

# U.S. DEPARTMENT OF TRANSPORTATION

## NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

### LABORATORY TEST PROCEDURE

FOR

FMVSS 209

Seat Belt Assemblies



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

**OVSC LABORATORY TEST PROCEDURE NO. 209  
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**REVISION CONTROL LOG  
FOR OVSC LABORATORY  
TEST PROCEDURES**

**TP209  
SEAT BELT ASSEMBLIES**

TEST PROCEDURE		FMVSS 209		DESCRIPTION
REV. No.	DATE	AMENDMENT	EFFECTIVE DATE	
00	4/1/71	32FR2415	3/1/67	Original release signed by O.D.
01	7/12/73	36FR17430	1/1/72	Minor revisions
02	6/16/93	N.A.	N.A.	Conversion to WordPerfect
03	3/2/98	N.A.	N.A.	Major revision
04	3/22/01			Minor revisions and conversion to Microsoft Word
05	1/17/2003	N.A.	N.A.	Changed English units to metric, changed images to Word pictures and changed washing procedure.
06	8/22/05	70FR48883	Mandatory compliance 2/22/07 Voluntary compliance 10/21/05	Upgrade for new ELR acceleration pulse corridor requirement.
07	8/30/06	71FR51522	Effective date 10/30/06 Compliance date 2/22/07	Incorporate changes to tolerances, indication of locking, definitions, change in FMVSS 209 S5.2
08	12/28/07	N.A.	N.A.	Minor revisions to sections 2 and C.9 to be consistent with current FMVSS No. 209 requirements.
09				
10				

## 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 specified 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 TPs are not rules, regulations or NHTSA interpretations regarding the FMVSS. The TPs are not intended to limit the requirements of the applicable FMVSS(s). In addition the TPs 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. TPs 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

FMVSS 209, Seat Belt Assemblies, specifies requirements for seat belt assemblies used in passenger cars, multipurpose passenger vehicles (MPVs), trucks, and buses. The standard requires that a seat belt assembly shall be designed for use by one, and only one, person at any one time. A Type 2 seat belt assembly shall provide upper torso restraint without shifting the pelvic restraint into the abdominal region. An upper torso restraint shall be designed to minimize vertical forces on the shoulders and spine. Hardware for upper torso restraint shall be so designed and located in the seat belt assembly that the possibility of injury to the occupant is minimized.

All hardware parts, which contact under normal usage a vehicle occupant, clothing, or webbing shall be free from burrs and sharp edges. Seat belt assemblies shall be provided with a buckle readily accessible to the occupant to permit his or her easy and rapid removal from the assembly. Buckle release mechanism shall be designed to minimize the possibility of accidental release. A buckle with release mechanism in the latched position shall have only one opening in which the tongue can be inserted on the end of the buckle designed to receive and latch the tongue.

The ends of webbing in a seat belt assembly shall be protected or treated to prevent raveling. The end of the webbing in a seat belt assembly having a metal-to-metal buckle that is used by the occupant to adjust the size of the assembly shall not pull out of the adjustment hardware at the maximum size adjustment.

Each seat belt assembly shall be permanently and legibly marked or labeled with year of manufacture, model, and name or trademark of manufacturer or distributor, or of importer if manufactured outside the United States. A model shall consist of a single combination of webbing having a specific type of fiber weave and construction, and hardware having a specific design. Webbing of various colors may be included under the same model, but webbing of each color shall comply with the webbing requirements.

The width of the webbing in a seat belt assembly shall be not less than 46 mm, except for portions that do not touch a 95th percentile adult male dummy with the seat in any adjustment position and the seat back in the manufacturer's nominal design riding position. Type 1 seat belt assemblies shall have a breaking strength of 26,689 N, and Type 2 assemblies shall have a breaking strength of 22,241 N for the pelvic belt portion and 17,793 N for the upper torso belt portion. The webbing in a Type 1 assembly shall not elongate more than 20 percent at 11,120 N, and the webbing in a Type 2 assembly shall not elongate more than 30 percent at 11,120 N for the pelvic belt portion and 40 percent at 11,120 N for the upper torso belt portion.

## 2. GENERAL REQUIREMENTS....Continued

Seat belt assemblies shall be capable of adjustment to fit occupants whose dimensions and weight range from those of a 5th percentile adult female (height of 4 feet, 11 inches, weighing 46.3 kg and having a waist circumference of 599 mm) to those of a 95th percentile adult male (height of 6 feet, 0.8 inches, weighing 97.5 kg and having a waist circumference of 1080 mm). The assembly shall have an automatic locking retractor (ALR), an emergency locking retractor (ELR), or an adjusting device that is within the reach of the occupant.

The following is a summary of adult occupant measurements:

	5th Percentile Adult Female	95th Percentile Adult Male
Weight	46.3 kg	97.5 kg
Erect Sitting Height	785 mm	965 mm
Hip Breadth--Sitting	325 mm	419 mm
Hip Circumference--Sitting	925 mm	1199 mm
Waist Circumference--Sitting	599 mm	1080 mm
Chest Depth	190 mm	267 mm
Chest Circumference--Nipple	775 mm	1130 mm
Chest Circumference--Upper	757 mm	1130 mm
Chest Circumference--Lower	676 mm	1130 mm

## 3. SECURITY

The contractor shall provide appropriate security measures to protect the OVSC test equipment 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 seat belt assemblies. Any security problems which arise shall be reported by telephone to the Industrial Property Manager (IPM), Office of Contracts and Procurement, within two working days after the incident. A letter containing specific details of the security problem will be sent to the IPM (with copy to the COTR) within 48 hours.

The contractor shall protect and segregate the data that evolves from compliance testing before and after each seat belt assembly test. No information concerning the safety compliance testing program shall be released to anyone except the COTR, unless specifically authorized by the COTR or the COTR's Division Chief.

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

#### **4. GOOD HOUSEKEEPING**

Contractors shall maintain the entire 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 test schedule to the COTR prior to compliance testing. Tests shall be completed as required in the contract. All testing shall be coordinated to allow monitoring by the COTR.

#### **6. TEST DATA DISPOSITION**

The contractor shall make all preliminary compliance test data available to the COTR 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 COTR within five working days. Additionally, the contractor shall analyze the preliminary test results as directed by the COTR. All backup data sheets, strip charts, recordings, plots, technicians' notes, etc., shall be either sent to the COTR or destroyed at the conclusion of each delivery order, purchase order, etc.

#### **7. GOVERNMENT FURNISHED TEST ITEMS (GFTI)**

The Contractor has the responsibility of accepting seat belt assemblies delivered from either motor vehicle or seat belt assembly manufacturers or seat belt assembly distributors. In all instances, the contractor acts in behalf of OVSC when signing an acceptance of GFTI.

Each seat belt assembly shall be permanently marked with a GROUP and SPECIMEN number prior to compliance testing in order to prevent improper test sequencing. The marking shall withstand testing and handling. Manufacturer's data such as model and part numbers shall be recorded for each seat belt assembly prior to compliance testing. No testing shall begin until the contractor has received the verification statement for the seat belt assembly from the manufacturer.

All seat belt assemblies shall be stored in a clean, dry storage area to prevent deterioration of the test specimens in any manner, which might affect test results. The seat belt assemblies shall not be altered for any reason without the written consent of the COTR.

The automatic locking feature of an emergency locking retractor shall not be removed without written instructions from the manufacturer and the written consent of the COTR.

All seat belt assemblies shall be inspected and inventoried within one week of receipt by the contractor. A Monthly Status Report shall be submitted by the contractor to the COTR and a suggested format is shown below.

## 7. GOVERNMENT FURNISHED TEST ITEMS (GFTI)....Continued

SAMPLE OF MONTHLY STATUS REPORT:

### FMVSS 209 MONTHLY STATUS REPORT

Contract No.: \_\_\_\_\_

Date: \_\_\_\_\_

#### A. SUMMARY TABLE

GRP NO.	VEH MFR	VEHICLE MODEL	SEAT BELT MFR	BELT MODEL NO.	DATE RECVD	TEST START DATE	TEST COMPL. DATE	DATE REP. MAILED	COMMENTS
001									
002									
003									
004									
005									
006									
007									
008									
009									
010									
011									
etc.									

B. Tests scheduled for next reporting period (assy. model(s) scheduled for testing):

C. Description of any problems and/or delays in testing:

D. Description of specific actions taken to correct problems and/or delays:



## 8. CALIBRATION OF TEST INSTRUMENTS

Before the contractor initiates the safety compliance test program, a test instrumentation calibration system will be implemented and maintained in accordance with established calibration practices. At the minimum, the calibration system shall comply with the following:

- A. Standards for calibrating the measuring and test equipment shall 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 shall 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. The contractor shall provide a written calibration procedure, which, as a minimum, includes the following information for all measuring 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.

## 8. CALIBRATION OF TEST INSTRUMENTS ... Continued

Further guidance is provided in the International Standard ISO 10012-1, "Quality Assurance Requirements for Measuring Equipment" and American National Standard ANSI/NCSS Z540-1, "Calibration Laboratories and Measuring and Test Equipment – General Requirements."

## 9. PHOTOGRAPHIC DOCUMENTATION

Photographs shall be color, 8 x 10 inches, and legible. A tag, label or placard identifying the seat belt assembly shall appear in each photograph and be legible. Each photograph shall be labeled as to subject matter. The test setup and equipment used in all tests shall be photographed for the record before and at prescribed time periods during testing listed in this test procedure.

- A. Photographs for every assembly performance test configuration will be taken and kept with the data sheets. These photographs will encompass each phase of testing, i.e., pelvic loop load, upper torso loop load, common hardware.
- B. A photograph and detailed description of a FAILURE for all testing will be recorded. The detailed mode will be entered in the test report. The failure must be photographed at various angles to assure complete coverage.

Each test report shall contain the following photographs when applicable:

- A. Photograph of the tested seat belt assembly with label(s) showing
- B. Photograph of disassembled tested specimen
- C. Photographs of typical setups for performing the following tests:
  - (1) Webbing Elongation and Breaking Strength
  - (2) Webbing Abrasion (Hex Bar and Buckle Tests)
  - (3) Assembly Performance Loop Load
  - (4) Assembly Performance Buckle Release Force
  - (5) Retractor Acceleration (Emergency Locking Retractor ONLY)
  - (6) Retractor Cycling
- D. Applicable failure photographs with narrative description of the failure

## 10. DEFINITIONS

### **ADJUSTMENT HARDWARE**

Any or all hardware designed for adjusting the size of a seat belt assembly to fit the user, including such hardware that may be integral with a buckle, attachment hardware, or retractor.

### **ATTACHMENT HARDWARE**

Any or all hardware designed for securing the webbing of a seat belt assembly to a motor vehicle.

### **AUTOMATIC LOCKING RETRACTOR (ALR)**

A retractor incorporating adjustment hardware by means of a positive self-locking mechanism which is capable when locked of withstanding restraint forces.

### **BUCKLE**

A quick release connector which fastens a person in a seat belt assembly.

### **DUAL SENSITIVE RETRACTOR**

An emergency locking retractor that is sensitive to vehicle acceleration and sensitive to webbing withdrawal.

### **EMERGENCY LOCKING RETRACTOR (ELR)**

A retractor incorporating adjustment hardware by means of a locking mechanism that is activated by vehicle acceleration, webbing movement relative to the vehicle, or other automatic action during an emergency and is capable when locked of withstanding restraint forces.

### **HARDWARE**

Any metal or rigid plastic part of a seat belt assembly.

### **LOAD LIMITER**

A seat belt assembly component or feature that controls tension on the seat belt to modulate the forces that are imparted to occupants restrained by the belt assembly during a collision.

## 10. DEFINITIONS....Continued

### **NONLOCKING RETRACTOR**

A retractor from which the webbing is extended to essentially its full length by a small external force, which provides no adjustment for assembly length, and which may or may not be capable of sustaining restraint forces at maximum webbing extension.

### **PELVIC BELT RESTRAINT**

A seat belt assembly or portion thereof intended to restrain movement of the pelvis.

### **RETRACTOR**

A device for storing part or all of the webbing in a seat belt assembly.

### **SEAT BELT ASSEMBLY**

Any strap, webbing, or similar device designed to secure a person in a motor vehicle in order to mitigate the results of any accident, including all necessary buckles and other fasteners, and all hardware designed for installing such seat belt assembly in a motor vehicle. A Type 2 continuous webbing seat belt assembly is shown in Figure 1.

### **SEAT BACK RETAINER**

The portion of some seat belt assemblies designed to restrict forward movement of a seat back.

### **STRAP**

A narrow non-woven material used in a seat belt assembly in place of webbing.

### **TYPE 1 SEAT BELT ASSEMBLY (T1)**

A lap belt for pelvic restraint.

### **TYPE 2 SEAT BELT ASSEMBLY (T2) – SEE FIGURE 1**

A combination of pelvic (lap) and upper torso (shoulder) restraints.

### **TYPE 2A UPPER TORSO (SHOULDER) BELT (T2A)**

An upper torso (shoulder) restraint for use only in conjunction with a pelvic (lap) belt as a T2 seat belt assembly.

# TYPE 2 CONTINUOUS WEBBING SEAT BELT ASSEMBLY

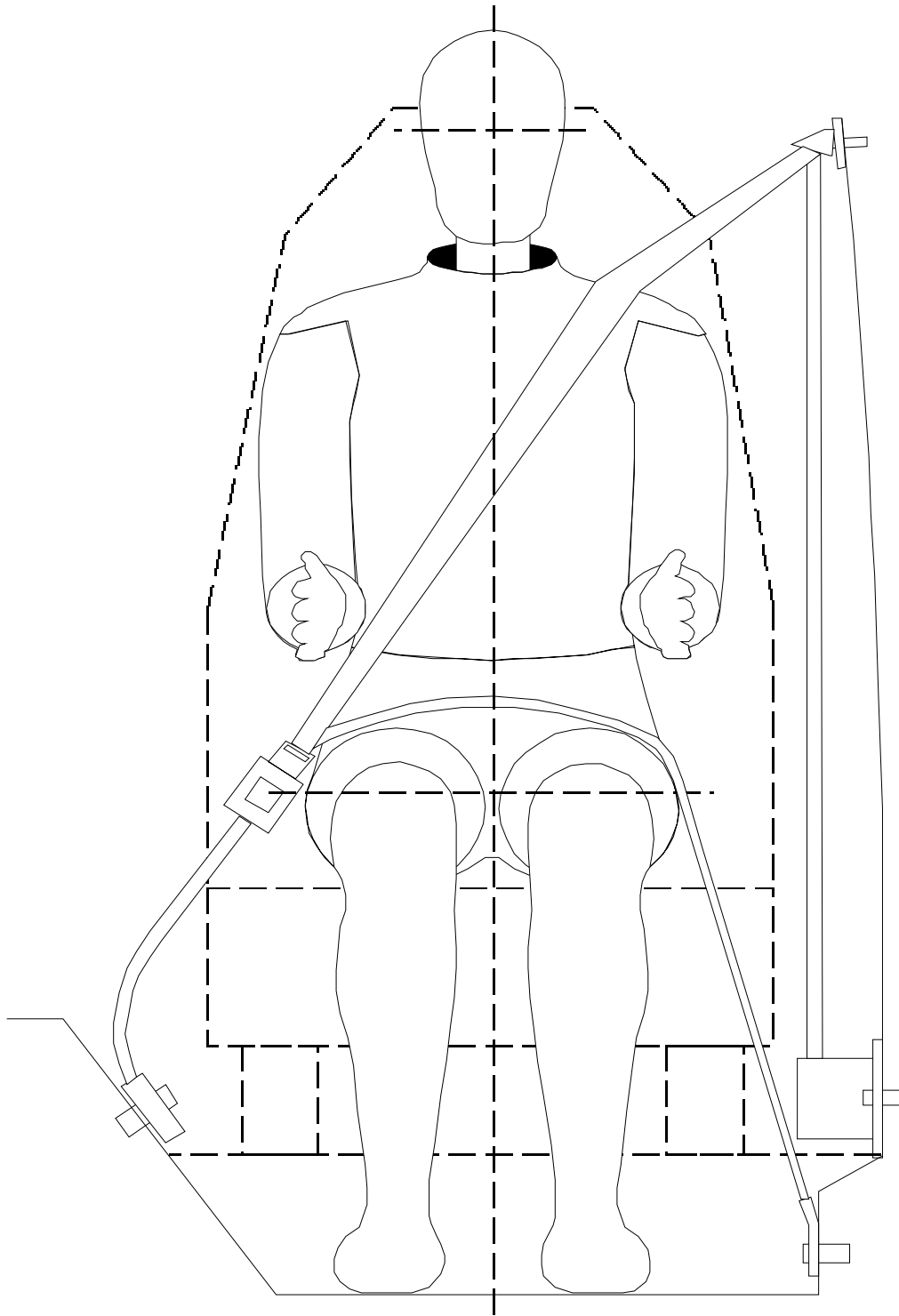


FIGURE 1

## 10. DEFINITIONS....Continued

### UPPER TORSO (SHOULDER) BELT RESTRAINT

A portion of a seat belt assembly intended to restrain movement of the chest and shoulder regions.

### WEBBING

A narrow fabric woven with continuous filling yarns and finished selvages.

## 11. 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 the replacement item of motor vehicle equipment and all costs associated with conducting the retest. The original test specimen 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 test failure, the contractor shall retain the retest specimen for a period not exceeding 180 days. If there is no test failure, the Contractor may dispose of the test 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 (2) 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.

## 12. COMPLIANCE TEST EXECUTION

### TEST PERSONNEL PERFORMANCE

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

### RECEIVING-INSPECTION OF TEST EQUIPMENT

Inspect all hardware for burrs and sharp edges. Inspect each seat belt assembly release mechanism for the possibility of accidental release and verify that the attachment hardware is included. Inspect the ends of the webbing to ascertain that raveling will be prevented.

### TEST SEQUENCES

Specific test requirements and procedures follow and are divided into four sub-groups.

GROUP A – Webbing Elongation and Breaking Strength (test samples 1 through 3)

GROUP B – Webbing Abrasion (test samples 4 through 6)

GROUP C – Hardware and Assembly Performance (test samples 7 through 9)

GROUP D – Retractor Performance (test samples 10 through 12)

Each sub-group has been designed to allow the laboratory technician to perform the tests with a minimum amount of reference to FMVSS 209. Data forms have also been provided with each procedure. The data forms should constitute a data package where the data forms utilized during the test sequences are in consecutive order and each data sheet contains a space for recording the GROUP NUMBER. Where appropriate, references are made [in brackets] to the applicable FMVSS 209 section. For example, [S5.2(j)] would refer to section 5.2(j) in 49 CFR 571.209 (FMVSS 209).

## 12. COMPLIANCE TEST EXECUTION....Continued

### OUTLINE OF TEST SEQUENCE

#### A. WEBBING ELONGATION AND BREAKING STRENGTH GROUP A (Test Samples 1, 2 and 3)

- (1) Webbing Width
  - (a) Conditioning
  - (b) Measure width during elongation test (46 mm min. width)
- (2) Webbing Maximum Elongation
  - (a) 20% at 11,120 N — Type 1
  - (b) 30% at 11,120 N — Type 2 (Pelvic)
  - (c) 40% at 11,120 N — Type 2 (Upper Torso)
- (3) Webbing Breaking Strength
  - (a) Minimum of 26,689 N — Type 1
  - (b) Minimum of 22,241 N — Type 2 (Pelvic)
  - (c) Minimum of 17,793 N — Type 2 (Upper Torso)
  - (d) Calculate median breaking strength
- (4) Resistance to Light
  - (a) Light exposure (carbon-arc), 100 hours
  - (b) Perform breaking strength test
  - (c) Calculate percentage breaking strength retained

**NOTE:** Must retain a minimum of 60% of median breaking strength calculated in A.3(d), Webbing Breaking Strength



**12. COMPLIANCE TEST EXECUTION....Continued**

AND, IF REQUIRED

(5) Resistance to Micro-Organisms

- (a) Soil burial for 2 weeks
- (b) Perform breaking strength test
- (c) Calculate percentage breaking strength retained

**NOTE:** Must retain a minimum of 85% of median breaking strength calculated in A.3(d), Webbing Breaking Strength

B. WEBBING ABRASION GROUP B (Test Samples 4, 5 and 6)

(1) Abrasion Resistance Test

- (a) General Conditioning
- (b) Abrasion Conditioning for 2,500 cycles
- (c) Breaking Strength (must retain 75% of required breaking strength)
  - 20,017 N – Type 1
  - 16,681 N – Type 2 (Pelvic)
  - 13,345 N – Type 2 (Upper Torso)

C. HARDWARE AND ASSEMBLY PERFORMANCE GROUP C (Test Samples 7, 8 and 9)

(1) Hardware Corrosion Resistance Test

- (a) Salt Spray Test (24 hours of exposure time)
- (b) Dry for one hour
- (c) Repeat (a) and (b) for attachment hardware near floor
- (d) Wash assemblies
- (e) Dry for 24 hours
- (f) Inspection of assemblies

**12. COMPLIANCE TEST EXECUTION....Continued**

- (2) Temperature Resistance Test
  - (a) 80°C (176°F) Temperature for 24 hours over water
  - (b) 80°C (176°F) Temperature for 24 hours in dry oven
- (3) Attachment Hardware Strength Test
- (4) Adjustment Force Test
- (5) Tilt-lock Adjustment Test
- (6) Hardware Buckle Latch Test (maximum separation force of 22N)
- (7) Loop Load Test (minimum loop load requirement)
  - (a) 22,241 N – Type 1
  - (b) 22,241 N – Type 2 (Pelvic)
  - (c) 13,345 N – Type 2 (Upper Torso)
- (8) Elongation Test
  - (a) Maximum extension of assembly loop of 178 mm – Type 1
  - (b) Maximum extension of assembly loop of 508 mm – Type 2 (Pelvic or Upper Torso)
- (9) Maximum Buckle Release Force
  - (a) 133 N – Type 1 and Type 2 assemblies
- (10) Common Hardware Loop Load Test
  - (a) 26,689 N loop load (13,345 N tensile force) applied to hardware common to pelvic and upper torso portions of a Type 2 assembly
- (11) Cut Webbing – Minimum Breaking Strength, if required
  - (a) 18,683 N – Type 1
  - (b) 15,569 N – Type 2 (Pelvic)
  - (c) 12,455 N – Type 2 (Upper Torso)

**12. COMPLIANCE TEST EXECUTION....Continued**

## (12) Retractor Load Test

## (a) Minimum Retractor Stitch Loop Load at 100% Extension

- 22,241 N – Type 1
- 22,241 N – Type 2 (Pelvic)
- 13,345 N – Type 2 (Upper Torso)

OR

## (b) Minimum Tensile Load Test

- 11,120 N – T1 assembly
- 11,120 N – Type 2 (Pelvic)
- 6,672 N – Type 2 (Upper Torso)

**D. RETRACTOR PERFORMANCE  
GROUP D (Test Samples 10, 11 and 12)**

## (1) Baseline Test

## (a) Conditioning

## (b) Measurement of baseline values

- Lowest retraction force
- Webbing travel before lockup
- Angle no-lock check (15 degrees)

## (2) Post Corrosion Cycling Test

## (a) Corrosion Conditioning – salt chamber exposure for 24 hours

## (b) Dry for one hour

**12. COMPLIANCE TEST EXECUTION....Continued**

- (c) Wash
  - (d) Dry for 24 hours
  - (e) Inspection
  - (f) 25 manual cycles
  - (g) 2,500 cycles
- (3) Post Temperature Cycling Test
- (a) 80°C (176°F) Temperature for 24 hours over water AND  
80°C (176°F) Temperature for 24 hours in dry oven
  - (b) 2,500 cycles
- (4) Dust Test for 5 hours
- (5) Additional Cycling
- (a) 25 manual cycles
  - (b) Automatic cycling
    - 5,000 cycles – ALR
    - 45,000 cycles – ELR

**NOTE:** Of the 50,000 cycles performed in Tests (2), (3) and (5), on ELRs, 10,000 shall be lockup cycles.

- (6) Post Test Retractor Performance Tests
- (a) Lowest retraction force shall be not less than 50% of  
baseline value
  - (b) Webbing travel before lockup
  - (c) Angle no-lock check (15 degrees)

**12. COMPLIANCE TEST EXECUTION....Continued**

- (7) Minimum Retractor Strength Test
  - (a) 22,241 N – Type 1
  - (b) 22,241 N – Type 2 (Pelvic)
  - (c) 13,345 N – Type 2 (Upper Torso)

**TEST REQUIREMENTS****General Requirements**

Inspect all hardware for burrs and sharp edges. Inspect each belt assembly release mechanism for possibility of accidental release and, if applicable, verify that the attachment hardware per SAE J800b is included. Inspect the ends of the webbing to ascertain that raveling will be prevented.

Tolerance requirements on angles: Unless a range of angles is specified or otherwise explicitly specified, all angles and orientations of seat belt assemblies and components specified in this test procedure shall have a tolerance of  $\pm 3$  degrees. When a range of angles is specified, no tolerance applies and the requirements must be met at every angle within the range.

**START GROUP A TEST SERIES****WEBBING ELONGATION AND BREAKING STRENGTH****TEST SAMPLES 1, 2 and 3****A.1 Webbing Width [S4.2(a), S5.1(a)]**

Condition three webbing specimens for 24 hours at  $23 \pm 2^\circ\text{C}$  and 48 percent to 67 percent relative humidity. Install each specimen in a tensile tester equipped with split grip webbing drums as shown in Figures 2 and 3. The webbing width is measured during the strength elongation pull. The tension during measurement of width shall be not more than 22 N on webbing from a Type 1 seat belt assembly and  $9786 \pm 450$  N on webbing from a Type 2 seat belt assembly.

## 12. COMPLIANCE TEST EXECUTION....Continued

## TENSILE TESTER SPLIT GRIP WEBBING DRUM

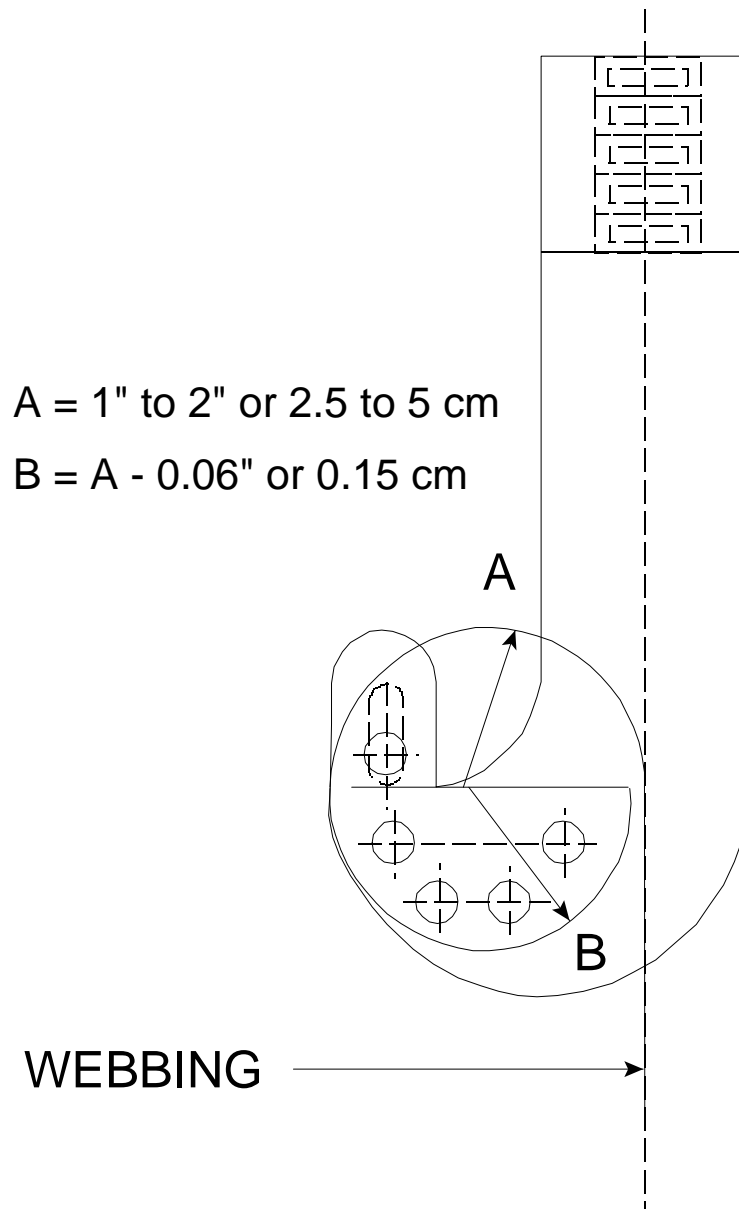


FIGURE 2

12. COMPLIANCE TEST EXECUTION...Continued

METHOD OF WRAPPING WEBBING SPLIT GRIPS

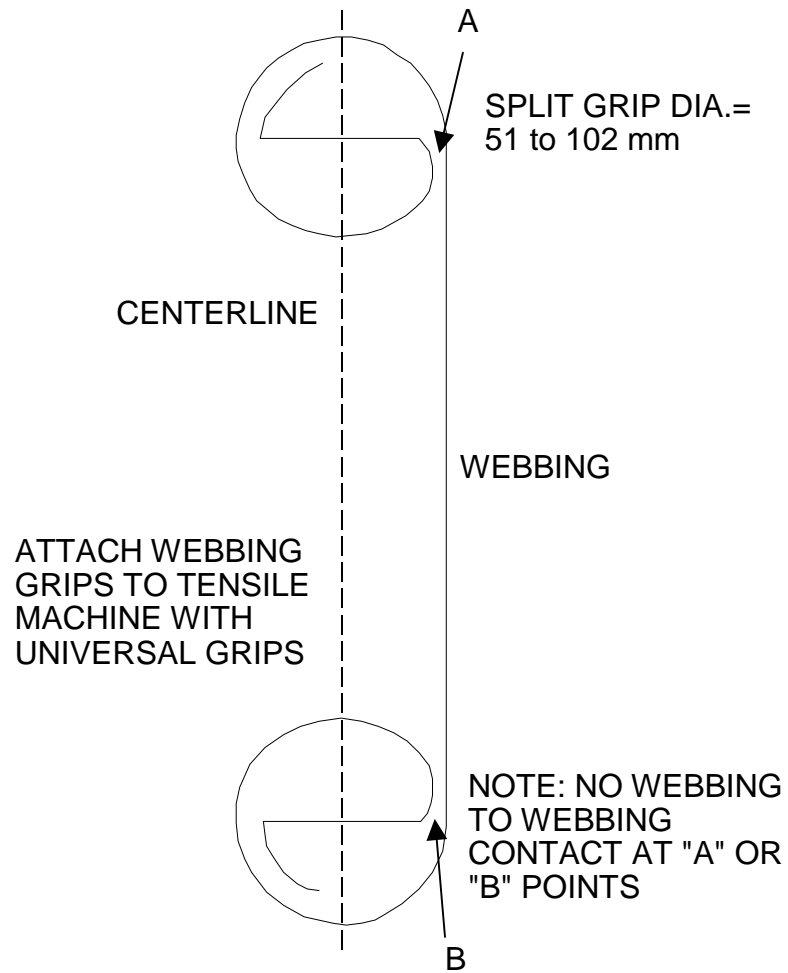


FIGURE 3

## 12. COMPLIANCE TEST EXECUTION....Continued

### A.2 Webbing Elongation [S4.2(c), S5.1(c)]

As above, preload the webbing specimen to a value between 196 N and 245 N and attach an extensometer with a 101.6 mm,  $+0.7938$  mm,  $-0$  mm (4 inch,  $+0.03125$  inch,  $-0$  inch), gage length. Apply the load at 51 and 102 mm per minute head separation. The webbing in a Type 1 seat belt assembly shall not elongate more than 20 percent at 11,120 N. The webbing in the pelvic portion of a Type 2 seat belt assembly shall not elongate more than 30 percent at 11,120 N. The webbing in the upper torso portion of a Type 2 seat belt assembly shall not elongate more than 40 percent at 11,120 N.

### A.3 Webbing Breaking Strength [S4.2(b), S5.1(b)]

As above, stop the machine, remove the extensometer, and continue to load at 51 to 102 mm/minute to the ultimate breaking strength. Webbing failures occurring in a portion of the webbing which was in contact with the grips at the beginning of the test shall not be considered valid. Retest shall be required if jaw breaks occur.

### A.4 Resistance to Light [S4.2(e), S5.1(e)]

Webbing samples at least 508 mm in length from three seat belt assemblies shall be suspended vertically on the inside of the specimen rack in a Type E carbon-arc light-exposure apparatus described in Standard Practice for Operating Light-Exposure Apparatus (Carbon-Arc Type) With and Without Water for Exposure of Nonmetallic Materials, ASTM Designation: G23-81, published by the American Society for Testing and Materials, except that the filter used for 100 percent polyester yarns shall be chemically strengthened soda-lime glass with a transmittance of less than 5 percent for wavelengths equal to or less than 305 nanometers and 90 percent or greater transmittance for wave lengths of 375 to 800 nanometers. The apparatus shall be operated without water spray at an air temperature of  $60 \pm 2^\circ\text{C}$  measured at a point  $25 \pm 5$  mm outside the specimen rack and midway in height. The temperature sensing element shall be shielded from radiation. The specimen shall be exposed to light from the carbon-arc for 100 hours and then conditioned as prescribed in paragraph A.1 of this section. The breaking strength of the specimens shall be determined by the procedure prescribed in paragraph A.3 of this section. The median values for breaking strengths determined on exposed and unexposed specimens shall be used to calculate the percentage of breaking strength retained. After exposure to light of a carbon arc, the webbing in a seat belt assembly shall have a median breaking strength not less than 60 percent of the median breaking strength and have a color retention of not less than Number 2 on the Geometric Gray Scale published by the AATCC.



## 12. COMPLIANCE TEST EXECUTION....Continued

### A.5 Resistance to Micro-Organisms [S4.2(f), S5.1(f)]

Webbing samples at least 508 mm in length from three seat belt assemblies shall first be preconditioned in accordance with Appendix A (1) and (2) of American Association of Textile Chemists and Colorist Test Method 30-81, "Fungicides Evaluation on Textiles; Mildew and Rot Resistance to Test I, "Soil Burial Test" of that test method. After soil-burial for a period of 2 weeks, the specimens shall be washed in water, dried and conditioned as prescribed in paragraph A of this section. The breaking strengths of the specimens shall be determined by the procedure prescribed in paragraph A.3. The median values for the breaking strengths determined on exposed and unexposed specimens shall be used to calibrate the percentage of breaking strength retained. After being subjected to AATCC test method 30-81 for a period of 2 weeks, the webbing in a seat belt assembly shall have a breaking strength not less than 85 percent of the strength before subjection to micro-organisms.

**NOTE:** This test shall not be required on webbing made from material which is inherently resistant to micro-organisms.

### START GROUP B TEST SERIES

#### WEBBING ABRASION

#### TEST SAMPLES 4, 5 and 6

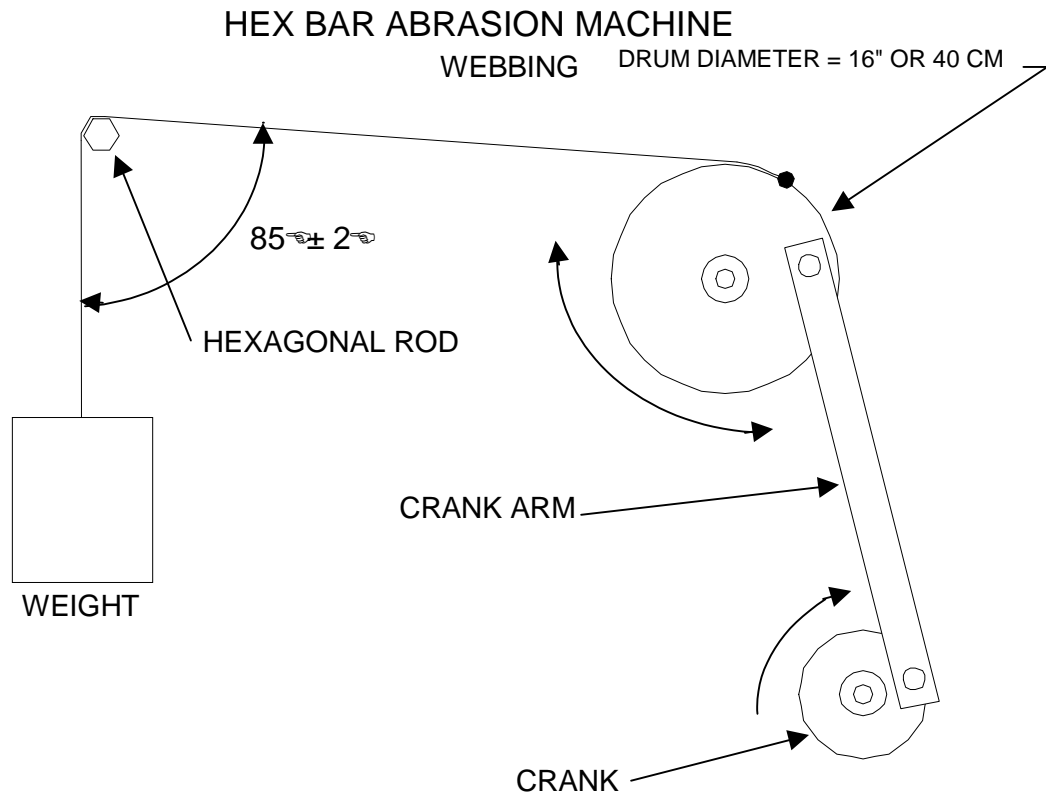
### B.1 Webbing Resistance to Abrasion Test [S4.2(d), S5.1(d) and S5.3(c)]

(a) Condition three specimens as in paragraph A.1. Mount the specimens in the hex bar abrasion machine. If the assembly contains a manual adjusting device, it shall be subjected to the buckle abrasion test. The hex bar abrasion machine is shown in Figure 4. The buckle abrasion apparatus is shown in Figure 5.

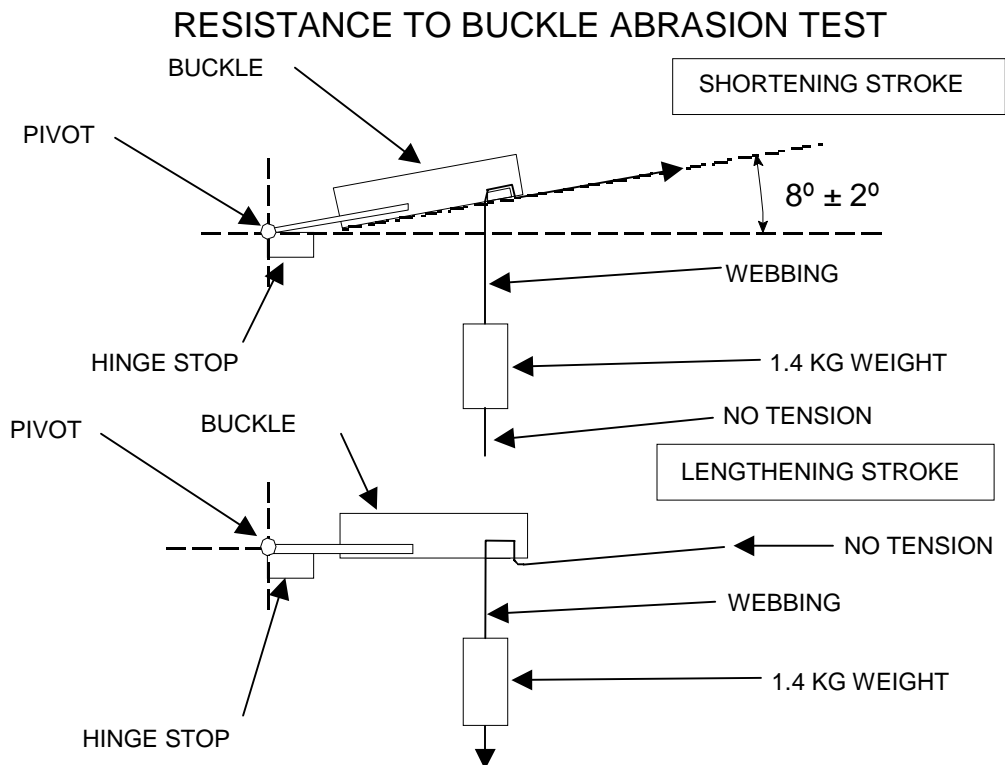
(b) Abrasion Conditioning

Rotate the hex bar after each 2,500 cycles and use a webbing stroke of  $330 \pm 13$  mm. Guides shall be provided to prevent movement of the webbing along the axis of the hex bar. These guides must not contact the webbing during the test. Oscillate the drum for 2,500 cycles (5,000 strokes) at a rate of 30 cycles,  $\pm 1$  cycle, per minute or 60 strokes,

12. COMPLIANCE TEST EXECUTION...Continued



**FIGURE 4**



**FIGURE 5**

## 12. COMPLIANCE TEST EXECUTION....Continued

± 2 strokes, per minute. See Figure 5 for buckle abrasion information. Condition the webbing for 4 hours at 65 percent relative humidity and 18°C. The reciprocating device shall be operated for 2,500 cycles at a rate of 18 cycles per minute with a stroke length of 203 mm. The resistance to abrasion is only a conditioning for the following.

### (c) Webbing Breaking Strength After Abrasion Conditioning

After abrasion conditioning, install the test samples in a tensile testing machine equipped with split grip webbing drums as shown previously. Subject the 3 specimens to a breaking strength test by increasing the tension on the webbing at a grip separation rate of 51 and 102 mm, per minute.

For a Type 2 assembly, the minimum breaking strength shall be 16,681 N for the pelvic portion and 13,345 N for the upper torso portion.

START GROUP C TEST SERIES  
HARDWARE AND ASSEMBLY PERFORMANCE  
TEST SAMPLES 7, 8 and 9

### HARDWARE PERFORMANCE TESTS

#### C.1 Hardware Corrosion Resistance [S4.3(a), S5.2(a)]

##### (a) Salt Spray Exposure

All hardware shall be subjected to a 24-hour exposure period in a salt spray chamber followed by a one-hour drying period. Any attachment hardware normally installed near the floor of a vehicle will be exposed to an additional 24-hour period followed by a one hour drying period. During the one hour drying period, the parts shall be at laboratory conditions. Following the salt spray exposure/drying cycle, follow Steps 1-3 below to wash the components thoroughly with water to remove the salt. After washing, follow Step 4 below to allow the specimens to dry for 24 hours under standard laboratory conditions specified in paragraph A.1.

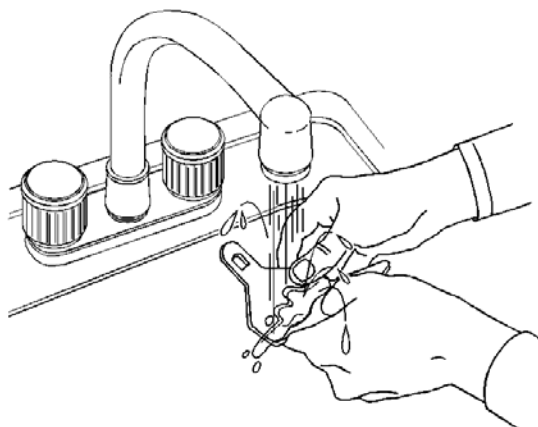
(1) Place component under running water at 38°C (100°F) ± 5°C (9°F).

(2) Thoroughly wash components lightly with fingers to remove salt from the surfaces. (Figure 6 illustrates the proper washing method)

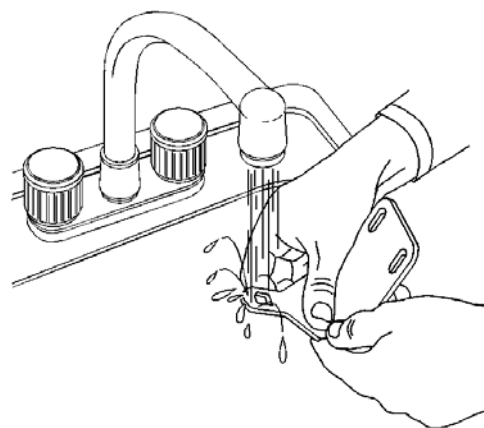
## 12. COMPLIANCE TEST EXECUTION....Continued

- (3) Turn component over and repeat Step #2.
- (4) After thoroughly washing and before evaluation, allow components to dry for 24 hours under standard laboratory conditions as stated in A-1.

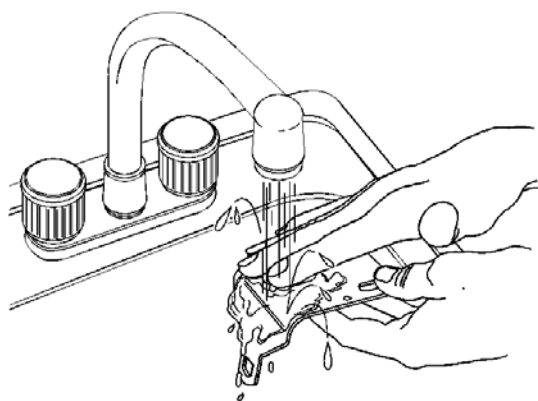
Follow steps 1-4 to wash thoroughly.



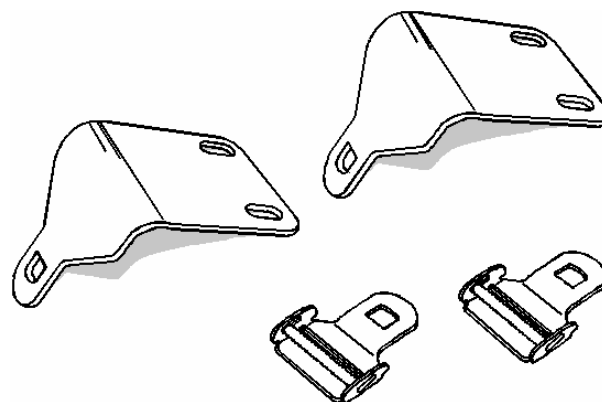
1. Place component under running water at 38°C (100°F) +/- 5°C (9°F).



2. Thoroughly wash while holding under running water. Rub component lightly with fingers to remove salt.



3. Turn component over and repeat step #2.



4. After thoroughly washing, allow to dry for 24 hours before evaluation.

**FIGURE 6**

## 12. COMPLIANCE TEST EXECUTION....Continued

### (b) Salt Spray System Test Setup

The analysis and calibration aspects of the salt spray system shall be in accordance with ASTM Procedure B117-73 entitled "Standard Method of Salt Spray (Fog) Testing." Prepare a salt solution by dissolving 5 parts,  $\pm 1$  part, of salt by weight in 95 parts of distilled water. The Ph range of the mixture shall be within 6.5 and 7.2. The compressed air supply to the nozzles will be maintained between 69 and 172 kN/m<sup>2</sup> (10 and 25 psig). Suspend or support the specimens between 15 and 30 degrees from the vertical and preferably parallel to the principal direction of horizontal flow of fog through the chamber. Buckles must be unlatched. Ensure that the specimen surfaces do not contact each other and direct the nozzles so that none of the spray can impinge directly on the specimens. Salt solution from one specimen shall not be allowed to drip on any other specimen.

### (c) Inspection Of Assemblies

At the conclusion of the 24 hour drying period, the hardware from 3 test samples shall be inspected. The significant surfaces of the hardware shall be free of ferrous or nonferrous corrosion that may be transferred, either directly or by means of the webbing, to the occupant or his/her clothing. The interpretation of "free of corrosion" on exposed significant surfaces is that the size of any corrosion spot must not extend outside of a 6 mm diameter gage pin. (The technician making the evaluation must be aware of the component's position on the seat belt assembly to be able to determine if corrosion can be transferred to the webbing or come in contact with the occupant.) Examine the hardware for such corrosion and record the results on the appropriate data sheet.

### C.2 Hardware Temperature Resistance [S4.3(b), S5.2(b)]

Plastic or other nonmetallic parts of 3 specimens shall be subjected to the temperature resistance test and shall not warp or otherwise deteriorate. Condition 3 specimens as in paragraph A.1 and then expose the assemblies to a temperature of  $80 \pm 1^\circ\text{C}$  ( $176 \pm 1.8^\circ\text{F}$ ), for 24 hours in a circulating air type oven in accordance with ASTM D756-78, Procedure D. The first 24 hour period will be a humid exposure, and then, the 3 specimens will be subjected to a second 24 hour period of dry heat at  $80 \pm 1^\circ\text{C}$  ( $176 \pm 1.8^\circ\text{F}$ ) in accordance with ASTM D756-78, Procedure D.

### C.3 Attachment Hardware [S4.3(c), S5.2(c)]

Attachment bolts used to secure the pelvic restraint shall be tested in a manner similar to that shown on the next page. A bolt from each of 3 seat belt assemblies shall be tested.

12. COMPLIANCE TEST EXECUTION...Continued

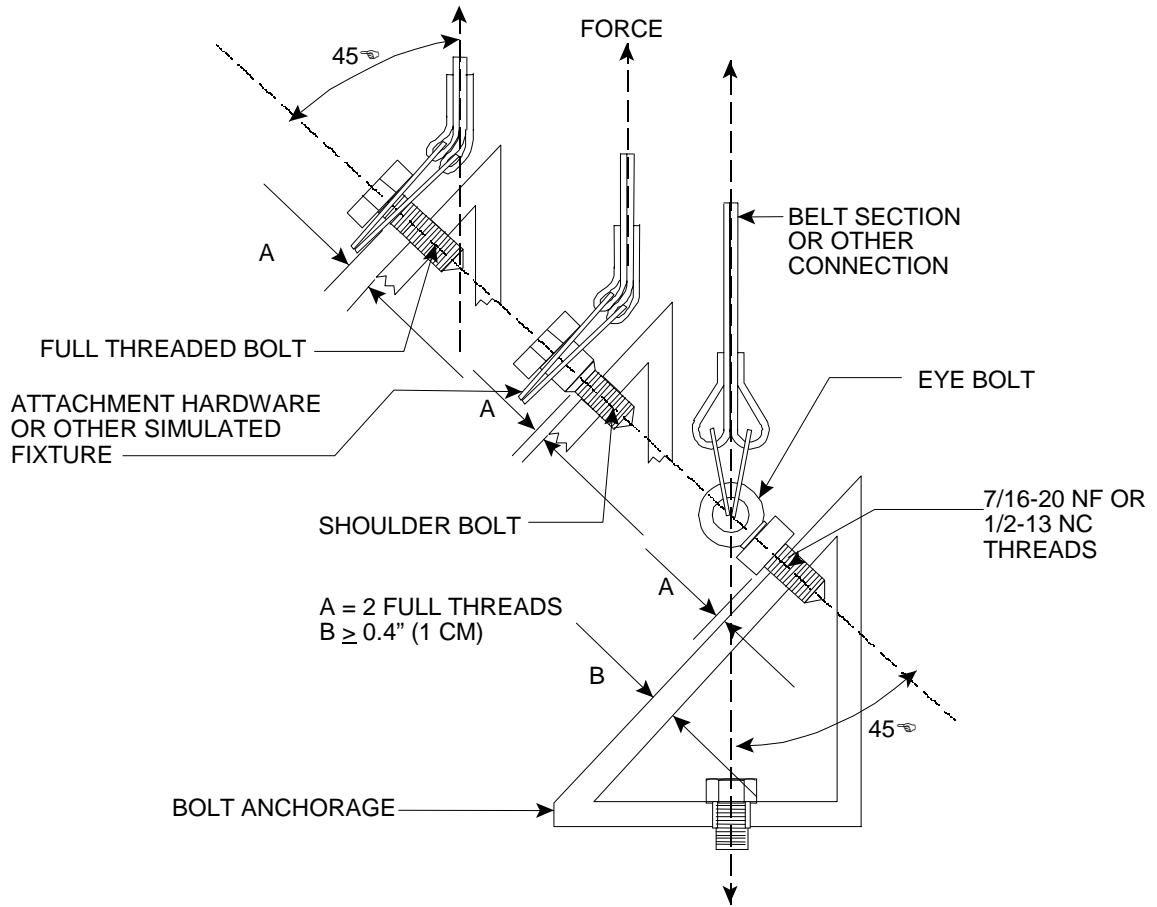


FIGURE 7

## 12. COMPLIANCE TEST EXECUTION....Continued

Attachment hardware, other than bolts, designed to receive the ends of 2 seat belt assemblies shall be subjected to a tensile force of 26,689 N in a manner simulating use. Attachment hardware from 3 seat belt assemblies shall be tested.

### C.4 Adjustment Force [S4.3(e), S5.2(e)]

Any manual adjusting device used to adjust the size of the seat belt assembly shall be tested for adjustment force. With no load on the anchor end, draw the webbing through the adjusting device at a rate of  $508 \pm 50$  mm/min. Measure the maximum force needed to adjust the size of the assembly to the nearest 1 N after the first 25 mm of webbing movement. Precycle the webbing 10 times prior to measurement. The maximum adjustment force needed to adjust (decrease) the size of the assembly shall not exceed 49 N.

### C.5 Tilt-lock Adjustment [S4.3(f), S5.2(f)]

Three buckles or devices of assemblies having tilt-lock adjustment shall be tested. The webbing shall be cycled 10 times before beginning the test. The base of the adjustment mechanism and the anchor end of the webbing shall be oriented in planes normal to each other at the onset of the test. The webbing shall be drawn through the adjustment mechanism in a direction to increase belt length at a rate of  $508 \text{ mm} \pm 50 \text{ mm}$  per minute while the plane of the base is slowly rotated in a direction to lock the webbing. Rotation shall be stopped with the webbing locks, but the pull on the webbing shall be continued until there is a resistance of at least 89N. The locking angle between the anchor end of the webbing and the base of the adjustment mechanism shall be measured to the nearest degree. The buckles shall lock the webbing at an angle of not less than 30 degrees measured between the base of the buckle and the anchor webbing.

### C.6 Hardware Buckle Latch [S4.3(g), S5.2(g)]

A buckle latch from three specimens shall be subjected to test. The buckles shall not fail, gall or wear to an extent that normal latching and unlatching is impaired. A metal-to-metal buckle shall separate in any position of partial engagement by a force of not more than 22 N. Withdraw the webbing from a metal-to-webbing buckle and open and close the buckle 10 times. Secure the actuator of a cycling device to the buckle latch. Prior to securing the latch to the actuator, adjust the cycling machine to produce a force of  $133 \pm 13$  N, and a cycling rate not to exceed 30 cycles per minute. Move the latch 200 times through the maximum possible travel against its stop.

## 12. COMPLIANCE TEST EXECUTION....Continued

### ASSEMBLY PERFORMANCE TESTS

The test will normally be conducted as a loop load with the D ring included in the loop to simulate, as close as possible, its position relative to the seat belt anchorages in the vehicle installation.

The length of webbing on the retractor spool during the loop load test will be representative of that which would be on the spool when the seat belt assembly is being used by a 50th percentile adult male. These lengths will be supplied by the COTR. The length of webbing on the retractor spool shall be recorded on the data sheet.

If the 1220 to 1270 mm loop specified in FMVSS 209, S5.3(b)(1) cannot be attained when the required webbing length is wrapped around the retractor spool, clamp the webbing to attain the correct loop size and ensure the excess remains in slack throughout the loop load test.

If the loop load test cannot be effectively performed on the seat belt assemblies due to complexity of seat belt design or other reasons, a series of component tensile strength tests will be conducted to include the anchorages, buckles, D rings, and retractors. This procedure shall be followed ONLY with the approval of the COTR.

When a failure occurs during the three-phase test sequence on the seat belt assembly in a phase that had undergone a previous stress test (i.e., buckle failing 26,689 N common hardware test after passing 22,241 N loop load test) the failed test will be repeated on new hardware with the first failure discounted.

If any failure occurs during the assembly performance test, the COTR will be contacted immediately and all compliance testing stopped on the seat belt assemblies. Testing will be resumed on these assemblies only on approval of the COTR.

The buckles (Group C) will be subjected to environmental stress testing separately with the functional tests (i.e., buckle latch, cycling, false latching, etc.) conducted on these samples.

The buckles will be unlatched during the corrosion test.

The correct sequence of tests is: environmental tests, loop load tests, and buckle release force test.

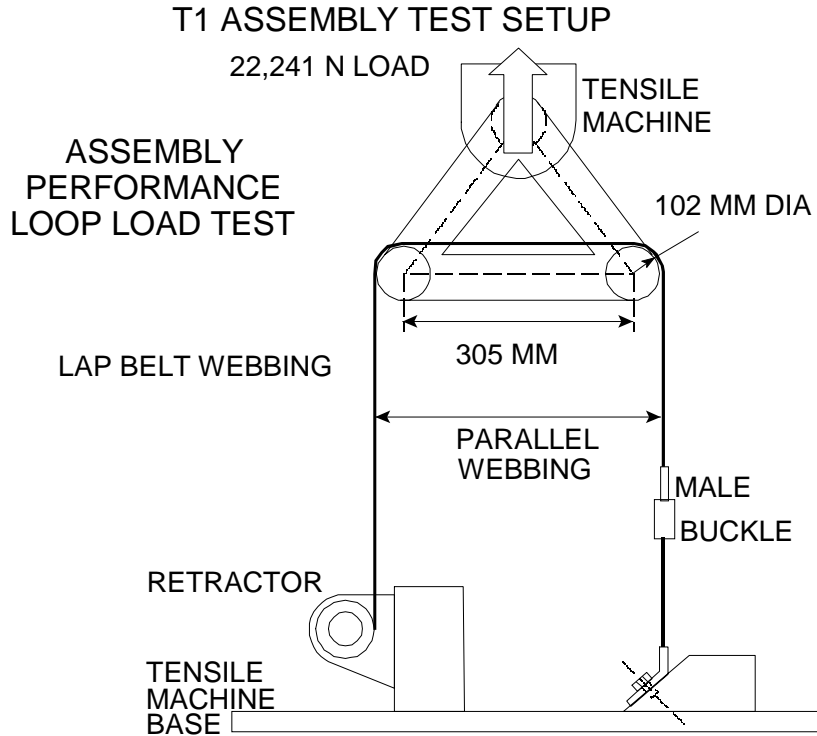


## 12. COMPLIANCE TEST EXECUTION....Continued

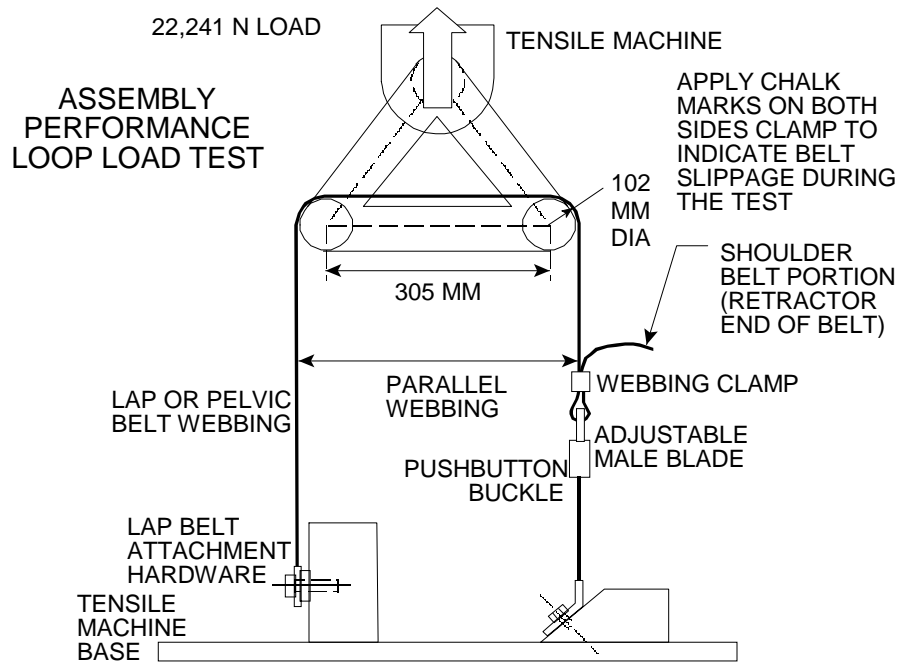
### Loop Load Test Setup

Condition three specimens as in paragraph A.1 and attach a double-roller block and anchorage bar to the heads of the tensile machine as shown in Figures 8, 9, 10 and 11. Position the webbing loop on the roller fixture and attach the ends to the adapter fixtures to form an angle closest to 90 degrees, or the closest angle to approximate in-vehicle installation, between the webbing and the laced end of the attachment hardware. Position the buckle so that it does not contact the rollers during the test. Lock the ALR or ELR units and apply a 245 N load. Reduce the load to zero and adjust the loop length to be between 1220 to 1270 mm, if possible. Apply a preload of 89 to 98 N load, initiate recording, and begin the test, applying the load required at 51 to 102 mm per minute.

12. COMPLIANCE TEST EXECUTION....Continued



**T2 SEAT BELT ASSEMBLY, PELVIC RESTRAINT TEST SETUP**



12. COMPLIANCE TEST EXECUTION...Continued

T2 SEAT BELT ASSEMBLY, UPPER TORSO RESTRAINT TEST SETUP

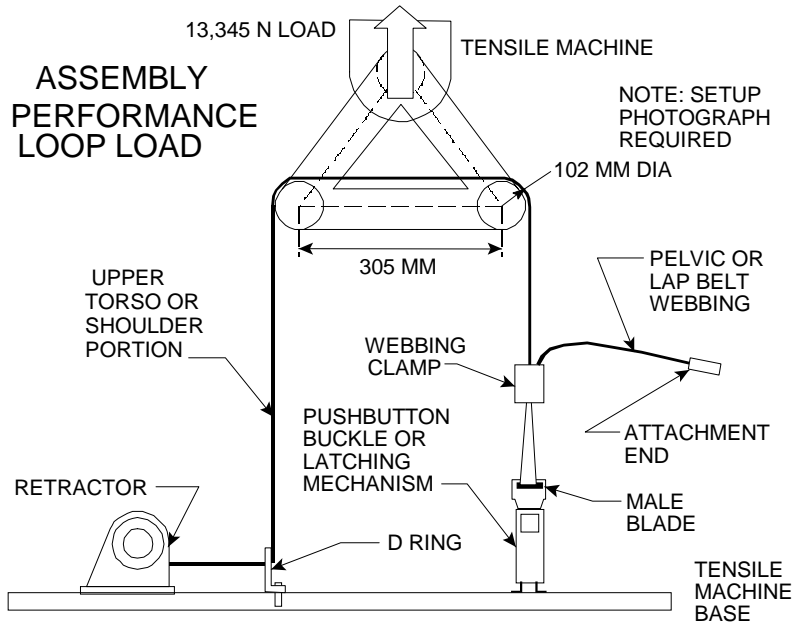


FIGURE 10

COMMON HARDWARE TEST SETUP

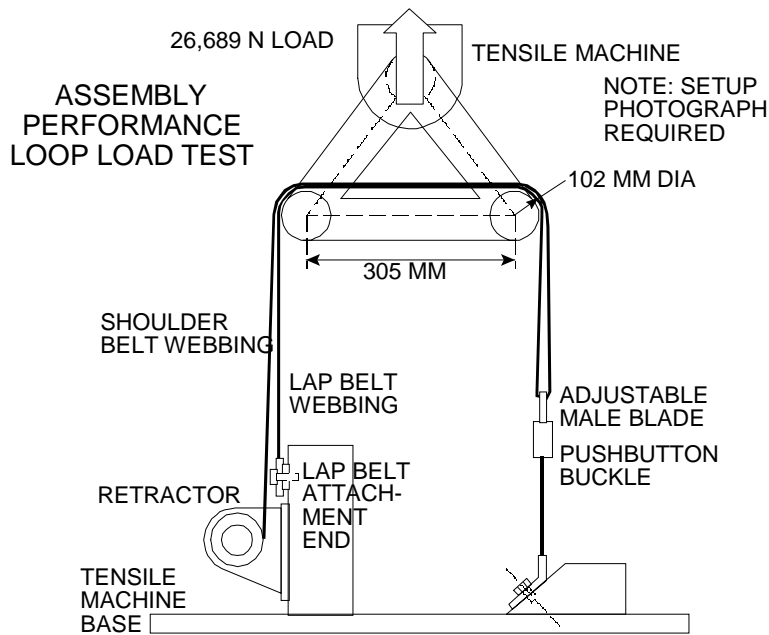


FIGURE 11

## 12. COMPLIANCE TEST EXECUTION...Continued

### C.7 Loop Load Test [S4.4(a)(b), S5.3(a)(b)]

For a Type 1 assembly, apply a loop load of 22,241 N (11,120 N tensile load) using the test setup shown in Figure 8. All structural components shall withstand a minimum force of 11,120 N.

For the pelvic portion of a Type 2 assembly, apply a loop load of 22,241 N (11,120 N tensile load) using the test setup shown in Figure 9. All structural components shall withstand a minimum force of 11,120 N.

For the upper torso portion of a Type 2 assembly, apply a loop load of 13,345 N (6,672 N tensile load) using the test setup shown in Figure 10. All structural components shall withstand a minimum force of 6,672 N.

### C.8 Elongation Test

Elongation shall be measured while performing Test C.6, Loop Load.

For a Type 1 assembly, measure the loop length when a 22,241 N loop load is achieved. The assembly loop shall extend no more than 178 mm (356 mm between anchorages).

For the pelvic portion of a Type 2 assembly, measure the loop length when a 22,241 N loop load is achieved. The assembly loop shall extend no more than 254 mm (508 mm between anchorages).

For the upper torso portion of a Type 2 assembly, measure the loop length when a 13,344 N loop load is achieved. The assembly loop shall extend no more than 254 mm (508 mm between anchorages).

### C.9 Buckle Release Force Test [S4.3(d), S5.3(b)(2)]

After each elongation test, reduce the loop load to 667 N ( $334 \pm 22$  N force on buckle), back the pushbutton buckle with a rigid fixture to prevent movement, and apply a release force with a direct readout force gage. The release force shall be applied in a manner and direction typical of that which would be employed by a seat belt occupant. For push button-release buckles, the force shall be applied at least 3 mm from the edge of the push button access opening of the buckle in a direction that produces maximum releasing effect. For lever-release buckles, the force shall be applied on the centerline of the buckle lever or finger tab in a direction that produces maximum releasing effect. Maximum buckle release force shall not exceed 133 N.

## 12. COMPLIANCE TEST EXECUTION....Continued

### C.10 Common Hardware Load Test [S4.4(b)(3), S5.3(b)(3)]

Use the same three test samples to conduct the common hardware load test. The components common to both pelvic and upper torso restraint shall withstand a tensile force of  $13,344 \pm 134$  N (26,689 N loop load force). See the test setup shown in Figure 11 for the loop load configuration.

### C.11 Cut Webbing Breaking Strength Test [S4.4(b)(6), S5.3(b)(4)]

If the webbing is cut for a distance of 10 percent or more of its width, the test sample shall be tested for breaking strength as in paragraph A.3. The portion of the webbing at the cut point shall have a breaking strength of not less than 15,569 N for a pelvic restraint, or not less than 12,455 N for an upper torso restraint.

### C.12 Retractor Load Test [S5.3(b)(5)]

Fully extend the webbing from the ALR or ELR and apply a 11,120 N tensile force (loop load of 22,241 N) for a pelvic or continuous webbing system or a  $6,672 \pm 67$  N tensile force ( $13,344 \pm 134$  N loop load) for upper torso webbing systems.

## START GROUP D TEST SERIES RETRACTOR PERFORMANCE TEST SAMPLES 10, 11 and 12

### Retractor Performance Tests

The retractor cycling testing on ALRs and ELRs will be conducted as presently specified with the following additional requirements:

The cycling rate for each retractor will be recorded on the data sheet.

The retractors that operate erratically on the cycling apparatus will be immediately removed and placed in a conditioned environment for testing at a later time so as not to delay the program.

The time period between environmental stress and initiation of retractor cycling shall be kept to a minimum in accordance with good engineering practice.

The retractors undergoing environmental stress testing will be oriented in the chamber to simulate their installation position in the vehicle.

## 12. COMPLIANCE TEST EXECUTION....Continued

The retractor configurations that cannot be tested using the present test equipment and fixtures without destroying the integrity of the test specimen will be put aside for consultation with the COTR. These retractors shall not be tested until a specific procedure is developed for each retractor.

Both the environmental and non-environmental cycling tests will be performed as specified in the contract.

The retractor 0.7g acceleration pulse testing will be conducted as specified in this test procedure with the following additional requirements:

- a. The retractor acceleration pulse testing shall be conducted in accordance with SAE J211 Dec 03, "Instrumentation for Impact Test – Part 1 – Electronic Instrumentation", Channel Frequency Class 60, and shall use an accelerometer having a full scale range of  $\pm 10$  g. The accelerometer shall be mounted to the sled table and all retractor fixtures shall be rigid.
- b. The acceleration pulse trace for recording purposes shall be plotted against the required acceleration pulse corridor, and shall be included in the Final Report. A valid acceleration pulse test shall exhibit a recorded acceleration that is completely within the required acceleration pulse corridor (Figure 13).
- c. For each acceleration pulse test, webbing payout shall be measured using a displacement transducer.
- d. The retractor shall be accelerated three times to lockup with the 0.7g pulse test immediately prior to conducting the 0.7g pulse test for recording purposes.
- e. If a retractor fails the 0.7g acceleration pulse test, 10 retests will be conducted on that retractor and recorded in the test report on a supplementary data page as retests.
- f. The level will be increased in 0.1g increments to determine a level at which the retractor functions if no lockup is achieved in the previous item above. This will be recorded on the data sheet.
- g. Lock-up is determined when the webbing belt load tension is measured to be at least 35 N.

## 12. COMPLIANCE TEST EXECUTION....Continued

### D.1 Baseline Tests

Condition three specimens as in paragraph A.1, and then mount the units as shown in Figure 12.

#### **For Automatic Locking Retractors (ALR) Units [S4.3(i), S5.2(i)]**

Extend the webbing fully and mark the 75 percent extension point and at  $\pm 51$  mm. After extending and retracting the webbing fully 10 times, attach a force gage per the figure on the next page and take force readings at the 75 percent +51 mm, 75 percent, and 75 percent -51 mm extension lines. The retraction force will be the AVERAGE of the three values. Now lock the ALR near the 75 percent line and mark the webbing. Unlock the ALR and extend the webbing to the next locking position. Measure and record the webbing travel with respect to the first locking position. The webbing shall not move more than 25 mm between locking positions of the retractor.

## 12. COMPLIANCE TEST EXECUTION....Continued

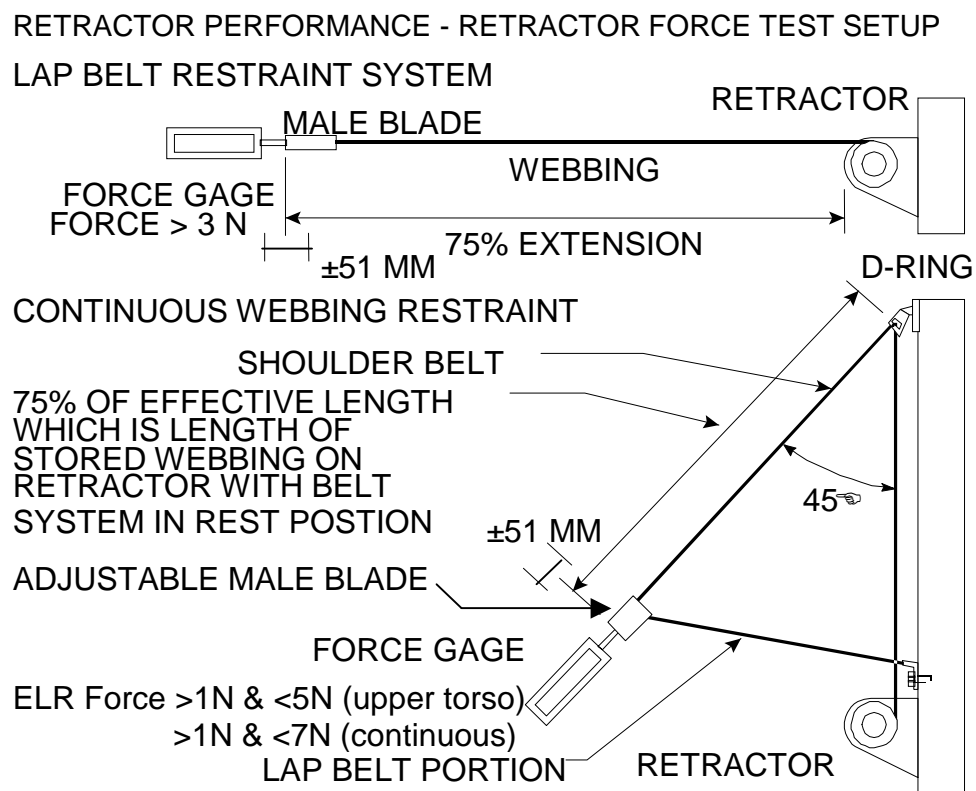


FIGURE 12

**For Emergency Locking Retractors (ELR) Units [S4.3(j), S5.2(j)]**

Extend the webbing fully and mark the 75 percent +51 mm extension point and the 75 percent -51 mm extension point. In the case of continuous webbing systems, the "effective length" (length of stored webbing in vehicle at rest position) will be used to determine the 75 percent point. While the webbing is being retracted (under zero acceleration loading), the LOWEST force of retraction within  $\pm 51$  mm of the 75 percent point shall be determined. This force shall be used to determine compliance with the 45° tilt-lock requirement specified below for Vehicle Sensitive Inertial ELRs. Now mount each of the three ELR units in an acceleration apparatus.

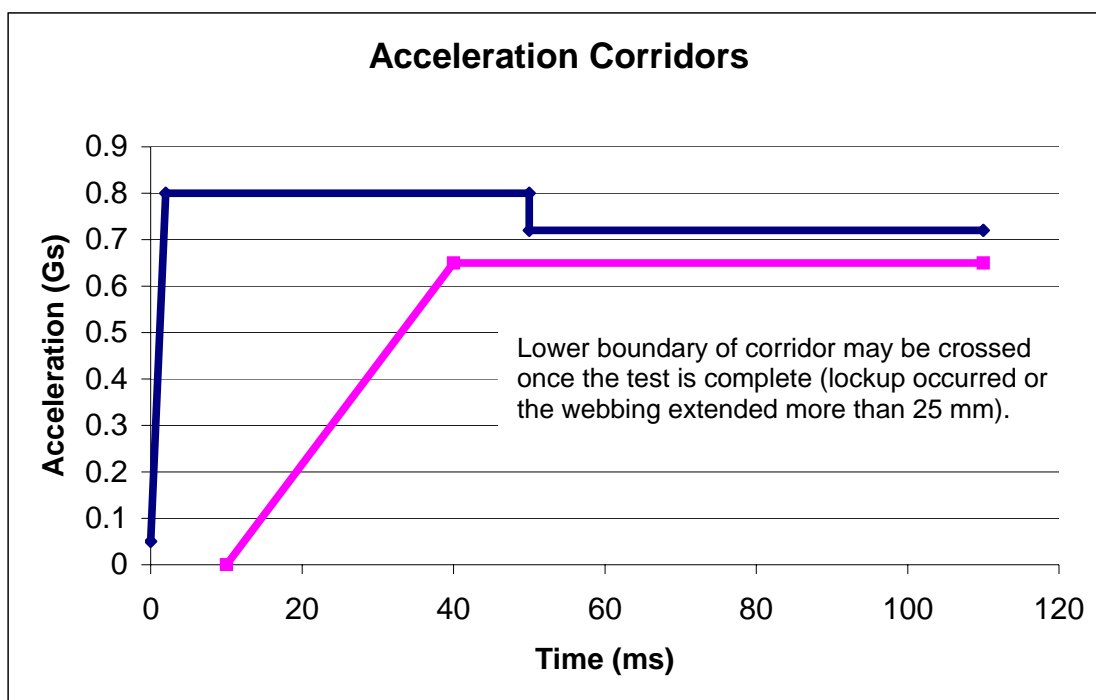


## 12. COMPLIANCE TEST EXECUTION....Continued

### FOR WEBBING SENSITIVE INERTIAL ELRs (retractor sensitive to webbing withdrawal):

Position the webbing at 75 percent extension. Subject the ELR to an acceleration no greater than 0.28g within a period of the first 50 milliseconds (ms) and throughout the test. Measure and record the webbing payout using a displacement transducer. The ELR shall not lockup before the webbing travels 51 mm.

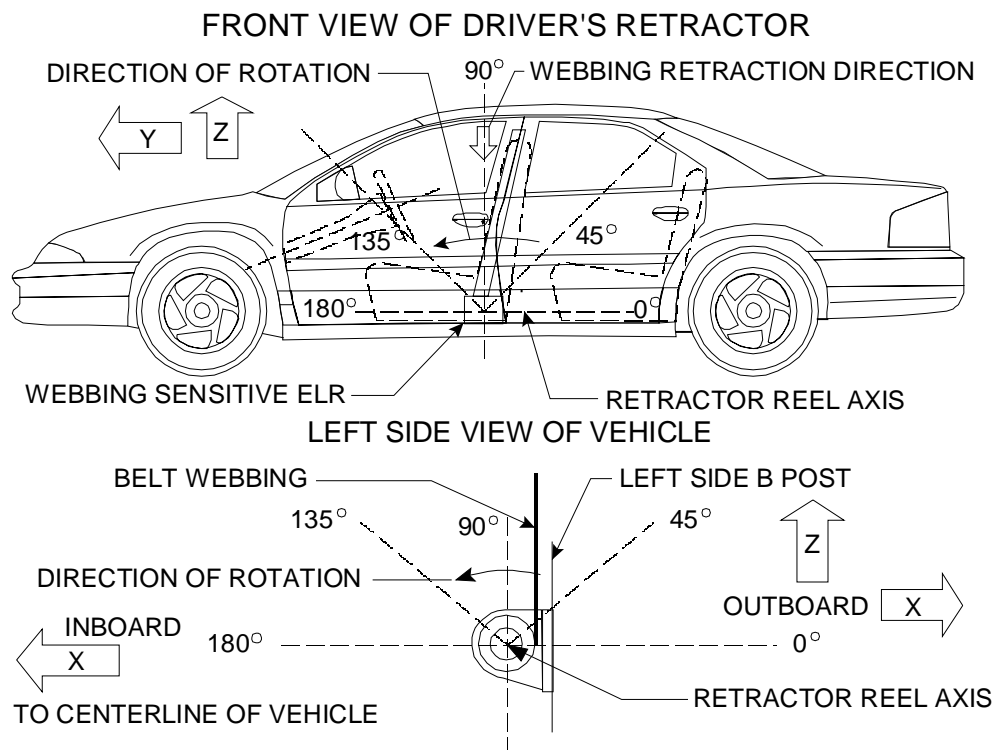
Position the webbing at 75 percent extension. Orient the retractor drum's central axis horizontally  $\pm 0.5$  degrees. Subject the ELR to a 0.7g acceleration pulse that lies within the acceleration time corridor shown in Figure 13 in the direction of webbing retraction. Measure the webbing payout using a displacement transducer. The ELR must lockup before the webbing travel exceeds 25 mm. Reorient the retractor drum's central axis at angles of 45, 90, 135, and 180 degrees to the horizontal plane as shown in Figure 14 and repeat this 0.7g acceleration pulse test. Repeat the webbing sensitive inertial ELR tests for the next two ELRs.



Time (ms)	Acceleration (g) Upper Limit	Acceleration (g) Lower Limit
0	0.05	
2	0.8	
50	0.8	
50	0.72	
10		0
40		0.65

**FIGURE 13**

## 12. COMPLIANCE TEST EXECUTION....Continued



**FIGURE 14**

**FOR VEHICLE SENSITIVE INERTIAL ELRs (retractor sensitive to vehicle acceleration):**

Rotate the retractor to any angle of 15° or less from its orientation in the vehicle and test for lockup under zero acceleration loading. The ELR shall not lock when the retractor is rotated in any direction.

Position the webbing at 75 percent extension. Orient the retractor drum's central axis at the angle at which it is installed in the vehicle  $\pm 0.5$  degrees. Subject the ELR to a 0.7g acceleration pulse that lies within the acceleration time corridor shown in Figure 13 in the horizontal plane in two directions normal to each other. Measure the webbing payout using a displacement transducer. The ELR must lockup before the webbing travel exceeds 25 mm.

Rotate the retractor to any angle of 45° or more from its orientation in the vehicle and test for lockup under zero acceleration loading and with a force greater than the minimum retraction force (i.e. the measured LOWEST force of retraction within  $\pm 51$  mm of the 75 percent extension point) applied to the webbing. The ELR shall lock. If the ELR does not lock, accelerate the retractor in three directions normal to each other while the retractor drum's central axis is oriented at angles of 45, 90, 135, and 180 degrees from the angle at which it is installed in the vehicle and measure webbing payout using a displacement transducer. The ELR must lockup before the webbing travel exceeds 25 mm.

## 12. COMPLIANCE TEST EXECUTION....Continued

Repeat the vehicle sensitive inertial ELR tests for the next two ELRs.

Note: The 0° line means the retractor drum's central axis when the ELR is in the vehicle-installed position.

### D.2 Post Corrosion Cycling Test (2,500 cycles) [S5.2(k)]

Expose the same three retractor units to corrosion conditioning. Suspend units in the salt chamber so that cupping of saline solution is minimized. After 24 hour period, fully extend the webbing and allow to dry at laboratory conditions for one hour. The post corrosion test washing technique for retractors is as follows:

Perform 4 wash cycles with the retractor mounted to a fixture to allow webbing extraction and retraction.

One wash cycle shall consist of the following:

- (a) Totally immerse the retractor assembly in  $38 \pm 5^{\circ}\text{C}$  ( $100 \pm 9^{\circ}\text{F}$ ) water.
- (b) Activate the retractor unit three times by fully extending the webbing from the retractor reel.
- (c) Remove the assembly from the water bath and drain as much water from the retractor as possible while activating the retractor unit by fully extending the webbing from the retractor reel three times.
- (d) Completely change the water after the retractors in a test set, a maximum of three retractors, have completed a wash cycle.

After washing, fully extend the webbing from each unit and allow it to dry at  $23 \pm 2^{\circ}\text{C}$  and 48 - 67% humidity for 24 hours. Examine for ferrous and non-ferrous corrosion. Do not remove retractor unit end covers which might expose the spring or locking mechanism. All cover removal will be performed by the COTR. Extend and retract webbing 25 times and then subject the units to 2,500 cycles while applying a force of 89 N at full webbing extension.

## 12. COMPLIANCE TEST EXECUTION....Continued

### D.3 Post Temperature Cycling Test (2,500 cycles)

Subject the same three specimens to 24 hours of  $80 \pm 1^\circ\text{C}$  ( $176 \pm 1.8^\circ\text{F}$ ) over water and 24 hours of  $80 \pm 1^\circ\text{C}$  ( $176 \pm 1.8^\circ\text{F}$ ) in a dry oven. Extend and retract the webbing 25 times and then subject the units to 2,500 cycles.

### D.4 Dust Test

Install the same three specimens in a dust chamber as shown in Figure 15. The chamber will contain 0.9 kg of coarse grain dust. Extend the webbing to the top of the chamber. Subject each retractor to a five hour test agitating the dust every 20 minutes, for a period of five seconds by using compressed air ( $550 \pm 55$  kPa) entering through an orifice with a diameter of  $1.5 \pm 0.1$  mm. Within 1 or 2 minutes after each agitation of dust, cycle the units 10 times by extending the webbing to the top of the chamber and retracting it. After cycling, return the webbing to the top of the chamber.

Even though the amount of webbing on the retractor reel greatly exceeds the 508 mm cycle space in the dust chamber, an extension and retraction distance of 508 mm will be acceptable since it is not desirable to use a combination of pulleys inside of the dust chamber to gain more webbing extension.

### D.5 Additional Cycling (5,000 or 45,000)

After removing the three specimens from the dust chamber, retract and extend the webbing fully 25 times. Then subject the three specimens to 5,000 cycles at 100 percent extension (or the "effective length" as in the case of continuous webbing systems) with an 89 N load for ALR units, and 45,000 cycles at 50 percent to 100 percent extension with an 89 N load for ELR units. Of the total 50,000 cycles for ELR units (5,000 + 45,000), 10,000 of them will be lockup cycles between 50 percent and 100 percent extension with an 89 N load. The lockup cycles can occur at the beginning or end of the 50,000 cycles or can be performed every fifth cycle depending on the laboratory test setup.

### D.6 Post Test Retractor Characteristics Test [S4.3(k)]

- (a) Retest the same three specimens as in paragraph D.1. The retraction force must be at least 50 percent of that observed in the original baseline test.

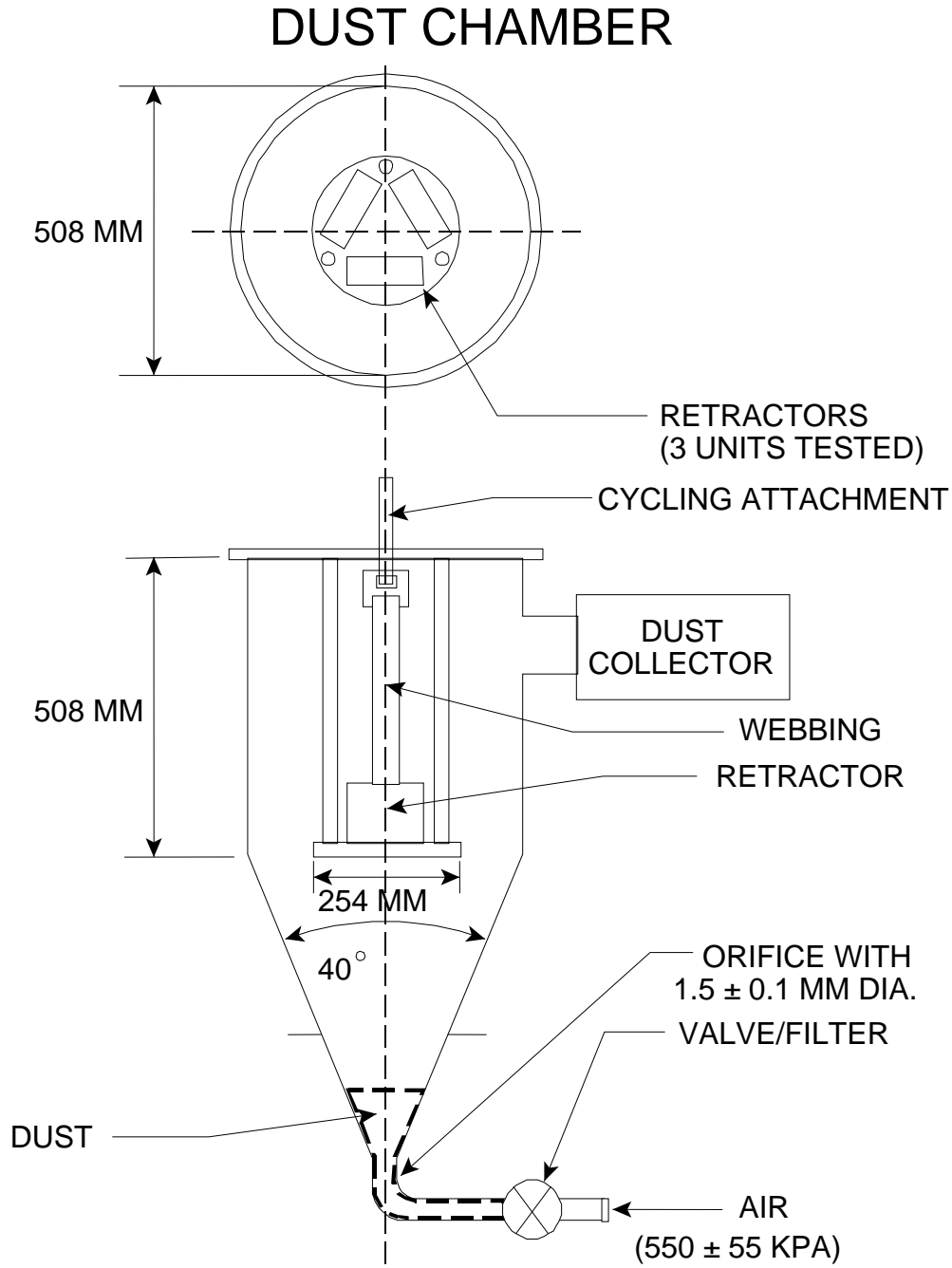


FIGURE 15

**12. COMPLIANCE TEST EXECUTION....Continued****(b) Retraction Force Test**

- (1) The retraction force test will be conducted with the seat belt assembly oriented in such a way as to simulate as close as possible the installation position in the vehicle, including all auxiliary hardware.
- (2) The test will be conducted with the male buckle blade removed from the webbing.

**(c) Angle No-Lock Check (15 degrees)**

Each ELR shall not lock when the retractor is rotated in any direction to any angle of 15° or less from its orientation in the vehicle.

**D.7 Retractor Performance -- Strength Test [S4.3(k)]**

Perform a loop load test on the same three specimens with the retractors locked to simulate a 1295 mm loop or the largest loop possible if less than 1295 mm. Apply a loop load of  $22,241 \pm 222$  N for a pelvic belt retractor, and a loop load of  $13,344 \pm 134$  N for an upper torso belt retractor or the retractor of a continuous webbing system.

**13. POST TEST REQUIREMENTS**

The contractor shall re-verify all instrumentation, check data sheets and photographs, and assure data is recorded in all data blocks on every compliance test data sheet.

Test items which have “passed” compliance requirements, and also any unused test items, shall be stored at no additional cost until receipt of disposition instructions from the COTR after all testing, inspection and acceptance of the Final Test Report.

## 14. REPORTS

### 14.1 MONTHLY STATUS REPORTS

The contractor shall submit a monthly report to the COTR. A sample of this report is shown on pages 6 and 69.

### 14.2 APPARENT NONCOMPLIANCE

Any indication of a test failure shall be communicated by telephone to the COTR within 24 hours with written notification mailed within 48 hours (Saturdays and Sundays 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.

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 COTR's discretion and shall be performed without additional costs to the OVSC.

Test items which have "failed" compliance requirements and any unused test items identical to test items which have "failed" compliance requirements, shall be stored by the contractor for at least 2 years after the test failure at no additional cost, unless directed by the COTR to do otherwise.

In the case of a test failure, all test equipment and instrumentation used during testing must be maintained in the same configuration and condition as during the test, or be capable of being readily returned to that same configuration and condition, until a final determination of "passed" or "failed" has been made by the COTR. Furthermore, in the case of a test failure, any test equipment components which are replaced after each test must be clearly labeled and stored in a clean, dry location and maintained at normal room temperature until a final determination of "passed" or "failed" has been made by the COTR.

The final determination of "passed" or "failed" shall be made by the COTR upon acceptance of the Final Test Report. Therefore, no test items shall be destroyed or disposed of until authorized by the COTR.

### 14.3 FINAL TEST REPORTS

#### 14.3.1 COPIES

In the case of a test failure, SEVEN copies of the Final Test Report shall be submitted to the COTR for acceptance within three weeks of test completion. The Final Test Report format to be used by all contractors can be found in the "Report Section."

Where there has been no indication of a test failure, FOUR copies of each Final Test Report shall be submitted to the COTR within three weeks of test completion. Payment of contractor's invoices for completed compliance tests may be withheld until the Final Test Report is accepted by the COTR. Invoices

shall not be submitted prior to submission of the Final Test Report.

#### **14. REPORTS...Continued**

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.

##### **14.3.2 REQUIREMENTS**

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 below for the purpose of standardization.



## 14. REPORTS...Continued

### 14.3.3 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 209-ABC-20XX-001, where —

209 is the FMVSS tested  
 ABC are the initials for the laboratory  
 20XX 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

SAFETY COMPLIANCE TESTING FOR FMVSS 209  
 Seat Belt Assemblies  
 \* \* \* \* \*  
 World Motors Corporation  
 20XX Ace Super Coupe  
 AutoKraft Seat Belt Assembly P/N 12345678

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

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

**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 6111 (NVS-220)  
 Washington, DC 20590

**14. REPORTS....Continued****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: \_\_\_\_\_

**14. REPORTS....Continued****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**

209-ABC-20XX-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 209 compliance testing of AutoKraft rear outboard Type 2 seat belt assemblies being installed in 20XX Ace Super Coupes, AutoKraft P/N 12345678

**Block 5 -- REPORT DATE**

March 1, 20XX

**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-209-001

**14. REPORTS....Continued**

## Block 9 -- PERFORMING ORGANIZATION NAME AND ADDRESS

ABC Laboratories  
405 Main Street  
Detroit, MI 48070

## Block 10 -- WORK UNIT NUMBER

Leave blank

## Block 11 -- CONTRACT OR GRANT NUMBER

DTNH22-20XX-D-12345

## Block 12 -- SPONSORING AGENCY NAME AND ADDRESS

US Department of Transportation  
National Highway Traffic Safety Administration  
Enforcement  
Office of Vehicle Safety Compliance (NVS-220)  
400 Seventh Street, SW, Room 6111  
Washington, DC 20590

## Block 13 -- TYPE OF REPORT AND PERIOD COVERED

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

## Block 14 -- SPONSORING AGENCY CODE

NVS-220

## Block 15 -- SUPPLEMENTARY NOTES

Leave blank

**14. REPORTS....Continued**

## Block 16 -- ABSTRACT

Performance tests were conducted on AutoKraft rear outboard Type 2 seat belt assemblies being installed in 20XX Ace Super 2-door coupes in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-209-XX. 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 209

## Block 18 -- DISTRIBUTION STATEMENT

Copies of this report are available from --

National Highway Traffic Safety Administration  
Technical Information Services (NPO-405)  
400 Seventh St., SW, Room 2336  
Washington, DC 20590  
FAX No.: 202-493-2833  
Email: [tis@nhtsa.dot.gov](mailto:tis@nhtsa.dot.gov)

## Block 19 -- SECURITY CLASSIFICATION OF REPORT

Unclassified

## Block 20 -- SECURITY CLASSIFICATION OF PAGE

Unclassified

## Block 21 -- NUMBER OF PAGES

Add appropriate number

**14. REPORTS....Continued**

Block 22 -- PRICE

Leave blank

**14.3.4 TABLE OF CONTENTS**

Final test report Table of Contents shall include the following:

Section 1 — Purpose of Compliance Test

Section 2 — Compliance Data Summary

Section 3 — Test Data

Section 4 — Test Equipment List and Calibration Information

Section 5 — Photographs

Section 6 — Notice of Test Failure (if applicable)

**15. DATA SHEETS**DATA SHEET 1  
SUMMARY OF RESULTS

RETRACTOR TYPE: \_\_\_\_\_ - ALR; \_\_\_\_\_ - ELR;      GROUP NO.: \_\_\_\_\_

ELR RETRACTOR SENSITIVITY: \_\_\_\_\_ - WS; \_\_\_\_\_ - VS; \_\_\_\_\_ - DS

MFR DESIGNATED TEST PROCEDURE (IF APPLICABLE): \_\_\_\_\_ - WS; \_\_\_\_\_ - VS

BELT DATE MARKINGS: \_\_\_\_\_

BELT ASSY MFR.: \_\_\_\_\_

BELT ASSY PART/MODEL NO.: \_\_\_\_\_

SELLER/VEHICLE MFR.: \_\_\_\_\_

SELLER/VEH. MFR. PART/MODEL NO.: \_\_\_\_\_

LABELING/MARKING REQUIREMENTS: P = PASSED OR F = FAILED      P or F

SUMMARY OF RESULTS: (P = Passed, F = Failed, NA = Not Applicable)

(Continued on next page)

## 15. DATA SHEETS....Continued

No.	Test Title:	Group Number	A	A	A	B	B	B	C	C	C
		Specimen No.	1	2	3	4	5	6	7	8	9
01	General Requirements										
02	Webbing Width	Pelvic Type ____									
		Upper Torso									
03	Webbing Elongation	Pelvic Type ____									
		Upper Torso									
04	Webbing Breaking Strength	Pelvic Type ____									
		Upper Torso									
05	Resistance to Light	Pelvic Type ____									
		Upper Torso									
06	Resistance to Micro-Organisms	Pelvic Type ____									
		Upper Torso									
07	Webbing Breaking Strength	Pelvic Type ____									
		Upper Torso									

REMARKS:

RECORDED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

APPROVED BY: \_\_\_\_\_



## 15. DATA SHEETS....Continued

No.	Test Title:	Group Number	D	D	D
		Specimen No.	10	11	12
01	General Requirements				
02	Webbing Width	Pelvic Type ____			
		Upper Torso			
03	Webbing Elongation	Pelvic Type ____			
		Upper Torso			
04	Webbing Breaking Strength	Pelvic Type ____			
		Upper Torso			
05	Resistance to Light	Pelvic Type ____			
		Upper Torso			
06	Resistance to Micro-Organisms	Pelvic Type ____			
		Upper Torso			
07	Webbing Breaking Strength	Pelvic Type ____			
		Upper Torso			

REMARKS:

RECORDED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

APPROVED BY: \_\_\_\_\_

## 15. DATA SHEETS....Continued

No.	Test Title:	Group Number	A	A	A	B	B	B	C	C	C
		Specimen No.	1	2	3	4	5	6	7	8	9
08	Web Breaking Strength After Resistance to Abrasion	Pelvic Type ____									
		Upper Torso									
09	Hardware Corrosion Resistance										
10	Hardware Temperature Resistance										
11	Hardware Buckle Latch										
12	Loop Load	Pelvic Type ____									
		Upper Torso									
13	Elongation	Pelvic Type ____									
		Upper Torso									
14	Buckle Release Force	Pelvic Type ____									
		Upper Torso									
15	Common Hardware Load	Pelvic Type ____									
		Upper Torso									
16	Cut Webbing Strength	Pelvic Type ____									
		Upper Torso									
17	Retractor Load	Pelvic Type ____									
		Upper Torso									

RECORDED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

APPROVED BY: \_\_\_\_\_

## 15. DATA SHEETS....Continued

No.	Test Title:	Group Number	A	A	A	B	B	B	C	C	C
		Specimen No.	1	2	3	4	5	6	7	8	9
18	Retractor Performance-- Baseline Characteristics										
19	Post Corrosion Cycling (2,500 cycles)										
20	Post Temperature Cycling (2,500 cycles)										
21	Dust Test										
22	Additional Cycling (5,000 to 45,000 cycles)										
23	Post Test Retractor Performance										
24	Minimum Retractor Strength	Pelvic Type _____									
		Upper Torso									

REMARKS:

RECORDED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

APPROVED BY: \_\_\_\_\_

## 15. DATA SHEETS....Continued

No.	Test Title:	Group Number	D	D	D
		Specimen No.	10	11	12
08	Web Breaking Strength After Resistance to Abrasion	Pelvic Type ____			
		Upper Torso			
09	Hardware Corrosion Resistance				
10	Hardware Temperature Resistance				
11	Hardware Buckle Latch				
12	Loop Load	Pelvic Type ____			
		Upper Torso			
13	Elongation	Pelvic Type ____			
		Upper Torso			
14	Maximum Buckle Release Force	Pelvic Type ____			
		Upper Torso			
15	Common Hardware	Pelvic Type ____			
		Upper Torso			
16	Cut Webbing Minimum Breaking Strength	Pelvic Type ____			
		Upper Torso			
17	Retractor Load	Pelvic Type ____			
		Upper Torso			

REMARKS:

RECORDED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

APPROVED BY: \_\_\_\_\_

## 15. DATA SHEETS....Continued

No.	Test Title:	Group Number	D	D	D
		Specimen No.	10	11	12
18	Retractor Performance--Baseline Characteristics				
19	Post Corrosion Cycling (2,500 cycles)				
20	Post Temperature Cycling (2,500 cycles)				
21	Dust Test				
22	Additional Cycling (5,000 to 45,000 cycles)				
23	Post Test Retractor Performance				
24	Minimum Retractor Strength	Pelvic Type ____			
		Upper Torso			

REMARKS:

RECORDED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

APPROVED BY: \_\_\_\_\_

## 15. DATA SHEETS....Continued

DATA SHEET 2  
TEST RESULTS FOR SPECIMENS 1, 2 & 3

GROUP NO.: \_\_\_\_\_

TEST DATE: \_\_\_\_\_

## GENERAL REQUIREMENTS

(P = Passed, F = Failed, NA = Not Applicable)

		SPECIMEN NUMBER		
		1	2	3
A	Hardware Free of Burrs			
B	Buckle Release Design, etc.			
C	Attachment Hardware - Complete per SAE J800b			
D	Webbing -- End Ravel and Buckle Pull-Out			
E	Permanent Marking (Label Contents)			

REMARKS:

WEBBING WIDTH (Minimum = 46 mm)

TEST DATE: \_\_\_\_\_

(P = Passed, F = Failed, NA = Not Applicable)

		SPECIMEN NUMBER		
		1	2	3
A	Pelvic Belt (Type ____ ) Width (@22 N-T1 /9786±450 N-T2), mm			
B	Upper Torso Belt Width (@9786 N), mm			
C	Pelvic Belt Pass/Fail			
D	Upper Torso Belt Pass/Fail			

REMARKS:

**15. DATA SHEETS....Continued****MAXIMUM WEBBING ELONGATION**

TEST DATE: \_\_\_\_\_

(Pelvic Belt=20%-T1/30%-T2 @ 11,120 N; Upper Torso Belt=40% @ 11,120 N)

(P = Passed, F = Failed, NA = Not Applicable)

		SPECIMEN NUMBER		
		1	2	3
A	Pelvic Belt (Type ____), percent			
B	Upper Torso Belt, percent			
C	Pelvic Belt Pass/Fail			
D	Upper Torso Belt Pass/Fail			

REMARKS:

**MIN. WEBBING BREAKING STRENGTH**

TEST DATE: \_\_\_\_\_

(Pelvic Belt=26,689 N -T1/22,241 N-T2; Upper Torso Belt=17,793 N)

(P = Passed, F = Failed, NA = Not Applicable)

		SPECIMEN NUMBER		
		1	2	3
A	Pelvic Belt (Type ____ ), N			
B	Upper Torso Belt, N			
C	Pelvic Belt Pass/Fail			
D	Upper Torso Belt Pass/Fail			

REMARKS:

RECORDED BY: \_\_\_\_\_

DATE: \_\_\_\_\_

APPROVED BY: \_\_\_\_\_

## 15. DATA SHEETS....Continued

DATA SHEET 3  
TEST RESULTS FOR SPECIMENS 4, 5 & 6

GROUP NO.: \_\_\_\_\_

TEST DATE: \_\_\_\_\_

## WEBBING RESISTANCE TO ABRASION

(Test Method: \_\_\_ Hex Bar OR \_\_\_ Buckle; Spec=2500 cycles)

(P = Passed, F = Failed, NA = Not Applicable)

		SPECIMEN NUMBER		
		4	5	6
A	Buckle Test			
B	Hex Bar Test			
C	Buckle Test Pass/Fail			
D	Hex Bar Test Pass/Fail			

REMARKS:

## BREAK STRENGTH AFTER ABRASION TEST

TEST DATE: \_\_\_\_\_

(Median Pelvic Belt Spec=20,017N-T1/16,681N -T2; Median Upper Torso Belt Spec=13,345N)

(P = Passed, F = Failed, NA = Not Applicable)

		SPECIMEN NUMBER		
		4	5	6
A	Pelvic Belt (Type ___ )Buckle Test, N			
B	Pelvic Belt (Type ___ ) Hex Bar Test, N			
C	Upper Torso Belt Buckle Test, N			
D	Upper Torso Belt Hex Bar Test, N			
E	Pelvic Belt Buckle Test Pass/Fail	_____ median value		
F	Pelvic Belt Hex Bar Test Pass/Fail	_____ median value		
G	Upper Torso Belt Buckle Test Pass/Fail	_____ median value		
H	Upper Torso Belt Hex Bar Test Pass/Fail	_____ median value		

RECORDED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

APPROVED BY: \_\_\_\_\_



## 15. DATA SHEETS....Continued

DATA SHEET 4  
TEST RESULTS FOR SPECIMENS 7, 8 & 9

GROUP NO.: \_\_\_\_\_

TEST DATE: \_\_\_\_\_

CORROSION RESISTANCE

(Spec=24 hr exposure time)

(P = Passed, F = Failed, NA = Not Applicable)

		SPECIMEN NUMBER		
		7	8	9
A	Attachment Hardware Pass/Fail			
B	Other Hardware Pass/Fail			

REMARKS:

TEMPERATURE RESISTANCE

TEST

DATE: \_\_\_\_\_

(Spec=48 hr @ 80°C ± 1°C or 176°F ± 1.8°F)

(P = Passed, F = Failed, NA = Not Applicable)

		SPECIMEN NUMBER		
		7	8	9
A	Parts Deteriorated -- Pass/Fail			

REMARKS:

**15. DATA SHEETS....Continued****BUCKLE LATCH**

TEST DATE: \_\_\_\_\_

(Spec=200 cycles @ 133 N  $\pm$ 13 N; False Latching Spec=22 N max separation force)

(P = Passed, F = Failed, NA = Not Applicable)

		SPECIMEN NUMBER		
		7	8	9
A	Buckle Latch Pass/Fail			
B	False Latching Force, N			
C	False Latching Pass/Fail			

REMARKS:

**ASSEMBLY PERFORMANCE - LOOP LOAD**

TEST DATE: \_\_\_\_\_

(Pelvic Belt Load Spec=22,241 N min.; Upper Torso Belt Load Spec=13,345 N min.)

(P = Passed, F = Failed, NA = Not Applicable)

		SPECIMEN NUMBER		
		7	8	9
A	Pelvic Belt (Type __) Loop Load, N			
B	Upper Torso Belt Loop Load, N			
C	Pelvic Belt Pass/Fail			
D	Upper Torso Belt Pass/Fail			

REMARKS:

**15. DATA SHEETS....Continued**

ASSY PERFORMANCE - MAX ELONGATION      TEST DATE: \_\_\_\_\_  
(Pelvic Belt Spec=356 mm-T1/508 mm-T2@22,241 N; Upper Torso Belt Spec=508 mm  
@13,344 N)  
(P = Passed, F = Failed, NA = Not Applicable)

		SPECIMEN NUMBER		
		7	8	9
A	Pelvic Belt (Type __) Elongation, mm			
B	Upper Torso Belt Elongation, mm			
C	Pelvic Belt Pass/Fail			
D	Upper Torso Belt Pass/Fail			

REMARKS:

ASSEMBLY PERF - MAX BUCKLE REL FORCE      TEST DATE: \_\_\_\_\_  
(Spec=133 N max. @ 667 N loop load)  
(P = Passed, F = Failed, NA = Not Applicable)

		SPECIMEN NUMBER		
		7	8	9
A	Buckle Release Force, N			
B	Buckle Release Force Pass/Fail			

REMARKS:

**15. DATA SHEETS....Continued**

ASSY PERFORMANCE - COMMON HARDWARE  
 (Min. Spec=26,689 N Loop/13,345 N Tensile)  
 (P = Passed, F = Failed, NA = Not Applicable)

TEST DATE: \_\_\_\_\_

		SPECIMEN NUMBER		
		7	8	9
A	Common Hardware Load, N			
B	Common Hardware Pass/Fail			

REMARKS:

ASSY PERF - MINIMUM CUT WEBBING STRENGTH      TEST DATE: \_\_\_\_\_  
 (Pelvic Belt Load Spec=18,683 N-T1/15,569 N-T2; Upper Torso Belt Load Spec=12,455 N)  
 (P = Passed, F = Failed, NA = Not Applicable)

		SPECIMEN NUMBER		
		7	8	9
A	Pelvic Belt (Type __) Loop Load, N			
B	Upper Torso Belt Loop Load, N			
C	Pelvic Belt Pass/Fail			
D	Upper Torso Belt Pass/Fail			

REMARKS:

RECORDED BY \_\_\_\_\_ DATE: \_\_\_\_\_

APPROVED BY: \_\_\_\_\_

## 15. DATA SHEETS....Continued

ASSY PERF – RETRACTOR STITCH LOAD

TEST DATE: \_\_\_\_\_

(Pelvic Belt Load Spec=11,120N Tensile,

Upper Torso Belt / Continuous Webbing System Load Spec=6,672 N Tensile)

(P = Passed, F = Failed, NA = Not Applicable)

		SPECIMEN NUMBER		
		7	8	9
A	Pelvic Belt Load, N			
B	Upper Torso Belt Load, N			

REMARKS:

RECORDED BY \_\_\_\_\_ DATE: \_\_\_\_\_

APPROVED BY: \_\_\_\_\_

## 15. DATA SHEETS....Continued

DATA SHEET 5  
TEST RESULTS FOR SPECIMENS 10, 11 & 12

GROUP NO.: \_\_\_\_\_ TEST DATE: \_\_\_\_\_

## RETRACTOR PERFORMANCE - BASELINE CHARACTERISTICS

(Belt Force Spec: Pelvic = 3 N min.; Upper Torso = 1 N to 5 N; Continuous = 1 N to 7 N;  
Webbing Travel Before Lockup Spec=25 mm max.)

(P = Passed, F = Failed, NA = Not Applicable)

		SPECIMEN NUMBER		
		10	11	12
A	Avg Force (ALR) Between 75%+51 mm & 75%-51 mm, N			
B	Lowest Retraction Force (ELR), N			
C	Webbing Travel Before Lockup (ALR), mm			
D	Webbing Travel Before Lockup (Web Sensitive ELR)			
	Retractor Accel to 2.8 m/s <sup>2</sup> (0.28G) @ 0° Angle, mm			
	Retractor Accel within 0.7 g pulse corridor @ horizontal position, mm			
	Retractor Accel within 0.7 g pulse corridor @ 45° Angle, mm			
	Retractor Accel within 0.7 g pulse corridor @ 90° Angle, mm			
	Retractor Accel within 0.7 g pulse corridor @ 135° Angle, mm			
	Retractor Accel within 0.7 g pulse corridor @ 180° Angle, mm			
E	Webbing Travel Before Lockup (Veh Sensitive ELR) 7.2 m/s <sup>2</sup> (0.72G) in 2 Directions - Secure Webbing & Accelerate Retractor, mm			
	X (Parallel to Vehicle Centerline), mm			
	Y (90° to Vehicle Centerline), mm			
F	15° Angle, No Lock Check for Veh Sensitive ELR			
G	45° Tilt-Lock Check for Veh Sensitive ELR (Y/N) If N, accelerate in 3 directions at multiple angles (use supplemental datasheet)			
	Pelvic Belt (Type __) Retractor Pass/Fail			
	Upper Torso Belt Retractor Pass/Fail			

**NOTE:** Web Sensitive ELRs cannot lockup at or below 2.8 m/s<sup>2</sup> (0.28G) for first 51 mm of webbing.

REMARKS:

**15. DATA SHEETS....Continued**

RETR PERF - POST CORROSION CYCLING (2500) TEST DATE: \_\_\_\_\_  
 (Spec=24 hr salt spray, 1 hr dry, 4 wash cycles- 38°C (100°F) water & 25 manual cycles)  
 (P = Passed, F = Failed, NA = Not Applicable)

		SPECIMEN NUMBER		
		10	11	12
A	Precycling Retractor Performance Pass/Fail			
B	2,500 Automatic Cycles Pass/Fail			

REMARKS:

RETR PERF - POST TEMPERATURE CYCLING (2500) TEST DATE: \_\_\_\_\_  
 (Spec=48 hr temp conditioning period of 24 hr @ 80°C ± 1°C or 176°F ± 1.8°F over water followed by 24 hr. @ 80°C ± 1°C or 176°F ± 1.8°F dry oven)  
 (P = Passed, F = Failed, NA = Not Applicable)

		SPECIMEN NUMBER		
		10	11	12
A	25 Manual Cycles Pass/Fail			
B	2,500 Automatic Cycles Pass/Fail			

REMARKS:

RETRACTOR PERFORMANCE - DUST TEST TEST DATE: \_\_\_\_\_  
 (Spec=5 hr cond period)  
 (P = Passed, F = Failed, NA = Not Applicable)

		SPECIMEN NUMBER		
		10	11	12
A	Pass/Fail			

REMARKS:

### 15. DATA SHEETS....Continued

RETRACTOR PERFORMANCE - CYCLING  
(P = Passed, F = Failed, NA = Not Applicable)

TEST DATE: \_\_\_\_\_

		SPECIMEN NUMBER		
		10	11	12
A	Retractor Performance - 25 manual cycles - Pass/Fail			
B	FOR ALR - 5,000 cycles @ 100% extension and 89 N load - Pass/Fail			
C	FOR ELR - 35,000 cycles @ 50% extension and 89 N load - Pass/Fail			
D	FOR ELR - 10,000 lockup cycles @ 50% extension and 89 N load - Pass/Fail			

RETR PERF - POST TEST CHARACTERISTICS  
(Actual Values)  
(P = Passed, F = Failed, NA = Not Applicable)

TEST DATE: \_\_\_\_\_

		SPECIMEN NUMBER		
		10	11	12
A	Avg Force (ALR) Between 75%+51 mm & 75%-51 mm, N			
B	Lowest Retraction Force (ELR), N			
C	Percent of BASELINE (minimum = 50%), percent			
D	Webbing Travel Before Lockup (ALR), mm			
E	Webbing Travel Before Lockup (Web Sensitive ELR)			
	Retractor Accel to 2.8 m/s <sup>2</sup> (0.28G) @ 0° Angle, mm			
	Retractor Accel within 0.7 g pulse corridor @ horizontal position, mm			
	Retractor Accel within 0.7 g pulse corridor @ 45° Angle, mm			
	Retractor Accel within 0.7 g pulse corridor @ 90° Angle, mm			
	Retractor Accel within 0.7 g pulse corridor @ 135° Angle, mm			
	Retractor Accel within 0.7 g pulse corridor @ 180° Angle, mm			



**15. DATA SHEETS....Continued**

(RETR PERF - POST TEST CHARACTERISTICS Table Continued)

		SPECIMEN NUMBER		
		10	11	12
G	Webbing Travel Before Lockup (Veh Sensitive ELR) within 0.7 g pulse corridor in 2 directions - Secure Webbing & Accelerate Retractor, mm			
	X (Parallel to Vehicle Centerline), mm			
	Y (90° to Vehicle Centerline), mm			
H	15° Angle, No Lock Check for Veh Sensitive ELR			
	Pelvic Belt (Type __) Retractor Pass/Fail			
	Upper Torso Belt Retractor Pass/Fail			

REMARKS:

RETR PERF - MIN STRENGTH

TEST DATE: \_\_\_\_\_

(Pelvic Belt Spec=22,241 N-Loop OR 11,120 N-Tensile; Upper Torso Belt/Continuous Webbing System Spec=13,344N-Loop OR 6,672 N-Tensile)

(P = Passed, F = Failed, NA = Not Applicable)

		SPECIMEN NUMBER		
		10	11	12
A	Pelvic Belt (Type __) Retractor Performance, N			
B	Upper Torso Belt/Contin. Web. Sys. Retr Perf, N			
C	Pelvic Belt Retractor Pass/Fail			
D	Upper Torso Belt/Contin. Web. Sys. Retr. Pass/Fail			

REMARKS:

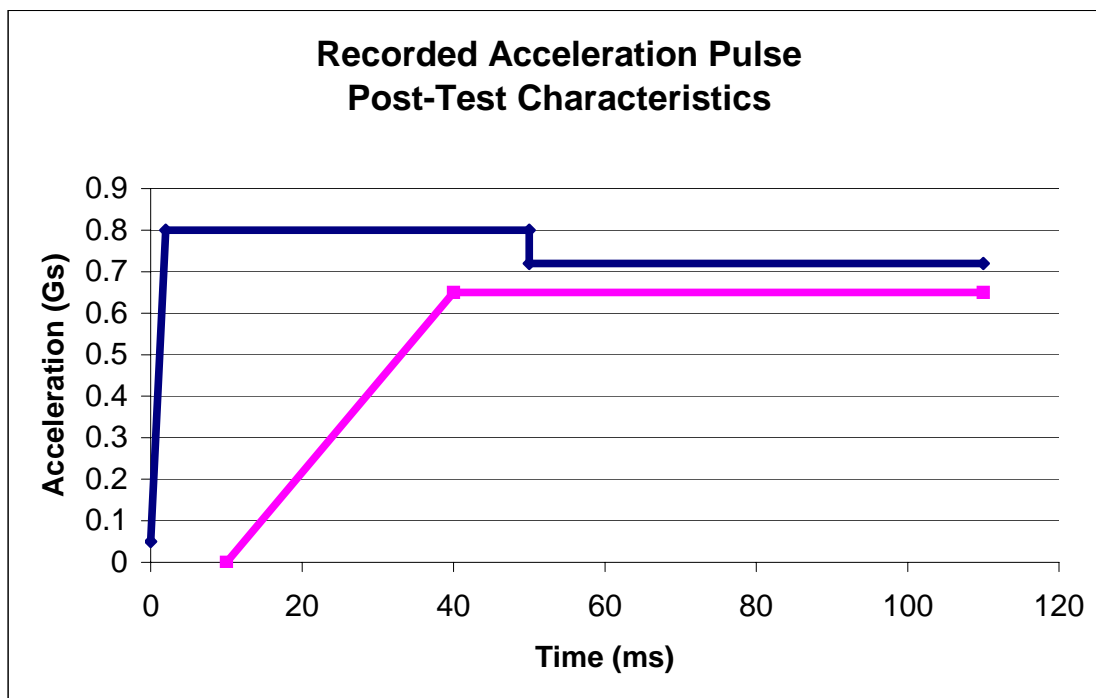
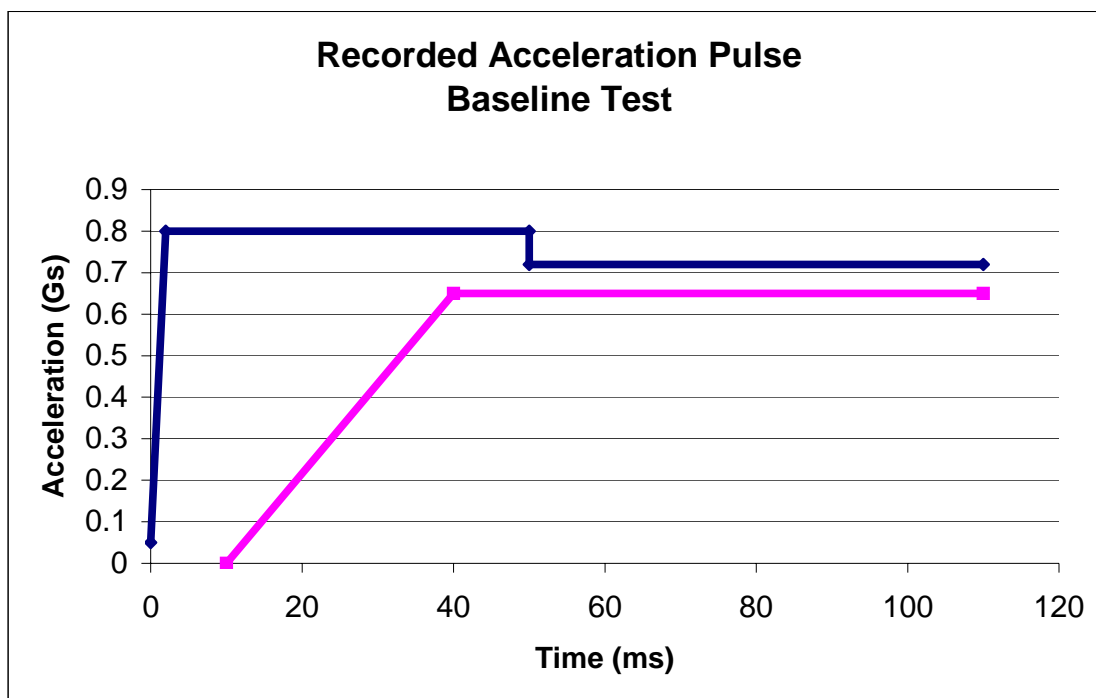
RECORDED BY: \_\_\_\_\_

DATE: \_\_\_\_\_

APPROVED BY: \_\_\_\_\_

**15. DATA SHEETS....Continued**

The acceleration pulse trace for recording purposes plotted below against the required acceleration pulse corridor for the retractor performance baseline test, and for the retractor performance characteristics post-environmental and cycle testing.



REMARKS:

RECORDED BY: \_\_\_\_\_

DATE: \_\_\_\_\_

APPROVED BY: \_\_\_\_\_

16. FORMS

LABORATORY NOTICE OF TEST FAILURE TO OVSC

FMVSS: 209 TEST DATE: \_\_\_\_\_

LABORATORY: \_\_\_\_\_

CONTRACT NO.: \_\_\_\_\_; DELV. ORDER NO.: \_\_\_\_\_

LABORATORY PROJECT ENGINEER'S NAME: \_\_\_\_\_

TEST SPECIMEN DESCRIPTION: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

MFR. PART NO.: \_\_\_\_\_; MFR.: \_\_\_\_\_

SELLER PART NO.: \_\_\_\_\_; SELLER: \_\_\_\_\_

TEST FAILURE DESCRIPTION: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

FMVSS REQUIREMENT, PARAGRAPH § \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

NOTIFICATION TO NHTSA (COTR): \_\_\_\_\_

DATE: \_\_\_\_\_

BY: \_\_\_\_\_

REMARKS:

## 16. FORMS....Continued

## FMVSS 209 MONTHLY STATUS REPORT

Contract No.: \_\_\_\_\_

Date: \_\_\_\_\_

## A. SUMMARY TABLE

GRP NO.	VEH MFR	VEHICLE MODEL	SEAT BELT MFR	BELT MODEL NO.	DATE RECVD	TEST START DATE	TEST COMPL. DATE	DATE REPT MAILED	COMMENTS
001									
002									
003									
004									
005									
006									
007									
008									
009									
010									
011									
etc.									

B. Tests scheduled for next reporting period (assy. model(s) scheduled for testing):

C. Description of any problems and/or delays in testing:

D. Description of specific actions taken to correct problems and/or delays: