR. Multiple data sheets may be needed for a complete compliance test series. In that event, list the title of the data sheet in the table of contents, and under the title, indent and list each sheet by the test number.

15.3.9 INTERPRETATIONS AND DEVIATIONS

Any interpretations and/or deviations from this Test Procedure shall be listed in this section of the Final Test Report.

15.3.10 INSTRUMENTATION CALIBRATION

Include a list of test equipment by item description, manufacturer, model number, latest calibration date and due date at the time the test was conducted.

15.3.11 PHOTOGRAPHS

Include the photographs in accordance with Section 10 of this test procedure.

16. DATA SHEETS

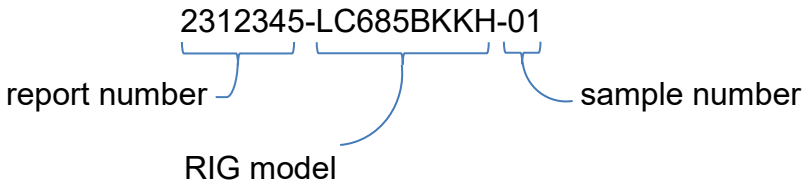
One sample of each Compliance Data Sheet is included in this section. More than one copy of a data sheet may be needed for a complete compliance test series.

Test data shall be recorded in standard engineering units, when applicable, on data sheets specifically prepared for this purpose, as shown in Section 16 of this procedure.

For each FMVSS requirement indicated on the data sheets, record PASS, FAIL, N/A (not applicable), or SEE REMARKS in the space provided. Each failure should be explained under REMARKS.

Completed data sheets shall be included in the Final Test Report for each test required by the contract. The supplemental data sheets do not need to be included in the Final Test Report, unless requested by the COR, but shall be retained by the test lab.

Data sheets used to describe dynamic testing will identify test items by report and model number or by report and item code. Item codes are used to describe the test items in a succinct manner. Typically, item codes are three alpha numeric sequences as described below.



DATA SHEET 1
REAR IMPACT GUARD IDENTIFICATION

Manufacturer:	
Brand:	
Model No.	
Guard Type:	(Conventional or Hydraulic)

Guards Manufactured for Complete Trailers:	
Trailer Make:	
Trailer Model Name:	
Trailer Model No.:	
Trailer Model Year:	

1	Item Code	
	Date of Manufacture	
	Test No.	
2	Item Code	
	Date of Manufacture	
	Test No.	
3	Item Code	
	Date of Manufacture	
	Test No.	

DATA SHEET 2
REAR IMPACT GUARD TEST RESULTS SUMMARY

Item Code	Test Number	Test Location	Applied Force	Load Displacement	Energy Absorption	Ground Clearance Measurement	Pass / Fail

DATA SHEET 3
LABELING (S223, S5.3)

Report No.:_____ Model No.: _____

Test Date: _____

FMVSS 223, S5.3	**Pass/Fail**
The labels on the subject rear impact guard were inspected and compared to the requirements of FMVSS No. 223 S5.3, as applicable.	

Remarks:

List any labeling failures by describing the applicable section of the standard and explaining what information is missing or incorrect.

Include the following statement with the correct Appendix identifier, “Photographs of the labels are included in Appendix _.”

DATA SHEET 3- supplement
LABELING (S223, S5.3)

Report No.: _____ Model No.: _____

Test Date: _____

Section	Required Statement	Pass/Fail
S5.3	Each guard shall be permanently labeled with the information specified in S5.3 (a) through (c) below. The information shall be in English and in letters that are at least 2.5 mm high. The label shall be placed on the forward or rearward facing surface of the horizontal member of the guard and is readily accessible for visual inspection.	
S5.3(a)	The guard manufacturer's name and address.	
S5.3(b)	The statement: "Manufactured in ____," inserting the month and year of the guard's manufacture.	
S5.3(c)	The guard label must include the letters "DOT", constituting a certification by the guard manufacturer that the guard conforms to all requirements of FMVSS 223.	

DATA SHEET 4
INSTALLATION INSTRUCTIONS (S223, S5.4, S5.5)

Report No.: _____ Model No.: _____

Test Date: _____

FMVSS 223, S5.4, S5.5	**Pass/Fail**
The printed instructions accompanying the subject child restraint system were inspected and compared to the requirements of FMVSS No. 223 S5.4, S5.5, as applicable.	

Remarks:

List any failures by describing the applicable section of the standard and explaining what information is missing or incorrect.

DATA SHEET 4- supplement
INSTALLATION INSTRUCTIONS (S223, S5.4, S5.5)

Report No.: _____ Model No.: _____

Test Date: _____

Section	Required Statement	Pass/Fail
S5.4	Other than a guard that is to be installed on a vehicle manufactured by the manufacturer of the guard: each rear impact guard shall be accompanied by all attachment hardware necessary for installation of the guard on the chassis of the motor vehicle for which it is intended.	
S5.5	The manufacturer of rear impact guards for sale to vehicle manufacturers shall include with each guard printed instructions in English for installing the guard, as well as a diagram or schematic depicting proper guard installation.	
S5.5(a)	The instructions or procedures shall specify which vehicles on which the guard can be installed. Vehicles may be designated by listing the make and model of the vehicles for which the guard is suitable, or by specifying the design elements that would make any vehicle an appropriate.	
S5.5(b)	The instructions shall specify a description of the chassis to which the guard will be attached, including frame design types with dimensions, material thickness, and tire track width.	
S5.5(c)	The instructions shall explain the method of attaching the guard to the chassis of each vehicle make and model listed or to the design elements specified in the instructions or procedures.	
	The principal aspects of vehicle chassis that are necessary to the proper functioning of the guard shall be specified including the maximum allowable vertical distance between the bottom edge of the horizontal member of the guard and the ground to ensure post-test ground clearance requirements are met.	
	If the chassis strength is inadequate for the guard design, the instructions or procedures shall specify methods for adequately reinforcing the vehicle chassis.	
	Procedures for properly installing any guard attachment hardware shall be provided.	

DATA SHEET 5
PROJECTED VERTICAL HEIGHT (S223, S5.1)

Report No.: _____ Model No.: _____

Test Date: _____

Section	Requirement	Measurement	Pass/Fail
S5.1	The horizontal member of each guard shall have a vertical height of at least 100 mm at each point across the guard width, when projected horizontally on a transverse vertical plane. The guard is to be mounted so that all portions of the horizontal member necessary to achieve a 100 mm high projected vertical height are located not more than 305 mm forward of the vehicle's rear extremity.		
	Horizontal Member- ≥ 100 mm (3.9 in.)	mm (in.)	
	Distance from Rear Extremity- ≤ 305 mm (12.0 in.)	mm (in.)	

DATA SHEET 6
GUARD TEST CONDITIONS (223, S6.1)

Report No. _____ Test No. _____
Test Date: _____ Item Code: _____

Laboratory Ambient Conditions During Testing:

Temperature (°C)	

Test Conditions:

Test Configuration	(Point Load, Uniform Load)
Test Location	(P1, P2, Uniform)
Load Displacement Rate	($2.0 \leq x \leq 9.0$ cm/min)

RIG Performance:

	Requirement	Result	Pass/Fail
Maximum Load	50 kN for P1 & P2, 350 kN for Uniform 700 kN for Alternative		
Maximum Displacement	≤ 125 mm		
Energy Absorption	≥ 20 kJ	(N/A for Point Load Test)	
Ground Clearance	≤ 560 mm		
Guard Load Path	Intact	(Yes/No)	

[Take pre- and post-test photographs as described in this test procedure and include them in the test report]

REMARKS:

Pretest and posttest photographs are presented in Appendix _.

Technician: _____ Date: _____

DATA SHEET 7
GUARD STRENGTH (223, S5.2.1)

Report No. _____ Test No. _____

Test Date: _____ Item Code: _____

[Insert the force-deflection history plot, using units of N for force and mm for deflection. The plot shall be labeled with maximum force and maximum deflection and have a height of 5” and a width 7”.]

DATA SHEET 8
GUARD ENERGY ABSORPTION (223, S5.2.2)

Report No. _____ Test No. _____

Test Date: _____ Item Code: _____

[Insert the energy-deflection history plot, using units of J for energy and mm for deflection. The plot shall be labeled with maximum energy and maximum deflection and have a height of 5” and a width 7”.]

17. FORMS

The Laboratory Notice of Test Failure (LNTF) and RIG Pre-Inspection forms shall not be incorporated into the Final Test Report.

Laboratory Notice of Test Failure to OVSC	
Test Contract	
Program Year	
FMVSS	
Test Failure Date	
Laboratory	
Lab Project Engineer	
Brand	
Model	
Manufacturer	
Component Type	
FMVSS Regulatory Text	
Summary of Problem/Apparent Failure	
Comments	
Notification to NHTSA	
Notice Prepared by:	
COTR:	
Date:	
Signature:	

RIG PRE-INSPECTION			
Inspection Date		**Test Lab**	
Rig Make		**Program Year**	
Rig Model		**Test Tech.**	
Drawing No.		**Contract No.**	

Procedure instructions: Measurements are listed in order of importance. Begin RIG inspection with item 1 on the list and proceed. The Contractor shall spend a maximum two hours verifying that the test rig is consistent with the manufacturer's production drawings. After a two-hour period has expired, stop work.
NOTE: This form is subject to change at the discretion of the COR.

1.0 Horizontal Member

#	Instruction	Drawing # ID	Measurement (*unit*)	Does measurement match drawing? YES/NO
1.1	Measure length of the horizontal member			
1.2	Measure width of the horizontal member			
1.3	Measure height of the horizontal member			
1.4	Measure material thickness of the horizontal member			

2.0 Structural Support Members

#	Instruction	Drawing # ID	Measurement (*unit*)	Does measurement match drawing? YES/NO
2.1	State number of structural support members			
2.2	Measure distance between structural support members			
2.3	Measure distance from the outboard edge to the structural support members			
2.4	Measure length of the structural support members			
2.5	Measure width of the structural support members			
2.6	Measure height of the structural support members			
2.7	Measure material thickness of structural support members			
2.8	Verify attachment method between the structural support members and the trailer			
2.9	Verify attachment method between the structural support members and the horizontal member			

3.0 Braces and Plates

The quatity refers to braces and plates on the RIG only. Sections of the trailer floor do not apply.

Brace or Plate Identifier	**QTY**	**Brace or Plate Dimensions on Drawing** *Describe geometry/features*	**Brace or Plate RIG Measurement**	**Does measurement match drawing?** YES/NO

4.0 Openings

Cutout or Opening Identifier	**QTY**	**Cutout or Opening Dimensions on Drawing** *Describe geometry/features*	**Cutout or Opening RIG Measurement**	**Does measurement match drawing?** YES/NO

5.0 Fasteners

Fastener Identifier *Please specify fastener*	**QTY**	**Fastener on Drawing** *Describe geometry/features*	**Fastener sent with RIG** *Describe geometry/features*	**Does measurement match drawing?** YES/NO
Total number of fasteners				

6.0 Horizontal Member

#	Instruction	Response	Do the welds on the RIG match the drawing YES/NO
1	Do the drawings call for weld seams?		
2	State the drawing weld specifications. *(e.g., MIG or TIG)*		
3	State the number of welds and weld locations.		
4	Do the weld seams on the RIG match the drawing specifications?		

RIG Pre-Inspection - Notification to NHTSA	
Notice Prepared by:	
COR:	
Date:	
Signature:	