Technical Report Documentation Page

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1151

2. GOVERNMENT ACCESSION No.

3. RECIPIENT'S CATALOG No.

4. TITLE AND SUBTITLE
Seat Belt Tests Type 2 Seat Belt Assembly Non-Locking Retractor

5. REPORT DATE
April 1972

6. PERFORMING ORGANIZATION

7. AUTHOR(S)
Merle Wilson

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1151

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13. TYPE OF REPORT & PERIOD COVERED

12. SPONSORING AGENCY NAME AND ADDRESS

14. SPONSORING AGENCY CODE

15. SUPPLEMENTARY NOTES

16. ABSTRACT

This is a Standards Conformity Evaluation Report. This report contains the results of tests performed to determine compliance with the applicable requirements of Federal Vehicle Safety Standard No. 209.

17. KEYWORDS

18. No. OF PAGES:
40

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November 2005, Division of Research and Innovation

882

SEAT BELT TESTS
TYPE 2 SEAT BELT ASSEMBLY
NON-LOCKING RETRACTOR
by Merle Wilson

72-56

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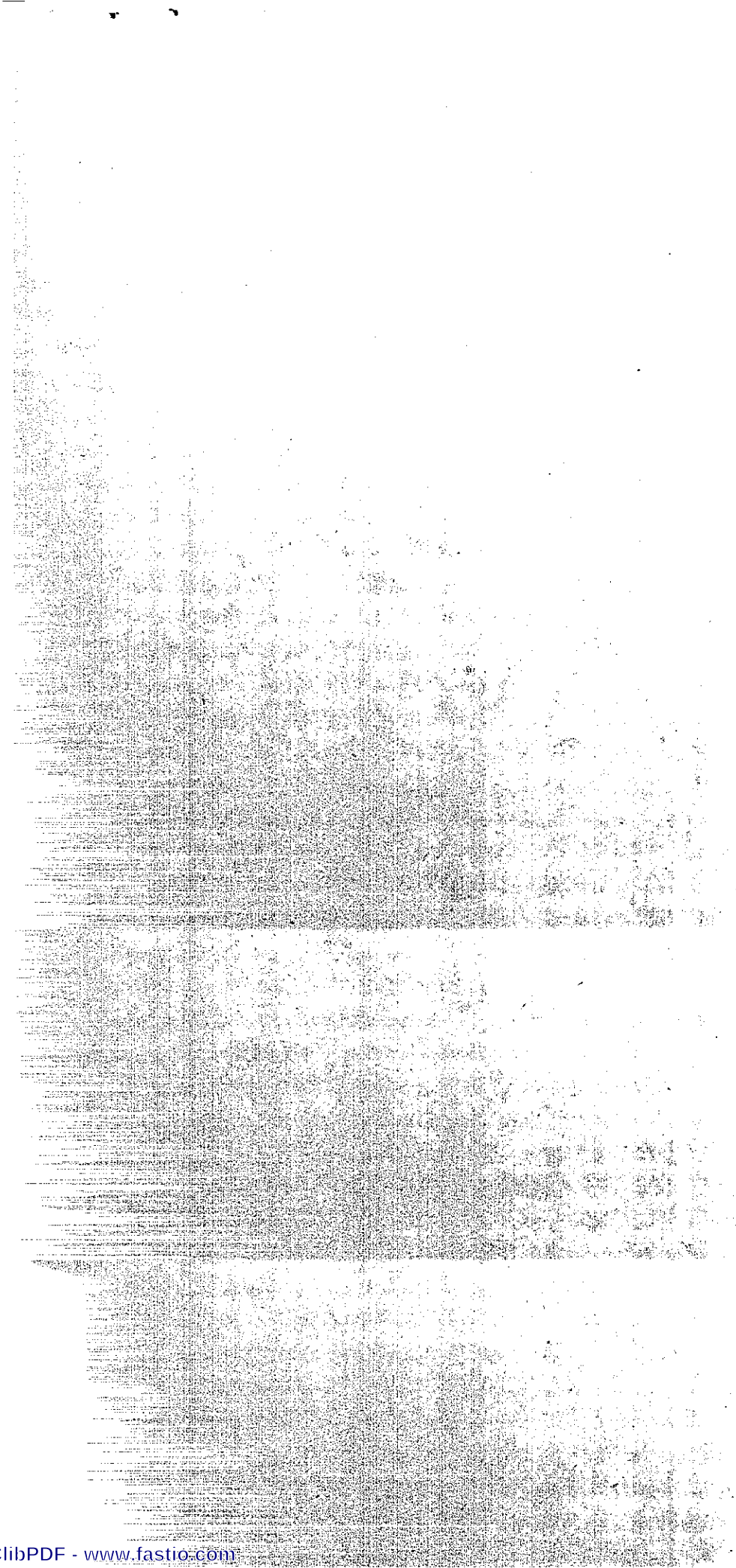

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Test Authorization Date: May 21, 1971

Report Date: April 6, 1972

Test Report No. 1151

Name of Device: REPA No. 01.90211.1
Type 2 Seat Belt Assembly.
Non-locking Retractor.

Submitted by: California Highway Patrol

SUMMARY OF TEST

Seat Belt Tests: See Data Sheets for Individual Tests

This is a Standards Conformity Evaluation Report.

This report contains the results of tests performed to determine compliance with the applicable requirements of Federal Vehicle Safety Standard No. 209.

JOHN L. BEATON
Materials and Research Engineer

By Merle E. Wilson

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Test No. 1151

Name of Device: Volkswagen-Repa No. 01-90211.1
Type 2 Seat Belt Assembly
Non-locking Retractor.

NOTES: FOR CHP ONLY

These belts failed to meet the requirements of the following sections:

S4.1 Requirements for Complete Assembly
(L) Installation instructions not supplied.
(M) Usage and maintenance instructions not supplied.

S4.3 Requirements for Hardware
(c)2 Attachment hardware designed to receive the ends of two seat belt assemblies - All three devices failed as noted in Note 3, Page 18. These may or may not be considered as failures.

Report Fee: $ 540.00 plus overhead assessment of 8.39%.

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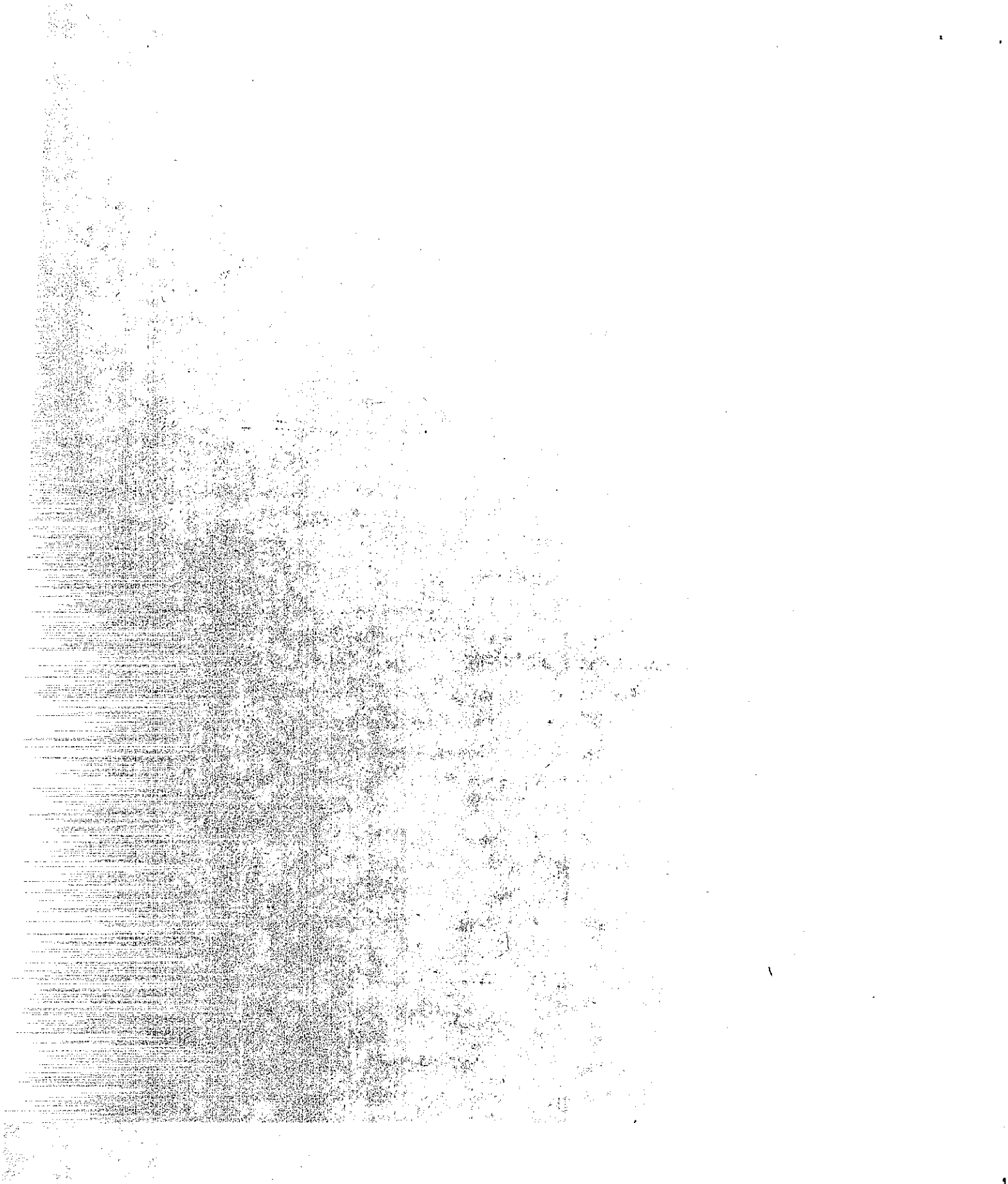

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TESTS AND INSPECTION

FM VSS Section Number	Specifications	Results of Test and Inspection
S4.	Requirements for complete assembly.	
S4.1 (a)	Single occupancy	Satisfactory
(b)	Pelvic restraint	Satisfactory
(c)	Upper torso restraint	Satisfactory
(d)	Hardware - Free from burrs and sharp edges	Satisfactory
(e)	Release Type 1 or 2 - Accessibile for easy and rapid release Type 3 - Readily accessible to an adult for easy and rapid release	Satisfactory
(f)	Attachment hardware - Includes all hardware for installation in accordance with SAE J800b	Satisfactory
(g)	Adjustment - Capable of snug adjustment	Satisfactory
(h)	Seat back retainer - Retainer is included for Type 3 belts used on hinged seats.	N/A
(i)	Webbing - Ends are protected or treated to prevent raveling and cannot pull out of adjustment hardware	Satisfactory
(j)	Strap - Meets requirements of S4.2, S4.3 and S4.4 if applicable.	N/A
(k)	Marking - permanently and legibly marked or labeled with year of manufacture, model and name or trademark of manufacturer.	Satisfactory
(l)	Installation instructions - Shall include applicable items in SAE J800b	None supplied
(m)	Usage and maintenance instructions	None supplied
(n)	Workmanship	Satisfactory

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Name of Device: Volkswagen - Repa No. 01.90211.1 Type 2 Seat Belt Assembly. Non-Locking Retractor.

Devices Received: Nine devices, May 21, 1972

Description: Refer to photographs.

Buckle: Frame- duplex 0.101" steel straps, in angular shape to conform to drive shaft tunnel and 0.102" flat steel strap. The assembly receives either or both driver's or passenger's seat belts. Black plastic cover. Latch - 0.193" steel wire, bent and inserted into the locking dog, with nylon housing and wire spring.

Locking Dog- 0.552" x 0.88" steel rod.

Tongue: Frame and tongue - 0.100" stamped steel with black plastic cover.

Sliding webbing grip - 0.158" stamped steel, looped for pelvic and upper torso webbing and includes a spring loaded bar to allow length adjustments.

Webbing: Weave - Twill
Material - Nylon
Color - Black
Stitching- Modified "W"

Maximum Length:
Pelvic Belt - 61" overall
Shoulder Belt - 51"

Mounting Hardware: Bracket Inboard Side - See Buckle-Frame above.
Bracket Outboard Side Lap Bolt-0.121" stamped steel.
Bracket Outboard Side Shoulder Belt - 0.121" stamped steel
Bolts (2) Outboard Side - Steel 7/16"-20x1" with 1/4" shoulder.
Bolts (2) Inboard Side, Duplex Buckle - steel 7/16"-20 x 3/4" without shoulder

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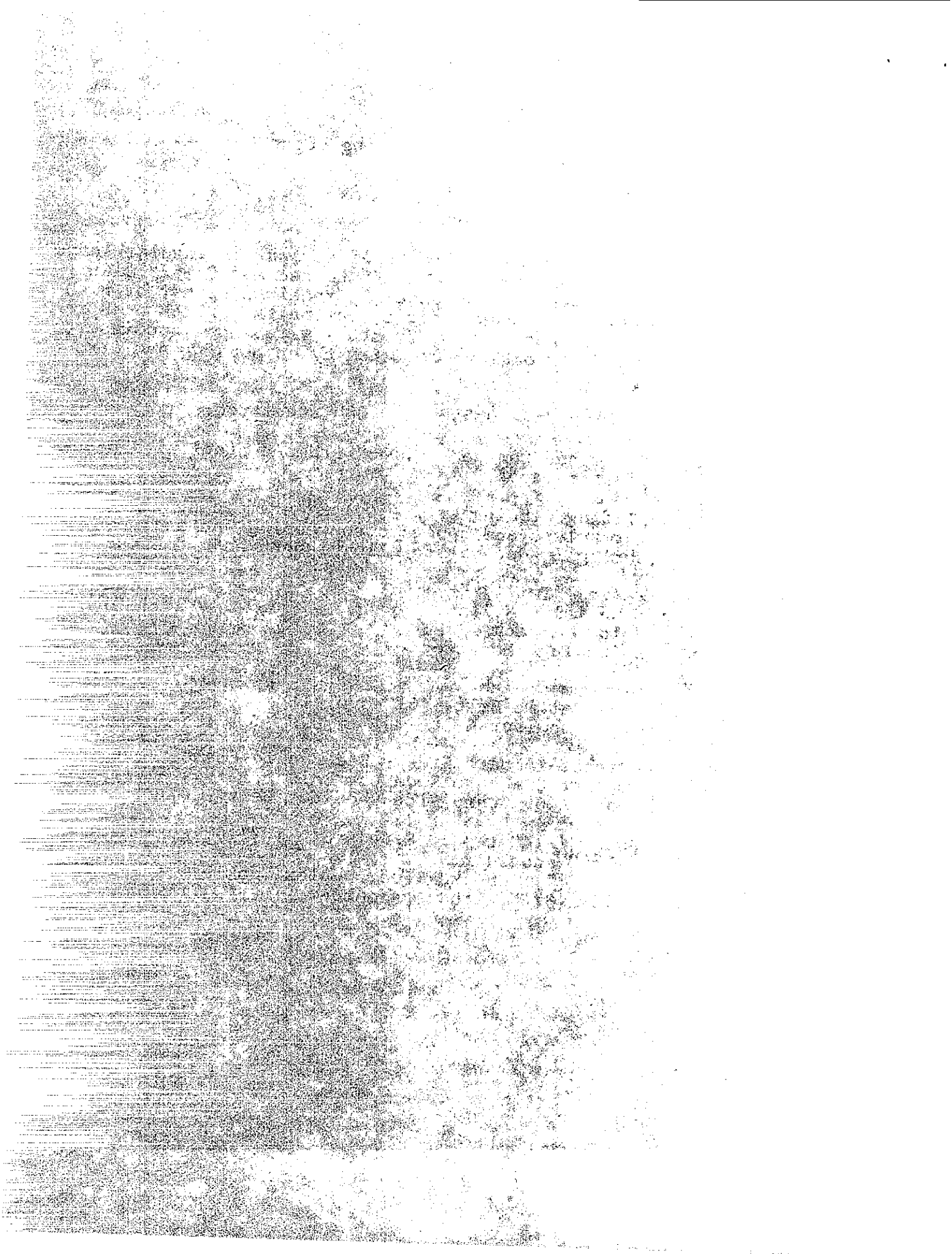

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Name of Device: Volkswagen-Repa No. 01.90211.1 (continued)

Marks of Identification:

Printed on a 1-3/8" by 2 1/4" cloth label sewn to shoulder belt webbing:

"VW"	Trademark in 1/4" diameter circle.
"113 857 721A"	In 1/8" numerals and letter.
"REPA 01.90211.1"	In 1/8" letters and numerals.
"MVS STD 209"	In 1/8" letters and numerals.
"1970"	In 1/8" numerals.
"MADE IN GERMANY"	In 1/16" letters.

Stamped on Tongue

"REPA"	In 3/32" letters.
"01.00076.0	In 3/32" numerals.
"1970"	In 3/32" numerals.

Stamped on Black Plastic Trim Cover of Tongue:

"VW"	Trademark in 15/32" diameter circle.
"REPA 01.00087.0"	In 3/32" letters and numerals.

Stamped on the drivers side inboard attachment bracket:

"REPA"	In 3/32" letters.
"01.0033.0"	In 3/32" numerals.
"1970"	In 3/32" numerals.

Stamped on the passengers side inboard attachment bracket:

"REPA"	In 3/32" letters.
"01.0034.0"	In 3/32" numerals.
"1970"	In 3/32" numerals.

Stamped on each half of the Black Plastic Trim Cover of the Buckle:

"VW"	Trademark in 5/8" diameter circle.
"311 857 753"	In 3/32" numerals.
"REPA 01.9003.0"	In 3/32" letters and numerals.

Stamped on each of the outboard attachment brackets, Lap Belt Side and Shoulder Belt Side:

"REPA 01.00280"	In 1/16" letters and numerals
"VW"	Trademark in 3/16" diameter circle.
"111 857 775A"	In 1/16" numerals and letter.

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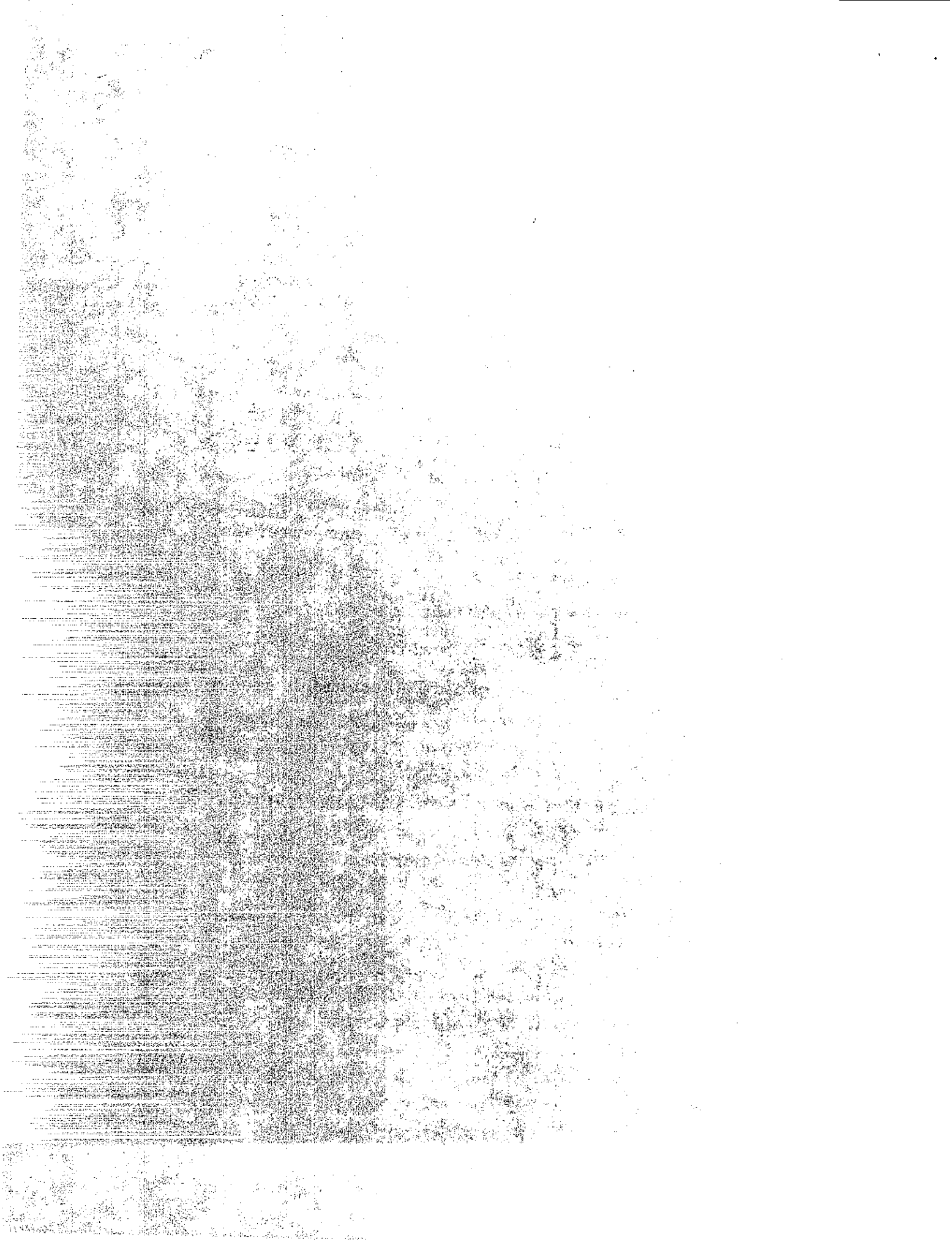

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Name of Device: VOLKSWAGEN- REPA NO.01.90211.1

Marks of Identification: (continued)

Raised on white plastic retractor spring housing:

"SPANNEN DURCH 8-MALIGE UMDREHUNG"	In 1/8" and 1/16" upper and lower case letters
"WIND SIX TO EIGHT TIMES"	In 1/8" and 1/16" upper and lower case letters.

Raised on white plastic webbing retainer of retractor housing:

"MADE IN GERMANY"	In 1/16" letters
"GHE"	Trademark in 1/16" letters.

Raised on the top of all bolts:

"REPA"	In 3/32" letters
" "	In 3/32" high figure
"8.8"	In 3/32" numerals

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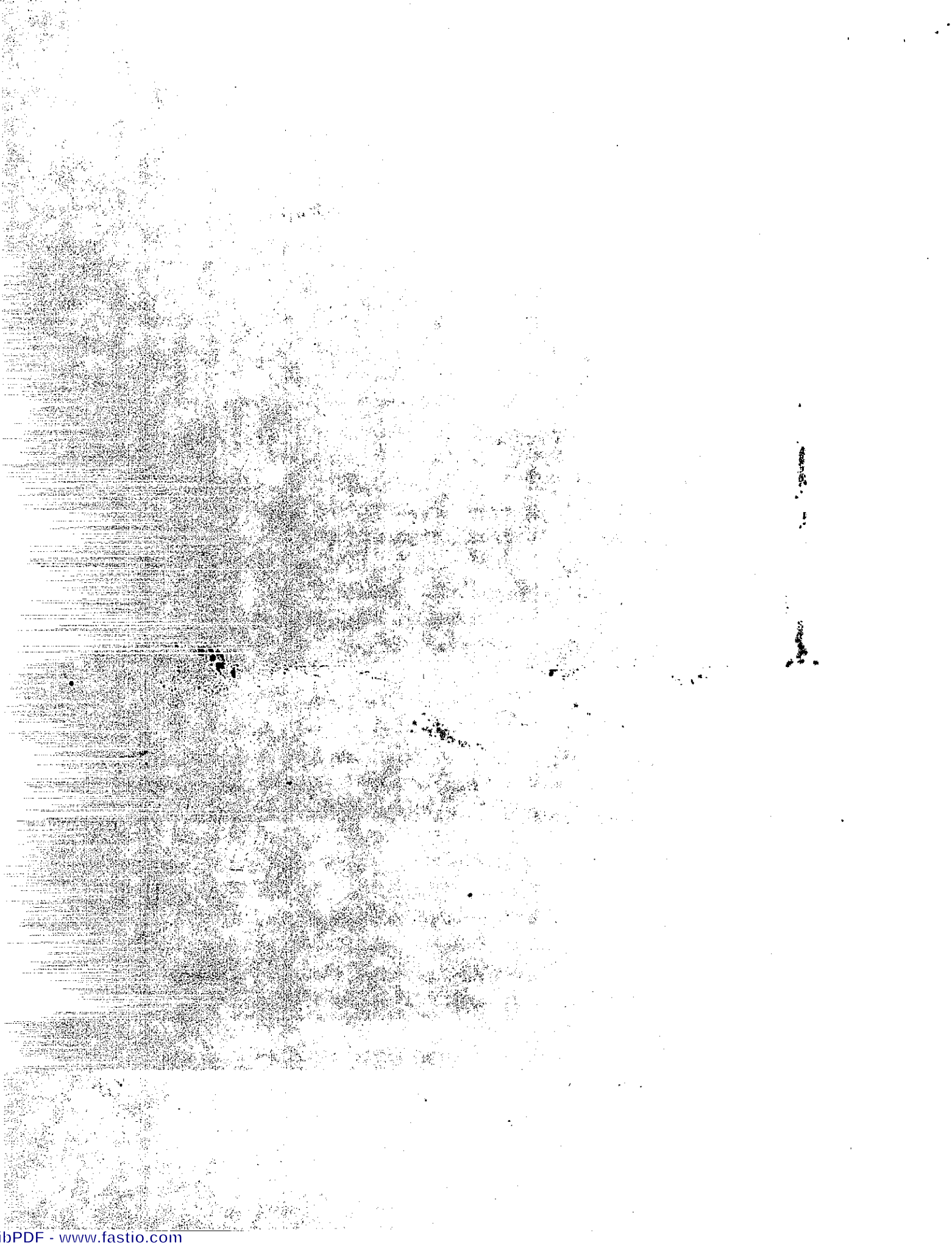

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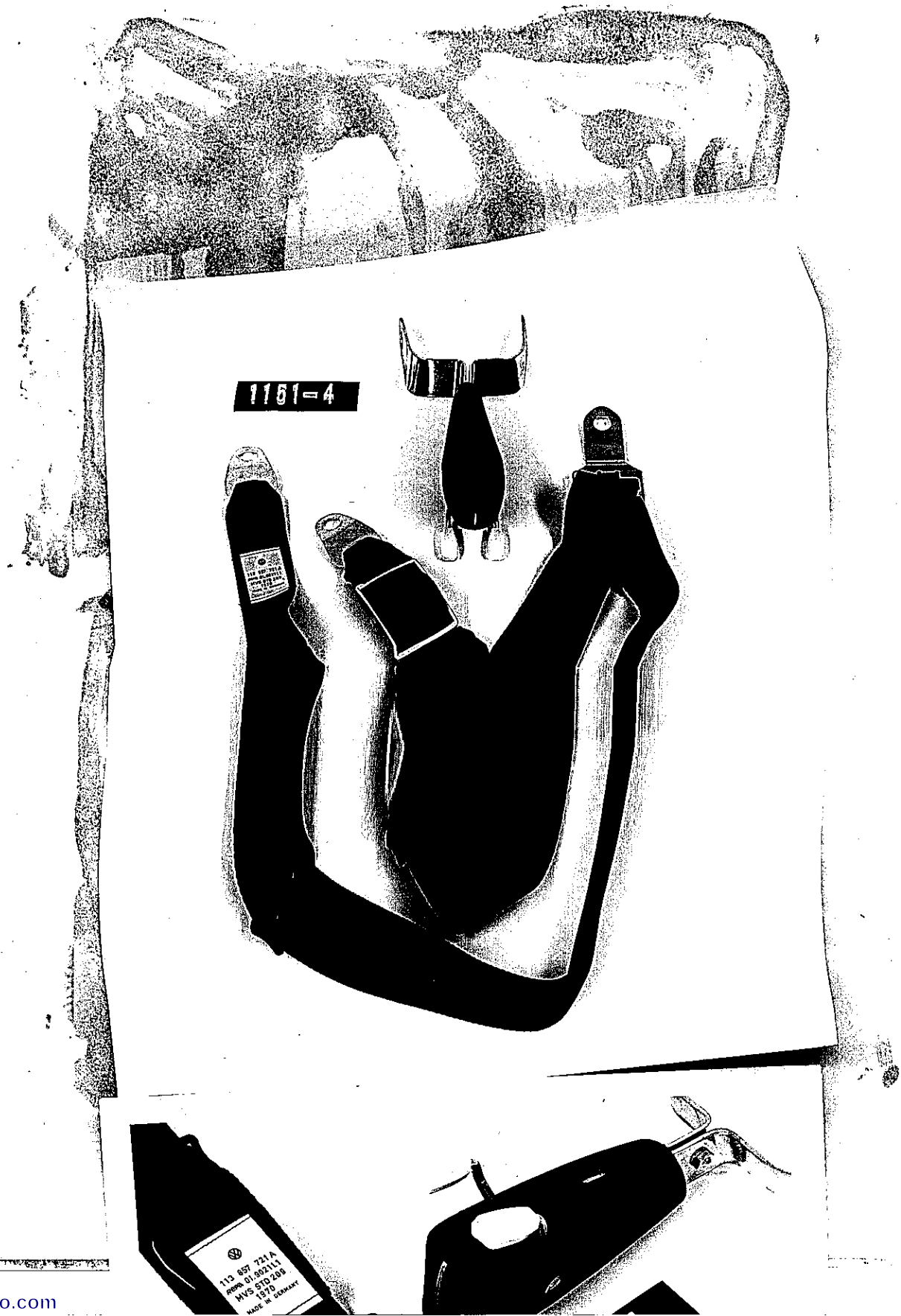
Photographs

Name of Device: VOLKSWAGEN-REPA No. 01.90211.1
Type 2 Seat Belt Assembly - Non-locking Retractor.



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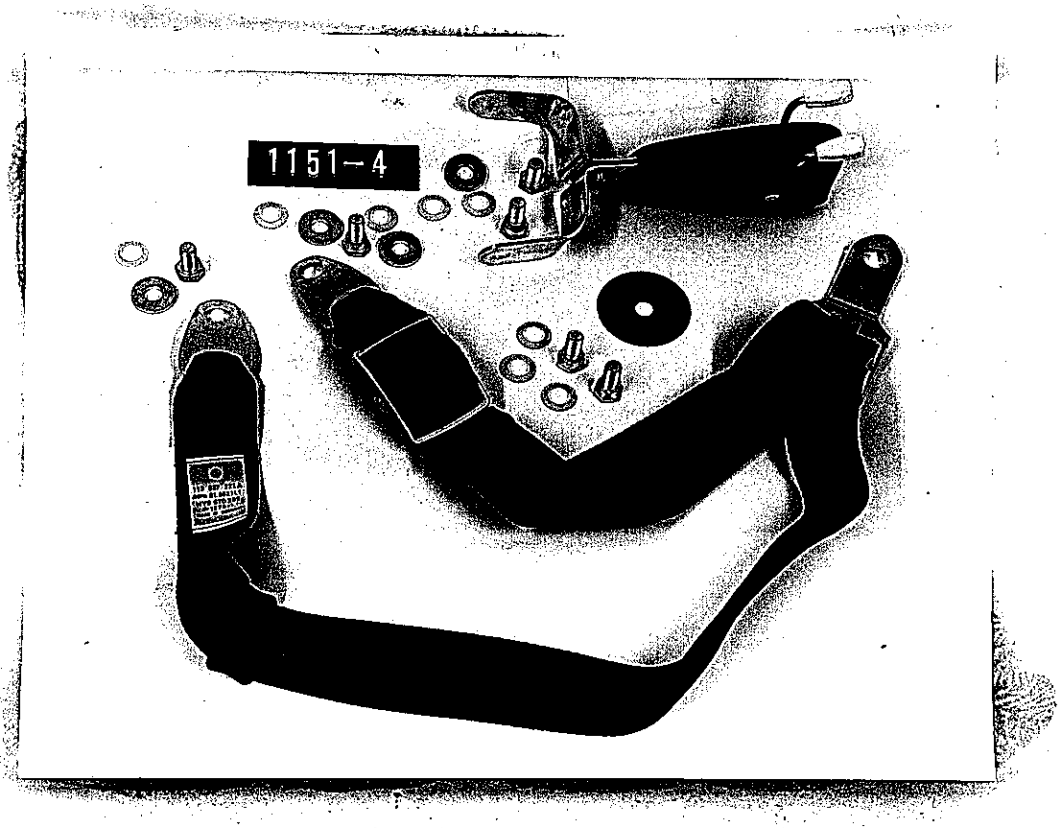
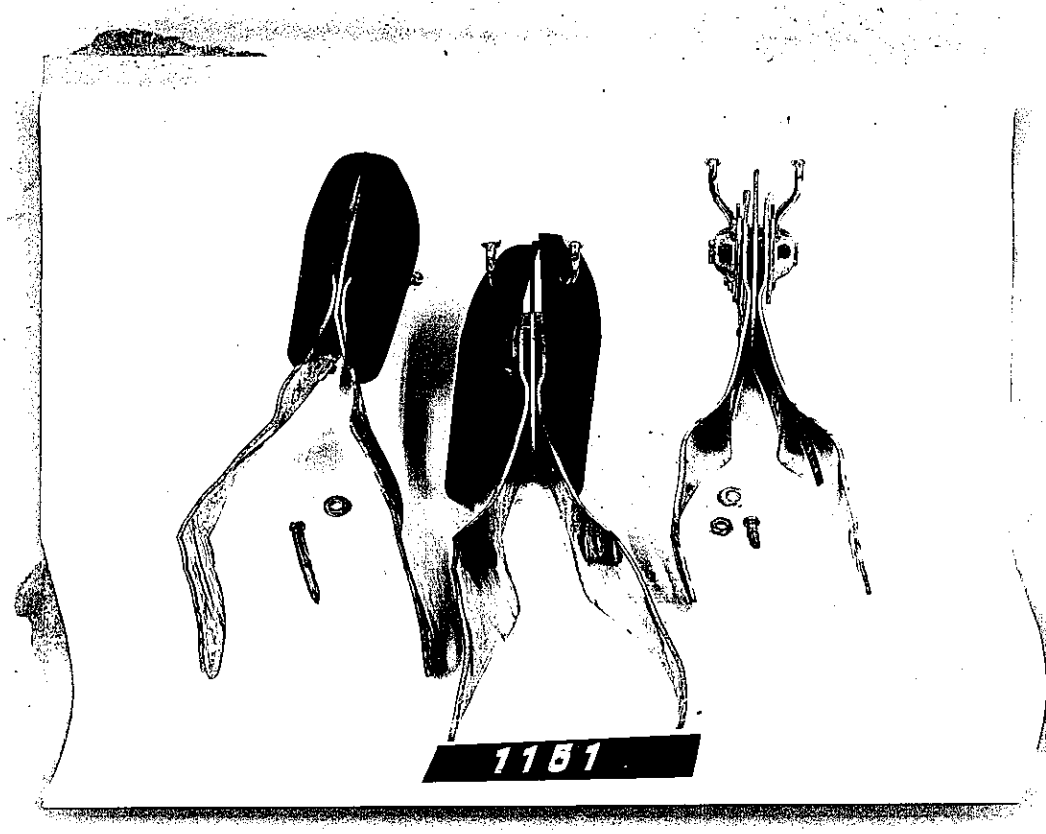
Photographs (continued)

Name of Device: VOLKSWAGEN-REPA No. 01.90211.1.





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Test and Inspection - Cont'd. Test No. 1151

Requirements for Webbing

S4.2

(a) Width - shall not be less than 1.8 inches for Type 1 or 2 and 0.9 inches for Type 3. * See Note 1, Page 18.

Belt No.	Location	Width (Inches)	
B- 1	Pelvic	2.05	
	Upper Torso	N/A	*
B- 2	Pelvic	2.00	
	Upper Torso	N/A	*
B- 3	Pelvic	2.05	
	Upper Torso	N/A	*

(b) Breaking Strength

Type 1 - Min. 6000 lbs.

Belt No.	Breaking Strength (Lbs)	
B- N/A		
B- N/A		
B- N/A		Median N/A

Type 2 - Pelvic - Min. 5000 lbs. (Except that a pelvic restraint of a Type 2 seat belt assembly that can be used without the upper torso restraint shall have a minimum of 6000 lbs.)

Belt No.	Breaking Strength (Lbs.)	
B- 1	5,301	
B- 2	5,550	
B- 3	5,600	Median 5,550

Type 2 - Upper Torso - Min. 4000 lbs. See Note 1, Page 18.

Belt No.	Breaking Strength (Lbs.)	
B- N/A		
B- N/A		
B- N/A		Median N/A

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(c) Elongation

Type 1 - Max. 20% at 2500 lbs.

Belt No.	Elongation (%)
B- N/A	
B- N/A	
B- N/A	

Type 2 - Pelvic - Max. 30% at 2500 lbs. (Except that a pelvic restraint of a Type 2 seat belt assembly that can be used without the upper torso restraint shall have a maximum of 20% at 2500 lbs.)

Belt No.	Elongation (%)
B- 1	21.5
B- 2	20.5
B- 3	20.0

Type 2 - Upper Torso - Max. 40% at 2500 lbs.

Belt No.	Elongation (%)
B- N/A	
B- N/A	
B- N/A	

See Note 1, Page 18.

(d) Resistance to Abrasion - Minimum breaking strength after abrasion test shall be at least 75% of original strength.

Pelvic Belt No.	Breaking Strength (Lbs.)	% of Original
B- 1	5,160	97.3
B- 2	5,100	91.9
B- 3	5,000	89.3
Median	5,100	Median 91.9

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Upper Torso See Note 1, Page 18.

Belt No.	Breaking Strength (lbs)	% of Original
B- N/A		
B- N/A		
B- N/A		
Median N/A	Median N/A	

(e) Resistance to Light - Minimum breaking strength after light test shall be not less than 60% of original strength. See Note 2, Page 18.

Pelvic

Belt No.	Breaking Strength (lbs)	% of Original
B-		
B-		
B-		
Median	Median	

Upper Torso See Note 1, Page 18.

Belt No.	Breaking Strength (lbs)	% of Original
N/A		
N/A		
N/A		
Median N/A	Median N/A	

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Test and Inspection - Cont'd. Test No. 1151

Requirements for Hardware

S4.3

(a) Corrosion Resistance

(1) Attachment hardware (including retractors)

Belt No.	Results
B- 1	Satisfactory
B- 2	Satisfactory
B- 3	Satisfactory

(2) Buckles and metallic parts other than attachment hardware.

Belt No.	Results
B- 4	Satisfactory
B- 5	Satisfactory
B- 6	Satisfactory

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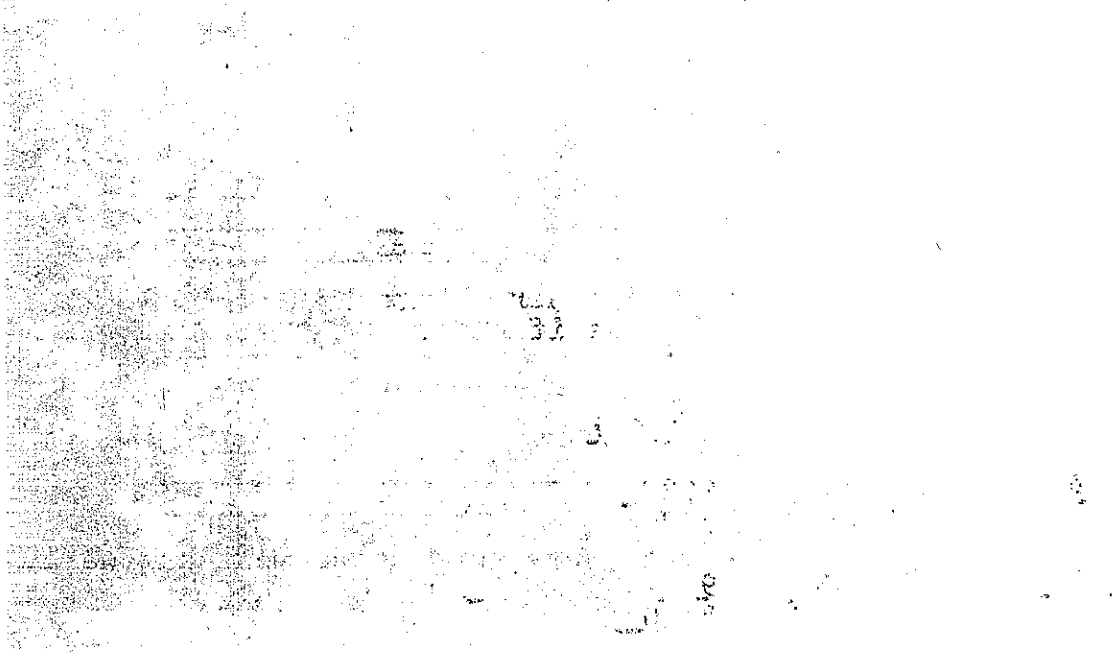

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(b) Temperature Resistance

Belt No.	Results
B- 1151-4	Satisfactory
B- 1151-5	Satisfactory
B- 1151-6	Satisfactory

(c) Attachment Hardware

1. Eye bolts, shoulder bolts and other bolts shall withstand 9000 lbs, or 5000 lbs if single belt only.

Belt No.	Location	Load (lbs.)	Failure
B- 4	Inboard	9020	None
	Outboard	5100	None
B- 5	Inboard	9010	None
	Outboard	5010	None
B- 6	Inboard	9050	None
	Outboard	5030	None

2. Other attachment hardware designed to receive the ends of two seat belt assemblies shall withstand 6000 lbs.

Belt No.	Load (lbs.)	Failure	
B- 4	5790	Failed	See Note 3, Page 18.
B- 5	6010	Failed	See Note 3, Page 18.
B- 6	6200	Failed	See Note 3, Page 18

3. Quick disconnect hooks retaining latch shall not move more than 0.80 inches in vertical or horizontal direction when loaded to 150 lbs.

Belt No.	Location	Vertical Movement (Inches)	Horizontal Movement (Inches)
B- N/A	Pelvic		
	Upper Torso		
B- N/A	Pelvic		
	Upper Torso		

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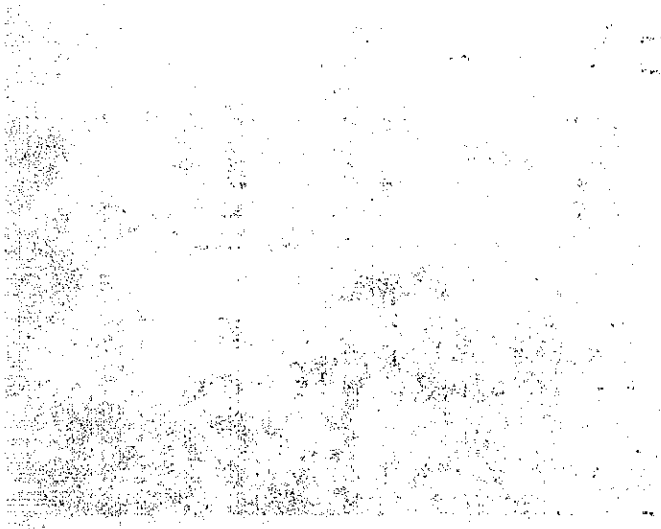

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(d) Buckle Release

(1) Type 1 and Type 2 - 30 lbs. max.

Belt No.	Location	Force (lbs)
B- 4	Pelvic	11.0
	Upper Torso	6.5
B- 5	Pelvic	9.0
	Upper Torso	5.0
B- 6	Pelvic	11.0
	Upper Torso	13.0

Type 3 - 20 lbs. Max.

Belt No.	Force (lbs.)
B- N/A	
B- N/A	
B- N/A	

(2) Pushbutton Area - 0.7 sq. inches and 0.4 inches min. linear dimension,

Area N/A sq.in.

Lever type shall permit insertion of .4 inch by 1.5 inch long bar. Satisfactory

(3) Pushbutton shall not release under 400 lbs. compressive load.

Belt No.	Results
B- N/A	
B- N/A	
B- N/A	

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(e) Adjustment Force - 11 lbs. max.

Belt No.	Location	Adjustment Force (lbs.)
B- 4	Pelvic	6.0
	Upper Torso	7.0
B- 5	Pelvic	8.0
	Upper Torso	8.5
B- 6	Pelvic	7.0
	Upper Torso	6.5

(f) Tilt-Lock Adjustment - 30° min.

Belt No.	Location	Locking Angle (Degrees)
B- 4	Pelvic	48
	Upper Torso	44
B- 5	Pelvic	39
	Upper Torso	59
B- 6	Pelvic	40
	Upper Torso	37

(g) Buckle latch

Buckle latch cycling - Normal latching and unlatching shall not be impaired. If partial engagement is possible - Separation force - 5 lbs. Max.

Belt No.	Belt Component	Separation Force (lbs.)	Results Cycling Tests
B- 4	Pelvic Upper Torso	Partial engagement not possible	Satisfactory
B- 5	Pelvic Upper Torso	Partial engagement not possible	Satisfactory
B- 6	Pelvic Upper Torso	Partial engagement not possible	Satisfactory

(h) Non-locking retractor

Pelvic restraint, residual extension of web - 0.25" max.

Belt No.	Extension (Inches)
B- 7	0.05
B- 8	0.10
B- 9	0.10

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Upper torso restraint, maximum retraction force - 1.1 lbs.

Belt No.	Retraction Force (lbs.)
B- N/A	
B- N/A	
B- N/A	

(i) Automatic - locking retractor

Retraction force

Pelvic - 0.60 lbs. min.
Upper Torso - 0.45 lbs. min.
Belt movement between locking dogs
Both belt types - 1 inch max.

Belt No.	Belt Component	Retractor Force (lbs.)	Movement Inches)
B- N/A	Pelvic		
	Upper Torso		
B- N/A	Pelvic		
	Upper Torso		
B- N/A	Pelvic		
	Upper Torso		

(j) Emergency locking retractor

Pelvic retractor - max. extension under 0.5 g load is 1 inch
retractor force - 1.5 lbs. min.

Belt No.	Extension (Inches)	Retraction Force (lbs.)
B- N/A		
B- N/A		
B- N/A		

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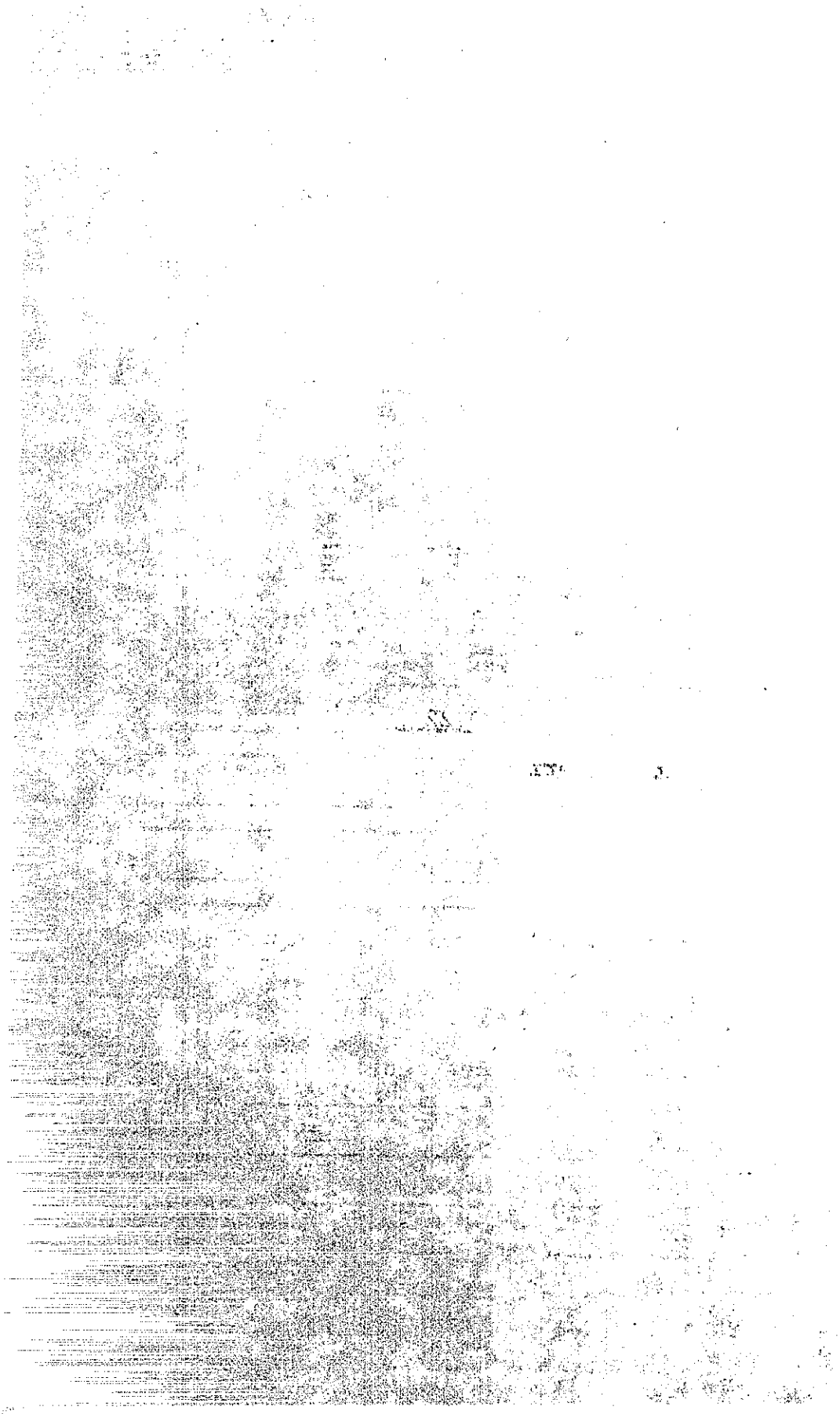

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Test and Inspection - Cont'd Test No. 1151

Upper torso retractor - max. extension under 0.5 g load is 1 inch; retraction force - 0.45 lbs. min., 1.1 lb. max.

Belt No.	Extension (Inches)	Retraction Force (lbs)
B- N/A		
B- N/A		
B- N/A		

(k) Performance of retractor

Final retraction force shall not be less than 50% of its original value

Belt No.	Original Force (lbs)	Final Force (lbs)	% of Original
B- 7	0.41	0.24	59
B- 8	0.41	0.25	61
B- 9	0.44	0.22	50

S4.4 Requirements for Assembly Performance

(a) Type 1 Seat Belt

(1) The assembly loop shall withstand a force of not less than 5000 lbs.

(2) The length of the pelvic restraint between anchorages shall not increase more than 14 inches when loaded to 5000 lbs (7 inches loop extension).

(3) Any webbing cut by the hardware during the test shall have a breaking strength at the cut of not less than 4,200 lbs.

(4) Complete fracture through any solid section of metal attachment hardware shall not occur during test.

Belt No.	Loop Load (lbs)	Assembly Extension (Inches)	Webbing Cut	Webbing Retest	Hardware Failures
B- N/A					
B- N/A					
B- N/A					

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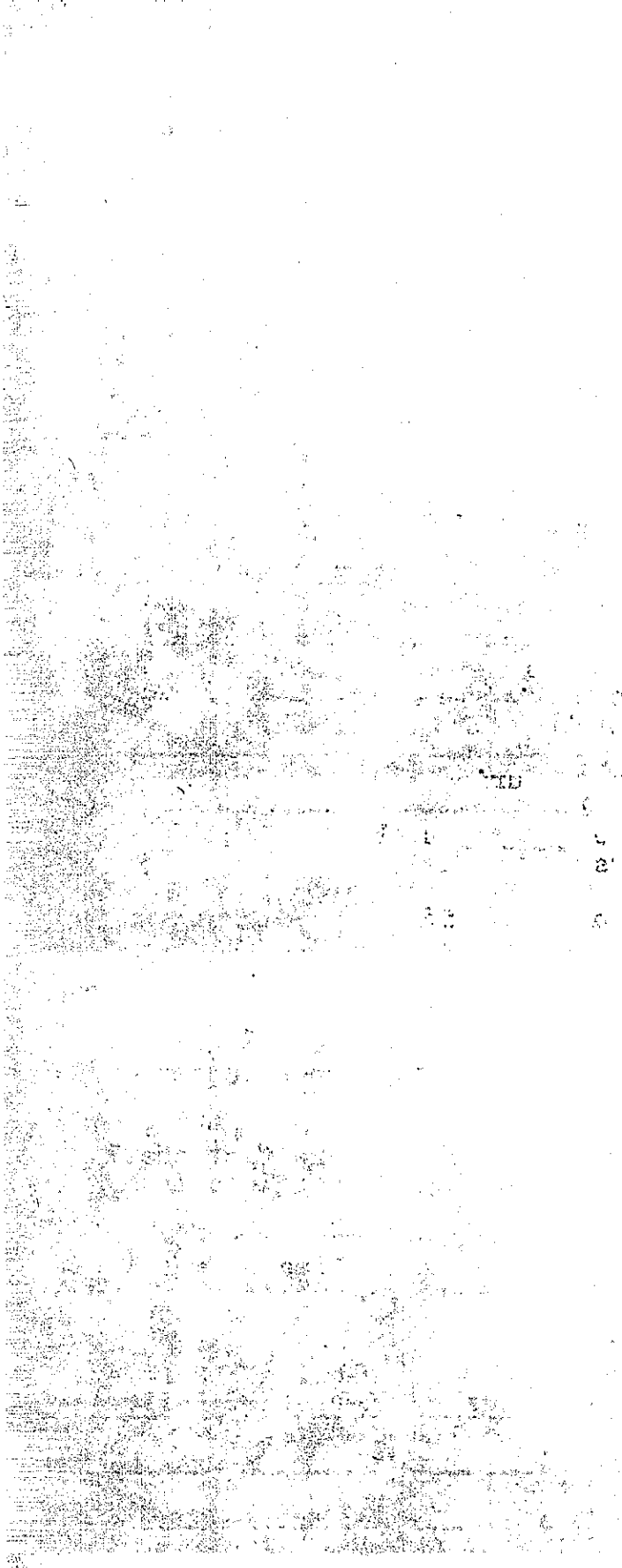

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(b) Type 2 Seat Belt

(1) The structural components in the pelvic restraint shall withstand a force of not less than 2500 lbs. (Except that a pelvic restraint of a Type 2 seat belt assembly that can be used without upper torso restraint shall comply with requirements for Type 1 seat belt assembly).

(2) The structural components in the upper torso restraint shall withstand a force of not less than 1500 lbs.

(3) The structural components that are common to pelvic and upper torso restraints shall withstand a force of not less than 3000 lbs.

(4) The length of the pelvic restraint between anchorages shall not increase more than 20 inches when loaded to 2500 lbs.

(5) The length of the upper torso restraint between anchorages shall not increase more than 20 inches when loaded to 1500 lbs (10 inches loop extension).

(6) Webbing cut by the hardware during test shall have a breaking strength of not less than 3500 lbs for webbing in the pelvic restraint or not less than 2800 lbs for webbing in the upper torso restraint.

(7) Complete fracture through any solid section of metal attachment hardware shall not occur during test.

Belt No.	Belt Component	Loop Load (lbs.)	Assembly Extension Inches	Webbing Cut	Webbing Retest	Hdwe. Failu
B- 4	Pelvic	5000	9.0	None	N/A	See Not 3 Page
	Upper Torso	1500	4.0	None	N/A	None
	Common	3100	8.25	None	N/A	None
B- 5	Pelvic	5010	8.75	None	N/A	See Note 3 Page 1
	Upper Torso	1500	5.0	None	N/A	None
	Common	3300	8.0	None	N/A	None
B- 6	Pelvic	5020	9.0	None	N/A	See Not 3 Page
	Upper Torso	1530	5.5	None	N/A	None
	Common	3050	7.75	None	N/A	None

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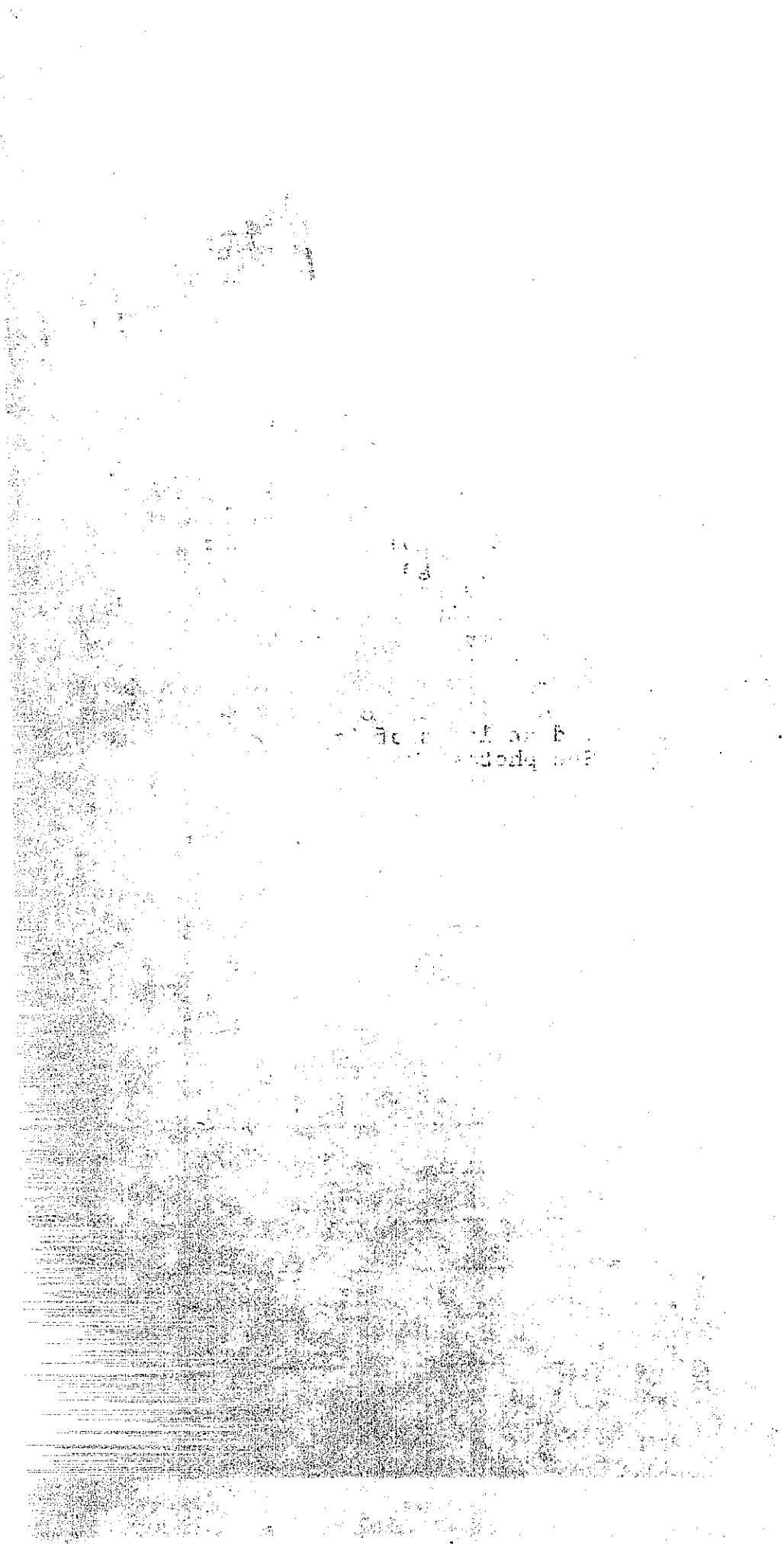

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Test No. 1151

Name of Device: VOLKSWAGEN-REPA No. 01.90211.1 Type 2 Seat Belt Assembly. Non-locking Retractor.

NOTES:

1. Webbing for the pelvic portion and the upper torso portion are common, therefore only the pelvic portion was tested, Pages 8,9, 10.

2. There was insufficient length of webbing to perform the Resistance to Light Breaking Strength, (Page 10); therefore, webbing taken from Devices B-7,8, and 9 was used and compared to the median value of the original breaking strengths from Devices B-1, 2, and 3, (Page 8.)

3. During the testing of the attachment hardware designed to receive the ends of two assemblies; S4.3(c)2, page 12; the test was attempted during the assembly performance and the tongue pulled out at a load of 5790 lbs on Device B-4. Subsequent testing of Devices B-5 and B-6 under this section was performed by placing two tongues in the duplex buckle and pulling the 6000 lbs. load through the webbing attached to the tongues. It is also noted that the 0.230" x 7/16" long machine screws on each of the three devices B-4, B-5, and B-6 failed at loads of 3500 lbs, 3800 lbs, and 3360 lbs, respectively. See photos, Page 7.

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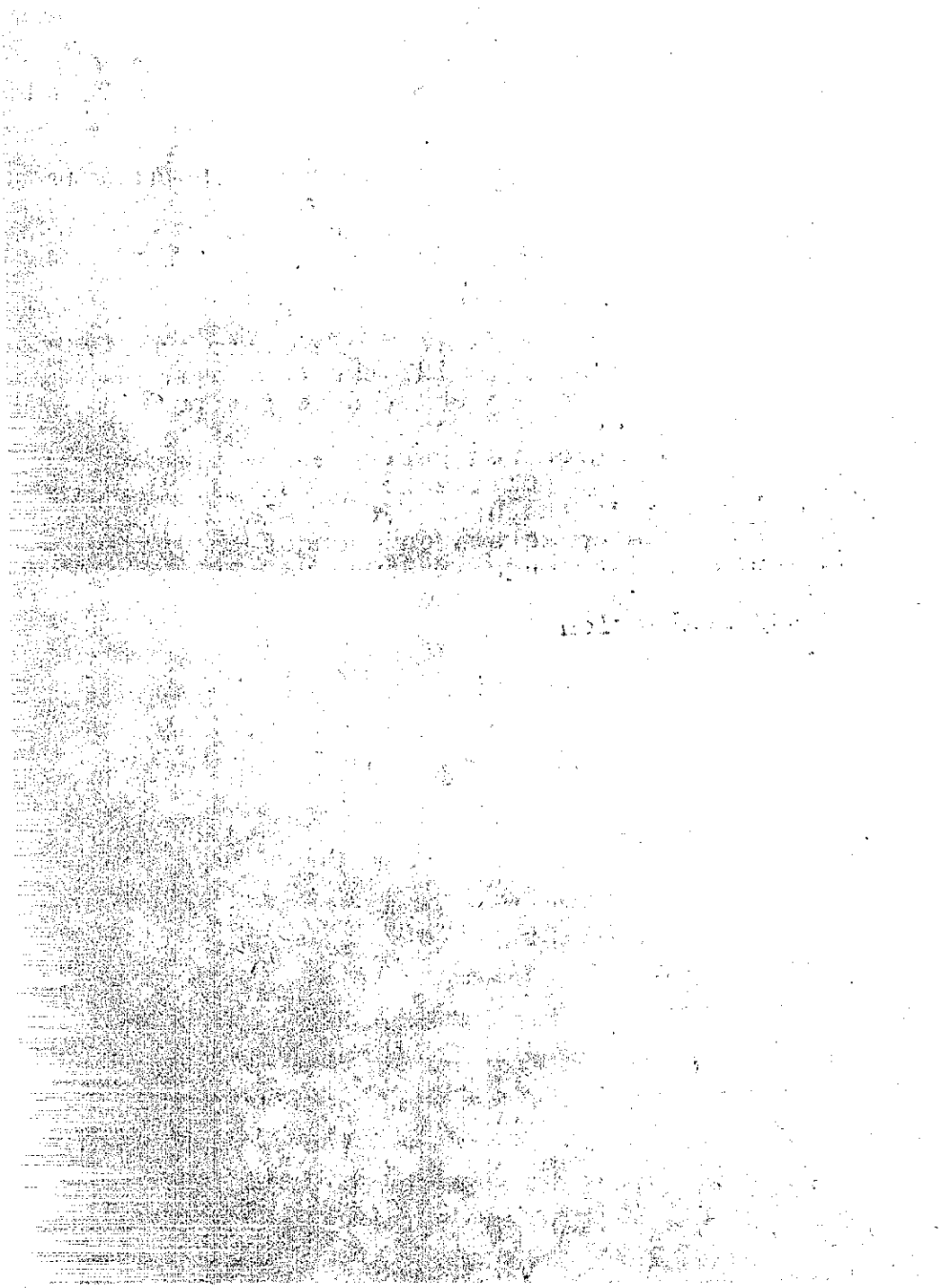

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