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ATTACHMENT B

Airbag Sys. Electrical Performance Test

ACU Component Electrical Performance test Result (Ver.5.40)

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ACU Component Electrical Performance test Result (Ver.560)

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NFA Airbag System Electrical Performance Test Result

NO	Phase	Test Level	Date	Content
1	Pilot	Component Level	2004.10.22	• NF ACU Component Electrical Performance test Result (Ver.540)
2	Pilot	Component Level	2005.01.03	• NF ACU Component Electrical Performance test Result (Ver.560)
3	Pilot	Vehicle Level	2005.01.07	• NF Airbag System Vehicle Electrical Performance test Result (Ver.560)

Airbag System Vehicle Electrical Performance test Result (Ver.5.60)

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ATTACHMENT C

Buckle PT sled test

NF Sonata Buckle Pretensioner sled test

50th

Test Date	Test Number	Test Type		HIC15	TENS.	COMP.	Nte	Ntf	Nce	Ncf	CG	CD	LH	RH
				700	4.17	4	1.0	1.0	1.0	1.0	60	63	10	10
	ETSSH03ST03801	30mph, Frontal, 50th, Belted	Driver seat	279	1.387	0.751	0.29	0.21	0.02	0.15	41.2	36.5	2.071	1.609
				39.9%	33.3%	18.8%	29.0%	21.0%	2.0%	15.0%	68.7%	57.9%	20.7%	16.1%
			Passenger seat	126	0.891	0.05	0.25	0.17	0.01	0.17	40.4	33.5	1.533	1.335
				18.0%	21.4%	1.3%	25.0%	17.0%	1.0%	17.0%	67.3%	53.2%	15.3%	13.4%
10/27/2004	04T30102	35mph, Frontal, 50th, High Output, Belted	Driver seat	134	1.542	0.63	0.24	0.32	0.33	0.14	50.5	30.1	5.934	4.202
				19.1%	37.0%	15.8%	24.0%	32.0%	33.0%	14.0%	84.2%	47.8%	59.3%	42.0%
			Passenger seat	375	1.383	0.414	0.21	0.2	0.16	0.15	46.1	35.9	2.946	1.694
				53.6%	33.2%	10.4%	21.0%	20.0%	16.0%	15.0%	76.8%	57.0%	29.5%	16.9%
10/28/2004	04T30201	35mph, Frontal, 50th, High Output, Belted	Driver seat	266	1.864	0.239	0.3	0.33	0.17	0.15	43.4	35.5	2.447	2.585
				38.0%	44.7%	6.0%	30.0%	33.0%	17.0%	15.0%	72.3%	56.3%	24.5%	25.9%
			Passenger seat	255	1.56	0.159	0.32	0.23	0.21	0.17	43.9	31.1	2.046	1.56
				36.4%	37.4%	4.0%	32.0%	23.0%	21.0%	17.0%	73.2%	49.4%	20.5%	15.6%
11/15/2004	04T31601	40mph, ODB, 50th, High Output, Belted	Driver seat	190	0.855	0.078	0.4	0.15	0.31	0.14	36.8	25.7	1.124	2.241
				27.1%	20.5%	2.0%	40.0%	15.0%	31.0%	14.0%	61.3%	40.8%	11.2%	22.4%
			Passenger seat	185	0.757	0.515	0.27	0.15	0.24	0.08	39.6	26	0.31	0.312
				26.4%	18.2%	12.9%	27.0%	15.0%	24.0%	8.0%	66.0%	41.3%	3.1%	3.1%
2/18/2005	05T04901	35mph (NCAP), Frontal, 50th, High Output, Belted	Driver seat											
			Passenger seat	388	0.96	0.28	0.271	0.164	0.305	0.117	42.4	20.1	4.378	2.479
				55.4%	23.0%	7.0%	27.1%	16.4%	30.5%	11.7%	70.7%	31.9%	43.8%	24.8%
3/3/2005	05T06001	35mph (NCAP), Frontal, 50th, High Output, Belted	Driver seat											
			Passenger seat	303	1.532	0.152	0.39	0.25	0.28	0.15	52.3	31.4	1.145	1.532
				43.3%	36.7%	3.8%	39.0%	25.0%	28.0%	15.0%	87.2%	49.8%	11.5%	15.3%

5th

Test Date	Test Number	Test Type		HIC15	TENS.	COMP.	Nte	Ntf	Nce	Ncf	CG	CD	LH	RH
				700	2.62	2.52	1	1	1	1	60	52	6.805	6.805
6/11/2004	04T16301	30mph, Frontal, 5th, Belted	Driver seat	188	1.206	0.216	0.51	0.31	0.35	0.2	48.4	29.9	1.821	1.297
				26.9%	46.0%	8.6%	51.0%	31.0%	35.0%	20.0%	80.7%	57.5%	26.8%	19.1%
			Passenger seat	374	0.844	0.112	0.54	0.23	0.44	0.25	46.7	28.7	0.27	0.155
				53.4%	32.2%	4.4%	54.0%	23.0%	44.0%	25.0%	77.8%	55.2%	4.0%	2.3%
11/11/2004	04T31501	25mph ODB, 5th, Low output, Belted	Driver seat	428	2.41	0.603	0.56	0.69	0.5	0.25	24.2	21.1	0.711	1.787
				61.1%	92.0%	23.9%	56.0%	69.0%	50.0%	25.0%	40.3%	40.6%	10.4%	26.3%
			Passenger seat	47	0.672	0.32	0.2	0.34	0.08	0.29	21.6	16.8	0.277	0.152
				6.7%	25.6%	12.7%	20.0%	34.0%	8.0%	29.0%	36.0%	32.3%	4.1%	2.2%

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ATTACHMENT D

CALIBRATION REPORTS

NF Calibration Report 11082005_Redacted

NFA Calibration (v2.5) Report

결재	담당	부서장

2005. 11. 08.

안전시스템연구부

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TRW Calibration report

HYUNDAI MOBIS


TTF Table (Normal)


TTF Table (FIS fail)


Front Side interaction


Misuse margin


NF 3.3 metric plot


NF3.3 P2 확인시험 metric plo


NF3.3 MGA 인시험 metric plot(


NF3.3 MGA 인시험 metric plot(


NF 2.4 metric plot


Internal data metric plot


NF2.4 MGA 확인시험 metric plo


Misuse metric plot

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ATTACHMENT D

CALIBRATION REPORTS

REDACTED REPORTS

2.4L Events

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2.4L P3 MGA Events

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3.3L Metric Plot

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3.3L P2 events

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3.3 P2 MGA events

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EVENT SAFETY MARGIN

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FRONTAL IMPACT CALIBRATION SIMULATION RESULTS

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Internal data metric plot

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Misuse Events 100% scale

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NF Advanced Front Calibration v2.5

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TTF_FIS Fail

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TTF_Normal

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ATTACHMENT E
Certification Reports

NFA SEAT BELT Certification Documents

NO	DATE	TITLE
1	October 11, 2004	Type 2 Seat Belt Assembly with Emergency Locking Retractor Assembly Model : TI-Z001 Installation 2005 Hyundai NF Sonata, FR RH
2	September 20, 2004	Type 2 Seat Belt Assembly with Emergency Locking Retractor Assembly Model : TI-Z002 Installation 2005 Hyundai NF Sonata, 2nd RH
3	September 20, 2004	Type 2 Seat Belt Assembly with Emergency Locking Retractor Assembly Model : TI-Z003 Installation 2005 Hyundai NF Sonata, 2nd LH
4	September 20, 2004	Type 2 Seat Belt Assembly with Emergency Locking Retractor Assembly Model : TI-Z004 Installation 2005 Hyundai NF Sonata, 2nd CTR
5	October 11, 2004	Type 2 Seat Belt Assembly with Emergency Locking Retractor Assembly Model : TI-Z005 Installation 2005 Hyundai NF Sonata, FR LH

HYUNDAI MOTOR GROUP

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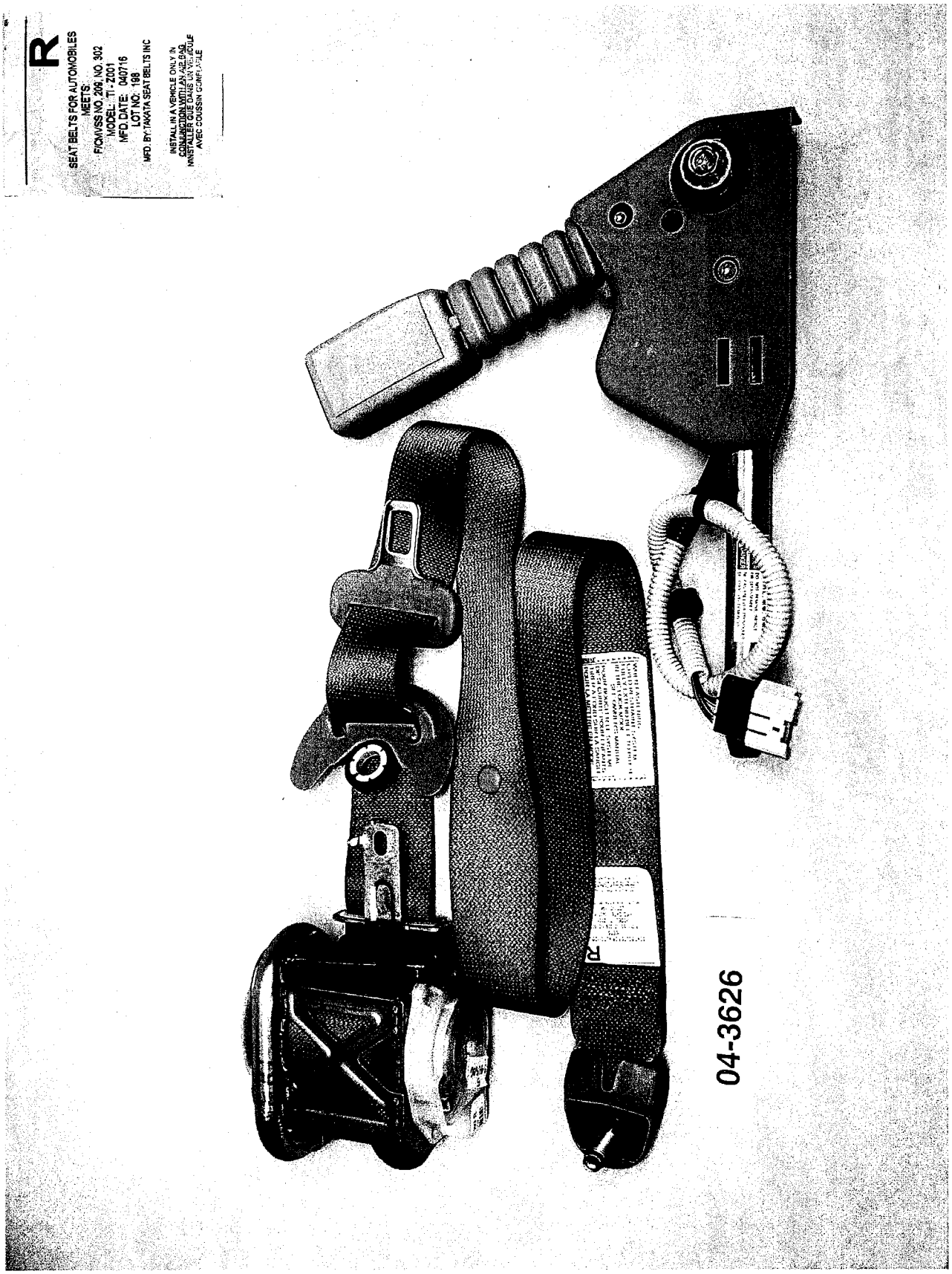
ATTACHMENT E

CERTIFICATION REPORTS

DATA A

ASSEMBLY PERFORMANCE

Specimen	Components Common to Pelvic and Upper Torso Proof Load, 13,345 N	Fully Extended Retractor Proof Load Tensile Test Torso, 6,672 N
C1	13,345	6,672
C2	13,345	6,672
C3	13,345	6,672
Average	13,345	6,672



JOB NO. 406056-01-000
DTB04R04-0761

MODEL NO. TI-Z001

10 OCTOBER 2004
FILE NO. 04-3626

DAYTON T. BROWN INC.
Founded 1950

JOB NO. 406056-01-000
DTB04R04-0761

MODEL NO. TI-Z001

10 OCTOBER 2004
FILE NO. 04-3627

DAYTON T. BROWN INC.
Founded 1950

DAYTON T. BROWN INC.
Founded 1950

CHURCH STREET • BOHEMIA, LONG ISLAND, NEW YORK 11716
AREA CODE 631 589-6300

TEST REPORT

Test Report No.: DTB04R04-0762 11 October 2004
Job No.: 406056-01-000

Revision Report No.: DTB04R04-0762, Addendum 1 21 October 2004

CLIENT Takata Seat Belts, Inc.
4611 Wiseman Blvd.
San Antonio, TX 78251

SUBJECT Type 2 Seat Belt Assembly with Emergency Locking Retractor

Assembly Model: TI-Z005

Installation 2005 Hyundai NF Sonata, FR LH

PURPOSE

The purpose of this report is to serve as an addendum to the original test report, inserting a notation on which assembly had an inverted tongue, as well as the additional Elongation measurement on Specimen C2. After the completion of all testing, specimen C2 was sent back to Takata for inspection and then returned back to Dayton T. Brown to perform an additional Elongation Test. This additional Elongation measurement is being included in the report.

SUMMARY

The test results listed herein show that the submitted representative sample meets the cited test requirements of Federal Motor Vehicle Safety Standard No. 209* for the type of assembly tested.

* Federal Motor Vehicle Safety Standard No. 209, Seat Belt Assemblies as Amended 1 October 2003

SAMPLE DESCRIPTION

The seat belt assembly consists of a push-button release-type buckle attached by a cable between the buckle frame and the buckle anchor plate. A length of webbing is attached by a stitched loop to an anchor plate. The webbing passes through the buckle connector tongue, continues on and goes through the torso pivot, and then into an emergency locking (vehicle and webbing sensitive) retractor. The retractor contains a load limiter which reduces the forces upon the wearer during impact. The assembly has a pyrotechnic pretensioner built within the buckle anchor.

GENERAL

The submitted specimens were inspected upon receipt at Dayton T. Brown, Inc. and found to be undamaged.

The specimens were received on 20 August 2004.

The assembly performance testing was conducted from 4 September through 6 October 2004.

The additional Elongation test was conducted on 14 October 2004.

The retractor performance testing was conducted from 4 September through 6 October 2004.

The effective length of the Emergency Locking Retractor is 1785 mm.

The length of webbing on the retractor spool with the seat belt buckled over a 50%ile male occupant, for this specific vehicle seating position was provided as 600 mm.

The installation angle of the Emergency Locking Retractor is 9.6° sensor.

The test results contained herein pertain only to the specimens listed in this report.

Dayton T. Brown, Inc. is not involved in any production quality inspections. All tests are based on the samples that are selected by the manufacturer and provided to Dayton T. Brown, Inc. without any Dayton T. Brown, Inc. involvement in said selection.

Dayton T. Brown, Inc. performs testing to FMVSS 209 under laboratory conditions. These tests do not measure and are not intended to measure all possible applications or installations of the seat belt assembly or components, except as so instructed by the manufacturer as to a particular configuration to be tested. In that event, the report will describe the particular application tested in detail. Dayton T. Brown, Inc. is not responsible for actual performance of any seat belt assembly, seat belt retractor, or individual seat belt component as installed in any vehicle.

LABELS

Refer to test specimen photograph, attached.

Very truly yours,

DAYTON T. BROWN, INC.

J. Benincasa
Test Technician

C. Scicluna
Test Engineer

Quality Department

TEST PROCEDURE

The test sample was inspected for the following properties in accordance with the procedures specified in Federal Motor Vehicle Safety Standard No. 209.

S4.1 GENERAL REQUIREMENTS

		Specimen Conformance
d.	Hardware (All hardware parts which contact, under normal usage, a person, clothing, or webbing shall be free of burrs and sharp edges.)	Satisfactory
h.	Webbing (The ends of webbing shall be protected or treated to prevent traveling and shall not pull out of the adjustment hardware at maximum size adjustment.)	Satisfactory
i.	Strap (A strap used in a seat belt assembly to sustain restraint forces shall comply with the requirements for webbing in S4.2, and if the strap is made from a rigid material, it shall comply with applicable requirements in S4.2, S4.3, and S4.4.)	Not Applicable
j.	Marking (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.)	Satisfactory
m.	Workmanship (Seat belt assemblies shall have good workmanship in accordance with good commercial practice.)	Satisfactory

S4.3 REQUIREMENTS FOR HARDWARE

	Test and Units	Specimen Average Determined	Required
a.	Corrosion Resistance		
	All other hardware	Passed	Shall be free of ferrous or nonferrous corrosion
b.	Temperature Resistance	Passed	Plastic or nonmetallic parts shall not warp or otherwise deteriorate to cause the assembly to operate improperly or fail to comply with the applicable requirements

S4.3 REQUIREMENTS FOR HARDWARE – (Continued)

	Test and Units	Specimen Average Determined	Required
d.	Buckle Release		
	1) Release force, N	23.4	133 N max.
	2) Push-button design		
	a) Area, mm^2	602.9	452 mm^2 min.
	b) Min. linear dimension, mm	15.5	10 mm min.
	3) Buckle crush, 1779 N compressive load	Passed	Shall remain operable and meet the applicable requirements
g.	Buckle Latch		
	1) Latch cycling	Passed	Shall not fail, nor gall or wear to an extent that normal latching and unlatching is impaired
	2) Partial engagement, release force, Newtons	N/A See Note[II]	A metal-to-metal buckle shall separate when in any position of partial engagement by a force of not more than 22 Newtons, See Note[I]

Note[I]: The partial engagement release force test is performed by inserting the buckle tongue straight into the buckle assembly as far as possible without achieving complete engagement. While in this straight-in insertion orientation, force is applied in a straight line to determine the amount of force required to separate the buckle tongue from the buckle assembly in this partial engagement orientation.

Note[II]: This buckle design contains a buckle tongue ejection spring, which precludes achieving a buckle/tongue partial engagement; therefore, partial engagement release force measurements were not taken.

S4.3 REQUIREMENTS FOR HARDWARE – (Continued)

	Test and Units	Specimen Average Determined	Required
j.	Emergency Locking Retractor (vehicle sensitive)		
	1) Movement prior to locking at 7 m/s^2 acceleration in "X" axis, mm		25 mm max.
	a) Original	16.5	
	b) After cycling	16.6	
	2) Movement prior to locking at 7 m/s^2 acceleration on "Y" axis, mm		25 mm max.
	a) Original	15.8	
	b) After cycling	16.5	
	3) Does retractor lock when tilted in any direction to any angle greater than 45° from the angle at which it is installed in the vehicle?	Yes	Does Retractor Lock?
	4) Movement prior to locking at 3 m/s^2 acceleration in "X" axis, mm		51 mm min. Lock/Not Locked
	a) Original	>51.0	
	b) After cycling	>51.0	
	5) Shall not lock when rotated in any direction to any angle of 15° or less from its orientation in the vehicle		Shall Not Lock
	a) Original	Passed	
	b) After cycling	Passed	
	6) Retraction force		
	a) Original, N	4.01	3 N min. Pelvic only 1-5 N Torso only 1-7 N Cont. Webbing
	b) After cycling, percent	91.2	Not less than 50% of original

S4.3 REQUIREMENTS FOR HARDWARE – (Continued)

	Test and Units	Specimen Average Determined	Required
k.	Performance of Retractor		
	1) Performance (cycling)	Passed	50,000 cycles
	2) Performance (strength)	Passed	Shall comply with applicable requirements

S4.4 ASSEMBLY PERFORMANCE

	Test and Units	Specimen Average Determined	Required
b.	Type 2 Assembly		
	1) Assembly loop force, pelvic, N	22,241	22,241 N min.
	2) Assembly loop force, torso, N	13,345	13,345 N min.
	3) Assembly loop extension, pelvic, mm	54.0	254 mm max.
	4) Assembly loop extension, torso, mm	245.9	254 mm max.
	5) Components common to pelvic and torso, N	13,345	13,345 N tensile load
	6) Fully extended torso retractor, N	6,672	6,672 N tensile load
	7) Cutting of webbing pelvic torso	 None None	Any webbing cut by the hardware during test shall be tested
	8) Fracture of hardware pelvic torso	 None None	Complete fracture through any solid section of metal attachment hardware shall not occur during test

DATA

HARDWARE

Specimen	Corrosion Resistance	Temperature Resistance
C1 and D1	Passed	Passed
C2 and D2	Passed	Passed
C3 and D3	Passed	Passed
Average	Passed	Passed

Specimen	Buckle Latch	Partial Engagement Release Force (N)[I]
C1	Passed	N/A
C2	Passed	N/A
C3	Passed	N/A
Average	Passed	N/A See Note[II]

Push-Button Release Buckle

Specimen	Release Area (mm^2)	Minimum Linear Dimension (mm)	Buckle Crush Proof Load
C1	602.9	15.5	Passed
C2	602.9	15.5	Passed
C3	602.9	15.5	Passed
Average	602.9	15.5	Passed

Note[I]: The partial engagement release force test is performed by inserting the buckle tongue straight into the buckle assembly as far as possible without achieving complete engagement. While in this straight-in insertion orientation, force is applied in a straight line to determine the amount of force required to separate the buckle tongue from the buckle assembly in this partial engagement orientation.

Note[II]: This buckle design contains a buckle tongue ejection spring, which precludes achieving a buckle/tongue partial engagement; therefore, partial engagement release force measurements were not taken.

DATA

RETRACTOR PERFORMANCE

Emergency Locking Retractor (Vehicle Sensitive)

Specimen	Retraction Force		Performance[III]	15° Angle No Lock Check	
	Original (N)	After Cycling (Percent)		Original	After Cycling
D1	4.00	91.2	Passed	Passed	Passed
D2	4.05	91.3	Passed	Passed	Passed
D3	4.00	91.2	Passed	Passed	Passed
Average	4.01	91.2	Passed	Passed	Passed

Specimen	Does Retractor Lock at 45° Angle?
D1	Yes
D2	Yes
D3	Yes

Specimen	Acceleration at 7 m/s^2 "X" Axis, Movement (mm)		Acceleration at 7 m/s^2 "Y" Axis, Movement (mm)	
	Original	After Cycling	Original	After Cycling
D1	16.5	15.0	15.0	15.0
D2	16.5	18.0	17.5	17.0
D3	16.5	17.0	15.0	17.5
Average	16.5	16.6	15.8	16.5

Specimen	Acceleration at 3 m/s^2 "X" Axis, Movement (mm)		Proof Load After Cycling
	Original	After Cycling	
D1	>51.0	>51.0	Passed
D2	>51.0	>51.0	Passed
D3	>51.0	>51.0	Passed
Average	>51.0	>51.0	Passed

[III]Performance Consists of:
2,500 cycles after salt spray exposure
2,500 cycles after temperature humidity exposure
45,000 cycles after dust exposure (includes 10,000 lockup cycles)

DATA

ASSEMBLY PERFORMANCE

Type 2 Assembly – Pelvic Portion

Specimen	Proof Load (N)	Loop Extension at 22,241 N (mm)	Buckle Release Force (N)	Cutting of Webbing	Fracture of Hardware
C1	22,241	54.1	27.1	None	None
C2	22,241	54.5	23.0	None	None
C3 *	22,241	53.6	20.2	None	None
Average	22,241	54.0	23.4	None	None

* The tongue was inverted for these tests.

Type 2 Assembly – Torso Portion

Specimen	Proof Load (N)	Loop Extension at 13,345 N (mm)	Cutting of Webbing	Fracture of Hardware
C1	13,345	320.5*	None	None
C2	13,345	91.7	None	None
C3	13,345	325.7*	None	None
C2 (dated 10/14/04)	13,345	328.2**	None	None
Average	13,345	245.9	None	None

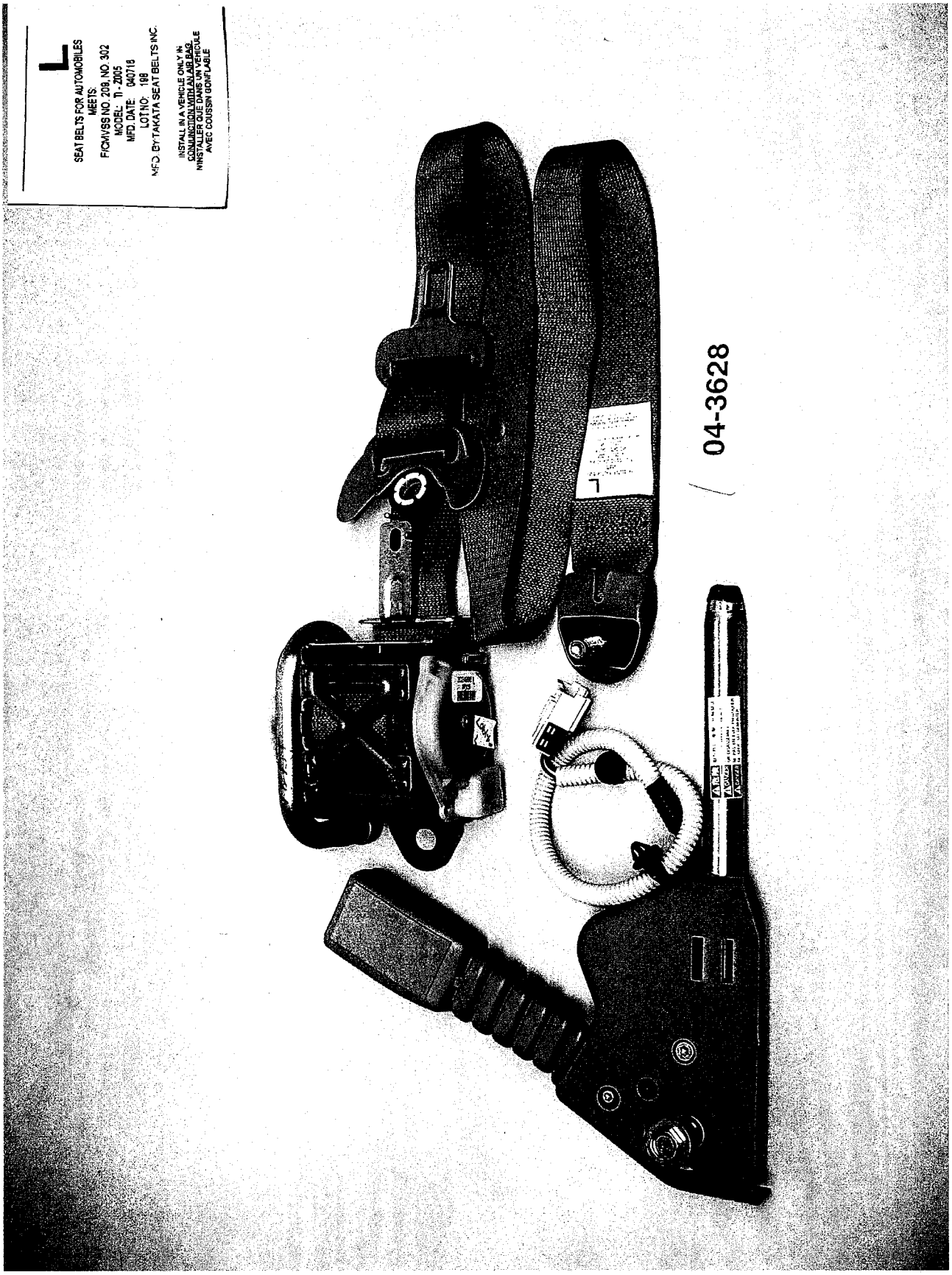
* Note: A type 2 seat belt assembly that includes a load-limiter is not required to comply with the elongation requirements.

** After the completion of all testing, specimen C2 was sent back to Takata for inspection and later returned back to Dayton T. Brown to perform an additional Elongation Test only. This additional Elongation measurement is being included in the report but not to be included in the overall average.

DATA

ASSEMBLY PERFORMANCE

Specimen	Components Common to Pelvic and Upper Torso Proof Load, 13,345 N	Fully Extended Retractor Proof Load Tensile Test Torso, 6,672 N
C1	13,345	6,672
C2	13,345	6,672
C3	13,345	6,672
Average	13,345	6,672

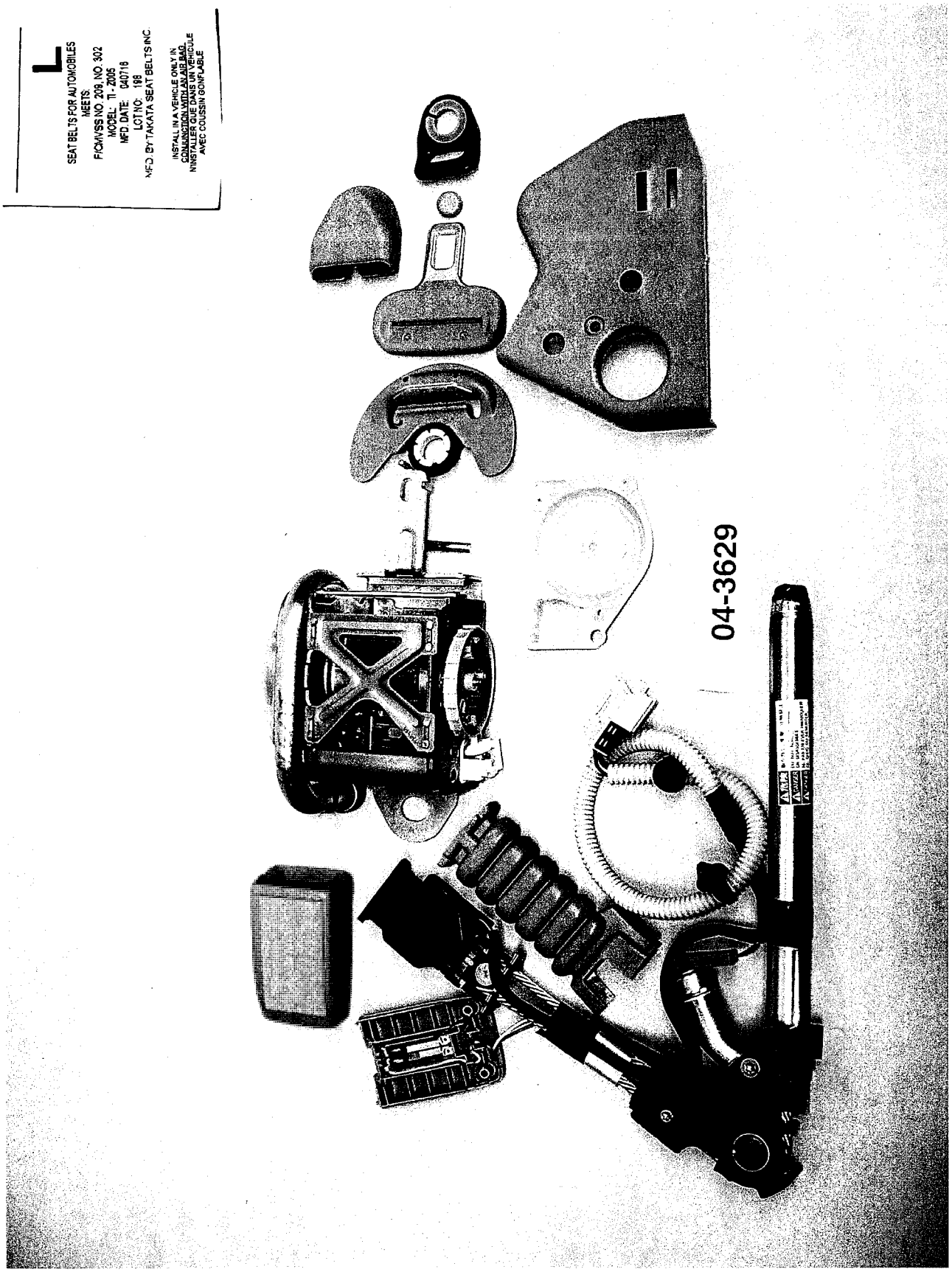


JOB NO. 406056-01-000
DTB04R04-0762

MODEL NO. TI-Z005

10 OCTOBER 2004
FILE NO. 04-3628

DAYTON T. BROWN INC.
Founded 1950



JOB NO. 406056-01-000
DTB04R04-0762

MODEL NO. TI-Z005

10 OCTOBER 2004
FILE NO. 04-3629

DAYTON T. BROWN INC.
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CHURCH STREET • BOHEMIA, LONG ISLAND, NEW YORK 11716
AREA CODE 631 589-6300

TEST REPORT

Test Report No.: DTB04R04-0697 20 September 2004
Job No.: 406056-01-000

CLIENT Takata Seat Belts, Inc.
4611 Wiseman Blvd.
San Antonio, TX 78251

SUBJECT Type 2 Seat Belt Assembly with Emergency Locking Retractor

Assembly Model: TI-Z004

Installation 2005 Hyundai NF Sonata, 2nd CTR

SUMMARY

The test results listed herein show that the submitted representative sample meets the cited test requirements of Federal Motor Vehicle Safety Standard No. 209* for the type of assembly tested.

* Federal Motor Vehicle Safety Standard No. 209, Seat Belt Assemblies as Amended 1 October 2003

SAMPLE DESCRIPTION

The seat belt assembly consists of a push-button release-type buckle attached by a stitched loop between the buckle frame and the buckle anchor plate. A length of webbing is attached by a stitched loop to a detachable anchor. The webbing passes through the buckle connector tongue, and then into an emergency locking (vehicle and webbing sensitive) retractor. In addition, the retractor is equipped with a "cinch" feature. The retractor operates as an emergency locking retractor until its webbing is fully extended, at which point, it functions as an automatic locking retractor. It remains in the "cinch" mode until all the webbing has been retracted, at which point, it again operates as an emergency locking retractor.

GENERAL

The submitted specimens were inspected upon receipt at Dayton T. Brown, Inc. and found to be undamaged.

The specimens were received on 17 August 2004.

The assembly performance testing was conducted from 18 August through 17 September 2004.

The retractor performance testing was conducted from 18 August through 17 September 2004.

The effective length of the Emergency Locking Retractor is 1560 mm.

The installation angle of the Emergency Locking Retractor is 0°.

The length of webbing on the retractor spool with the seat belt buckled over a 50%ile male occupant, for this specific vehicle seating position was provided as 600 mm.

The test results contained herein pertain only to the specimens listed in this report.

Dayton T. Brown, Inc. is not involved in any production quality inspections. All tests are based on the samples that are selected by the manufacturer and provided to Dayton T. Brown, Inc. without any Dayton T. Brown, Inc. involvement in said selection.

Dayton T. Brown, Inc. performs testing to FMVSS 209 under laboratory conditions. These tests do not measure and are not intended to measure all possible applications or installations of the seat belt assembly or components, except as so instructed by the manufacturer as to a particular configuration to be tested. In that event, the report will describe the particular application tested in detail. Dayton T. Brown, Inc. is not responsible for actual performance of any seat belt assembly, seat belt retractor, or individual seat belt component as installed in any vehicle.

LABELS

Refer to test specimen photograph, attached.

Very truly yours,

DAYTON T. BROWN, INC.

J. Benincasa
Test Technician

C. Scicluna
Test Engineer

Quality Department

TEST PROCEDURE

The test sample was inspected for the following properties in accordance with the procedures specified in Federal Motor Vehicle Safety Standard No. 209.

S4.1 GENERAL REQUIREMENTS

		Specimen Conformance
d.	Hardware (All hardware parts which contact, under normal usage, a person, clothing, or webbing shall be free of burrs and sharp edges.)	Satisfactory
h.	Webbing (The ends of webbing shall be protected or treated to prevent traveling and shall not pull out of the adjustment hardware at maximum size adjustment.)	Satisfactory
i.	Strap (A strap used in a seat belt assembly to sustain restraint forces shall comply with the requirements for webbing in S4.2, and if the strap is made from a rigid material, it shall comply with applicable requirements in S4.2, S4.3, and S4.4.)	Not Applicable
j.	Marking (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.)	Satisfactory
m.	Workmanship (Seat belt assemblies shall have good workmanship in accordance with good commercial practice.)	Satisfactory

S4.3 REQUIREMENTS FOR HARDWARE

	Test and Units	Specimen Average Determined	Required
a.	Corrosion Resistance		
	All other hardware	Passed	Shall be free of ferrous or nonferrous corrosion
b.	Temperature Resistance	Passed	Plastic or nonmetallic parts shall not warp or otherwise deteriorate to cause the assembly to operate improperly or fail to comply with the applicable requirements

S4.3 REQUIREMENTS FOR HARDWARE – (Continued)

	Test and Units	Specimen Average Determined	Required
d.	Buckle Release		
	1) Release force, N	42.4	133 N max.
	2) Push-button design		
	a) Area, mm^2	589.0	452 mm^2 min.
	b) Min. linear dimension, mm	15.5	10 mm min.
	3) Buckle crush, 1779 N compressive load	Passed	Shall remain operable and meet the applicable requirements
g.	Buckle Latch		
	1) Latch cycling	Passed	Shall not fail, nor gall or wear to an extent that normal latching and unlatching is impaired
	2) Partial engagement, release force, N	N/A See Note[II]	A metal-to-metal buckle shall separate when in any position of partial engagement by a force of not more than 22 N, See Note[I]

Note[I]: The partial engagement release force test is performed by inserting the buckle tongue straight into the buckle assembly as far as possible without achieving complete engagement. While in this straight-in insertion orientation, force is applied in a straight line to determine the amount of force required to separate the buckle tongue from the buckle assembly in this partial engagement orientation.

Note[II]: This buckle design contains a buckle tongue ejection spring, which precludes achieving a buckle/tongue partial engagement; therefore, partial engagement release force measurements were not taken.

S4.3 REQUIREMENTS FOR HARDWARE – (Continued)

	Test and Units	Specimen Average Determined	Required
i.	Retractor in "cinch" mode		
	1) Movement between locking positions, mm		25 mm max.
	a) Original	5.50	
	b) After cycling	5.50	
	2) Retraction Force		
	a) Original, N	4.31	Cont. Web. 1 N to 7 N.
	b) After cycling, Percent	80.1	Not Less than 50% of original
	3) Performance (cycling)	Passed	10,000 cycles

S4.3 REQUIREMENTS FOR HARDWARE – (Continued)

	Test and Units	Specimen Average Determined	Required
j.	Emergency Locking Retractor (vehicle sensitive)		
	1) Movement prior to locking at 7 m/s^2 acceleration in "X" axis, mm		25 mm max.
	a) Original	15.5	
	b) After cycling	15.0	
	2) Movement prior to locking at 7 m/s^2 acceleration on "Y" axis, mm		25 mm max.
	a) Original	16.3	
	b) After cycling	17.1	
	3) Does retractor lock when tilted in any direction to any angle greater than 45° from the angle at which it is installed in the vehicle?	Yes	Does Retractor Lock?
	4) Movement prior to locking at 3 m/s^2 acceleration in "X" axis, mm		51 mm min. Lock/Not Locked
	a) Original	>51.0	
	b) After cycling	>51.0	
	5) Shall not lock when rotated in any direction to any angle of 15° or less from its orientation in the vehicle		Shall Not Lock
	a) Original	Passed	
	b) After cycling	Passed	
	6) Retraction force		
	a) Original, N	4.28	3 N min. Pelvic only 1-5 N Torso only 1-7 N Cont. Webbing
	b) After cycling, percent	89.0	Not less than 50% of original

S4.3 REQUIREMENTS FOR HARDWARE – (Continued)

	Test and Units	Specimen Average Determined	Required
k.	Performance of Retractor		
	1) Performance (cycling)	Passed	40,000 cycles
	2) Performance (strength)	Passed	Shall comply with applicable requirements

S4.4 ASSEMBLY PERFORMANCE

	Test and Units	Specimen Average Determined	Required
b.	Type 2 Assembly		
	1) Assembly loop force, pelvic, N	22,241	22,241 N min.
	2) Assembly loop force, torso, N	13,345	13,345 N min.
	3) Assembly loop extension, pelvic, mm	58.4	254 mm max.
	4) Assembly loop extension, torso, mm	50.2	254 mm max.
	5) Components common to pelvic and torso, N	13,345	13,345 N tensile load
	6) Fully extended torso retractor, N	6,672	6,672 N tensile load
	7) Cutting of webbing pelvic torso	 None None	Any webbing cut by the hardware during test shall be tested
	8) Fracture of hardware pelvic torso	 None None	Complete fracture through any solid section of metal attachment hardware shall not occur during test

DATA

HARDWARE

Specimen	Corrosion Resistance	Temperature Resistance
C1 and D1	Passed	Passed
C2 and D2	Passed	Passed
C3 and D3	Passed	Passed
Average	Passed	Passed

Specimen	Buckle Latch	Partial Engagement Release Force (N)[I]
C1	Passed	N/A
C2	Passed	N/A
C3	Passed	N/A
Average	Passed	N/A See Note[II]

Push-Button Release Buckle

Specimen	Release Area (mm^2)	Minimum Linear Dimension (mm)	Buckle Crush Proof Load
C1	589.0	15.5	Passed
C2	589.0	15.5	Passed
C3	589.0	15.5	Passed
Average	589.0	15.5	Passed

Note[I]: The partial engagement release force test is performed by inserting the buckle tongue straight into the buckle assembly as far as possible without achieving complete engagement. While in this straight-in insertion orientation, force is applied in a straight line to determine the amount of force required to separate the buckle tongue from the buckle assembly in this partial engagement orientation.

Note[II]: This buckle design contains a buckle tongue ejection spring, which precludes achieving a buckle/tongue partial engagement; therefore, partial engagement release force measurements were not taken.

DATA

RETRACTOR PERFORMANCE

Retractor In "Cinch" Mode

Specimen	Movement Between Locking Positions (mm)		Performance[II]	Retraction Force	
	Original	After Cycling		Original (N)	After Cycling (Percent)
D1	5.50	5.50	Passed	4.33	79.2
D2	5.50	5.50	Passed	4.25	80.7
D3	5.50	5.50	Passed	4.35	80.6
Average	5.50	5.50	Passed	4.31	80.1

[II]Performance Consists of:
2500 cycles after salt spray exposure
2500 cycles after temperature humidity exposure
5000 cycles after dust exposure

DATA

RETRACTOR PERFORMANCE

Emergency Locking Retractor (Vehicle Sensitive)

Specimen	Retraction Force		Performance[III]	15° Angle No Lock Check	
	Original (N)	After Cycling (Percent)		Original	After Cycling
D1	4.25	90.5	Passed	Passed	Passed
D2	4.35	88.5	Passed	Passed	Passed
D3	4.25	88.2	Passed	Passed	Passed
Average	4.28	89.0	Passed	Passed	Passed

Specimen	Does Retractor Lock at 45° Angle?
D1	Yes
D2	Yes
D3	Yes

Specimen	Acceleration at 7 m/s^2 "X" Axis, Movement (mm)		Acceleration at 7 m/s^2 "Y" Axis, Movement (mm)	
	Original	After Cycling	Original	After Cycling
D1	15.5	15.0	15.5	18.0
D2	14.5	15.0	16.5	16.5
D3	16.5	15.0	17.0	17.0
Average	15.5	15.0	16.3	17.1

Specimen	Acceleration at 3 m/s^2 "X" Axis, Movement (mm)		Proof Load After Cycling
	Original	After Cycling	
D1	>51.0	>51.0	Passed
D2	>51.0	>51.0	Passed
D3	>51.0	>51.0	Passed
Average	>51.0	>51.0	Passed

[III]Performance Consists of:
40,000 cycles after dust exposure (includes 10,000 lockup cycles)

DATA

ASSEMBLY PERFORMANCE

Type 2 Assembly – Pelvic Portion

Specimen	Proof Load (N)	Loop Extension at 22,241 N (mm)	Buckle Release Force (N)	Cutting of Webbing	Fracture of Hardware
C1	22,241	59.6	39.8	None	None
C2	22,241	57.7	62.4	None	None
C3	22,241	57.9	25.2	None	None
Average	22,241	58.4	42.4	None	None

Type 2 Assembly – Torso Portion

Specimen	Proof Load (N)	Loop Extension at 13,345 N (mm)	Cutting of Webbing	Fracture of Hardware
C1	13,345	50.7	None	None
C2	13,345	51.2	None	None
C3	13,345	48.9	None	None
Average	13,345	50.2	None	None

DATA

ASSEMBLY PERFORMANCE

Specimen	Components Common to Pelvic and Upper Torso Proof Load, 13,345 N	Fully Extended Retractor Proof Load Tensile Test Torso, 6,672 N
C1	13,345	6,672
C2	13,345	6,672
C3	13,345	6,672
Average	13,345	6,672

JOB NO. 406056-01-000
DTB04R04-0697

MODEL NO. TI-Z004

19 SEPTEMBER 2004
FILE NO. 04-3621

DAYTON T. BROWN INC.
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JOB NO. 406056-01-000
DTB04R04-0697

MODEL NO. TI-Z004

19 SEPTEMBER 2004
FILE NO. 04-3622

DAYTON T. BROWN INC.
Founded 1950

PE14-023

HYUNDAI

9/12/2014

ATTACHMENT E

CERTIFICATION REPORTS

DAYTON T. BROWN INC.
Founded 1950

CHURCH STREET • BOHEMIA, LONG ISLAND, NEW YORK 11716
AREA CODE 631 589-6300

TEST REPORT

Test Report No.: DTB04R04-0695
Job No.: 406056-01-000

20 September 2004

CLIENT Takata Seat Belts, Inc.
4611 Wiseman Blvd.
San Antonio, TX 78251

SUBJECT Type 2 Seat Belt Assembly with Emergency Locking Retractor

Assembly Model: TI-Z002

Installation 2005 Hyundai NF Sonata, 2nd RH

SUMMARY

The test results listed herein show that the submitted representative sample meets the cited test requirements of Federal Motor Vehicle Safety Standard No. 209* for the type of assembly tested.

* Federal Motor Vehicle Safety Standard No. 209, Seat Belt Assemblies as Amended 1 October 2003

SAMPLE DESCRIPTION

The seat belt assembly consists of a push-button release-type buckle attached by a stitched loop between the buckle frame and the buckle anchor plate. A length of webbing is attached by a stitched loop to an anchor plate. The webbing passes through the buckle connector tongue, and then into an emergency locking (vehicle and webbing sensitive) retractor. In addition, the retractor is equipped with a "cinch" feature. The retractor operates as an emergency locking retractor until its webbing is fully extended, at which point, it functions as an automatic locking retractor. It remains in the "cinch" mode until all the webbing has been retracted, at which point, it again operates as an emergency locking retractor.

GENERAL

The submitted specimens were inspected upon receipt at Dayton T. Brown, Inc. and found to be undamaged.

The specimens were received on 17 August 2004.

The assembly performance testing was conducted from 18 August through 17 September 2004.

The retractor performance testing was conducted from 18 August through 17 September 2004.

The effective length of the Emergency Locking Retractor is 1640 mm.

The installation angle of the Emergency Locking Retractor is 0°.

The length of webbing on the retractor spool with the seat belt buckled over a 50%ile male occupant, for this specific vehicle seating position was provided as 600 mm.

The test results contained herein pertain only to the specimens listed in this report.

Dayton T. Brown, Inc. is not involved in any production quality inspections. All tests are based on the samples that are selected by the manufacturer and provided to Dayton T. Brown, Inc. without any Dayton T. Brown, Inc. involvement in said selection.

Dayton T. Brown, Inc. performs testing to FMVSS 209 under laboratory conditions. These tests do not measure and are not intended to measure all possible applications or installations of the seat belt assembly or components, except as so instructed by the manufacturer as to a particular configuration to be tested. In that event, the report will describe the particular application tested in detail. Dayton T. Brown, Inc. is not responsible for actual performance of any seat belt assembly, seat belt retractor, or individual seat belt component as installed in any vehicle.

LABELS

Refer to test specimen photograph, attached.

Very truly yours,

DAYTON T. BROWN, INC.

J. Benincasa
Test Technician

C. Scicluna
Test Engineer

M. Del Aris

Quality Department

TEST PROCEDURE

The test sample was inspected for the following properties in accordance with the procedures specified in Federal Motor Vehicle Safety Standard No. 209.

S4.1 GENERAL REQUIREMENTS

		Specimen Conformance
d.	Hardware (All hardware parts which contact, under normal usage, a person, clothing, or webbing shall be free of burrs and sharp edges.)	Satisfactory
h.	Webbing (The ends of webbing shall be protected or treated to prevent traveling and shall not pull out of the adjustment hardware at maximum size adjustment.)	Satisfactory
i.	Strap (A strap used in a seat belt assembly to sustain restraint forces shall comply with the requirements for webbing in S4.2, and if the strap is made from a rigid material, it shall comply with applicable requirements in S4.2, S4.3, and S4.4.)	Not Applicable
j.	Marking (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.)	Satisfactory
m.	Workmanship (Seat belt assemblies shall have good workmanship in accordance with good commercial practice.)	Satisfactory

S4.3 REQUIREMENTS FOR HARDWARE

	Test and Units	Specimen Average Determined	Required
a.	Corrosion Resistance		
	All other hardware	Passed	Shall be free of ferrous or nonferrous corrosion
b.	Temperature Resistance	Passed	Plastic or nonmetallic parts shall not warp or otherwise deteriorate to cause the assembly to operate improperly or fail to comply with the applicable requirements

S4.3 REQUIREMENTS FOR HARDWARE – (Continued)

	Test and Units	Specimen Average Determined	Required
d.	Buckle Release		
	1) Release force, N	47.9	133 N max.
	2) Push-button design		
	a) Area, mm^2	589.0	452 mm^2 min.
	b) Min. linear dimension, mm	15.5	10 mm min.
	3) Buckle crush, 1779 N compressive load	Passed	Shall remain operable and meet the applicable requirements
g.	Buckle Latch		
	1) Latch cycling	Passed	Shall not fail, nor gall or wear to an extent that normal latching and unlatching is impaired
	2) Partial engagement, release force, N	N/A See Note[II]	A metal-to-metal buckle shall separate when in any position of partial engagement by a force of not more than 22 N, See Note[I]

Note[I]: The partial engagement release force test is performed by inserting the buckle tongue straight into the buckle assembly as far as possible without achieving complete engagement. While in this straight-in insertion orientation, force is applied in a straight line to determine the amount of force required to separate the buckle tongue from the buckle assembly in this partial engagement orientation.

Note[II]: This buckle design contains a buckle tongue ejection spring, which precludes achieving a buckle/tongue partial engagement; therefore, partial engagement release force measurements were not taken.

S4.3 REQUIREMENTS FOR HARDWARE – (Continued)

	Test and Units	Specimen Average Determined	Required
i.	Retractor in "cinch" mode		
	1) Movement between locking positions, mm		25 mm max.
	a) Original	5.50	
	b) After cycling	5.50	
	2) Retraction Force		
	a) Original, N	5.00	Cont. Web. 1 N to 7 N.
	b) After cycling, Percent	90.3	Not Less than 50% of original
	3) Performance (cycling)	Passed	10,000 cycles

S4.3 REQUIREMENTS FOR HARDWARE – (Continued)

	Test and Units	Specimen Average Determined	Required
j.	Emergency Locking Retractor (vehicle sensitive)		
	1) Movement prior to locking at 7 m/s^2 acceleration in "X" axis, mm		25 mm max.
	a) Original	16.0	
	b) After cycling	14.8	
	2) Movement prior to locking at 7 m/s^2 acceleration on "Y" axis, mm		25 mm max.
	a) Original	17.1	
	b) After cycling	16.6	
	3) Does retractor lock when tilted in any direction to any angle greater than 45° from the angle at which it is installed in the vehicle?	Yes	Does Retractor Lock?
	4) Movement prior to locking at 3 m/s^2 acceleration in "X" axis, mm		51 mm min. Lock/Not Locked
	a) Original	>51.0	
	b) After cycling	>51.0	
	5) Shall not lock when rotated in any direction to any angle of 15° or less from its orientation in the vehicle		Shall Not Lock
	a) Original	Passed	
	b) After cycling	Passed	
	6) Retraction force		
	a) Original, N	5.01	3 N min. Pelvic only 1-5 N Torso only 1-7 N Cont. Webbing
	b) After cycling, percent	92.3	Not less than 50% of original

S4.3 REQUIREMENTS FOR HARDWARE – (Continued)

	Test and Units	Specimen Average Determined	Required
k.	Performance of Retractor		
	1) Performance (cycling)	Passed	40,000 cycles
	2) Performance (strength)	Passed	Shall comply with applicable requirements

S4.4 ASSEMBLY PERFORMANCE

	Test and Units	Specimen Average Determined	Required
b.	Type 2 Assembly		
	1) Assembly loop force, pelvic, N	22,241	22,241 N min.
	2) Assembly loop force, torso, N	13,345	13,345 N min.
	3) Assembly loop extension, pelvic, mm	61.3	254 mm max.
	4) Assembly loop extension, torso, mm	47.2	254 mm max.
	5) Components common to pelvic and torso, N	13,345	13,345 N tensile load
	6) Fully extended torso retractor, N	6,672	6,672 N tensile load
	7) Cutting of webbing pelvic torso	 None None	Any webbing cut by the hardware during test shall be tested
	8) Fracture of hardware pelvic torso	 None None	Complete fracture through any solid section of metal attachment hardware shall not occur during test

DATA

HARDWARE

Specimen	Corrosion Resistance	Temperature Resistance
C1 and D1	Passed	Passed
C2 and D2	Passed	Passed
C3 and D3	Passed	Passed
Average	Passed	Passed

Specimen	Buckle Latch	Partial Engagement Release Force (N)[I]
C1	Passed	N/A
C2	Passed	N/A
C3	Passed	N/A
Average	Passed	N/A See Note[II]

Push-Button Release Buckle

Specimen	Release Area (mm^2)	Minimum Linear Dimension (mm)	Buckle Crush Proof Load
C1	589.0	15.5	Passed
C2	589.0	15.5	Passed
C3	589.0	15.5	Passed
Average	589.0	15.5	Passed

Note[I]: The partial engagement release force test is performed by inserting the buckle tongue straight into the buckle assembly as far as possible without achieving complete engagement. While in this straight-in insertion orientation, force is applied in a straight line to determine the amount of force required to separate the buckle tongue from the buckle assembly in this partial engagement orientation.

Note[II]: This buckle design contains a buckle tongue ejection spring, which precludes achieving a buckle/tongue partial engagement; therefore, partial engagement release force measurements were not taken.

DATA

RETRACTOR PERFORMANCE

Retractor In "Cinch" Mode

Specimen	Movement Between Locking Positions (mm)		Performance[II]	Retraction Force	
	Original	After Cycling		Original (N)	After Cycling (Percent)
D1	5.50	5.50	Passed	5.00	87.0
D2	5.50	5.50	Passed	5.00	92.0
D3	5.50	5.50	Passed	5.00	92.0
Average	5.50	5.50	Passed	5.00	90.3

[II]Performance Consists of:
2500 cycles after salt spray exposure
2500 cycles after temperature humidity exposure
5000 cycles after dust exposure

DATA

RETRACTOR PERFORMANCE

Emergency Locking Retractor (Vehicle Sensitive)

Specimen	Retraction Force		Performance[III]	15° Angle No Lock Check	
	Original (N)	After Cycling (Percent)		Original	After Cycling
D1	5.10	90.1	Passed	Passed	Passed
D2	4.95	93.9	Passed	Passed	Passed
D3	5.00	93.0	Passed	Passed	Passed
Average	5.01	92.3	Passed	Passed	Passed

Specimen	Does Retractor Lock at 45° Angle?
D1	Yes
D2	Yes
D3	Yes

Specimen	Acceleration at 7 m/s^2 "X" Axis, Movement (mm)		Acceleration at 7 m/s^2 "Y" Axis, Movement (mm)	
	Original	After Cycling	Original	After Cycling
D1	15.5	14.5	17.5	17.5
D2	17.0	15.0	16.5	16.5
D3	15.5	15.0	17.5	16.0
Average	16.0	14.8	17.1	16.6

Specimen	Acceleration at 3 m/s^2 "X" Axis, Movement (mm)		Proof Load After Cycling
	Original	After Cycling	
D1	>51.0	>51.0	Passed
D2	>51.0	>51.0	Passed
D3	>51.0	>51.0	Passed
Average	>51.0	>51.0	Passed

[III]Performance Consists of:
40,000 cycles after dust exposure (includes 10,000 lockup cycles)

DATA

ASSEMBLY PERFORMANCE

Type 2 Assembly – Pelvic Portion

Specimen	Proof Load (N)	Loop Extension at 22,241 N (mm)	Buckle Release Force (N)	Cutting of Webbing	Fracture of Hardware
C1	22,241	61.7	43.0	None	None
C2	22,241	61.3	59.0	None	None
C3	22,241	61.0	41.7	None	None
Average	22,241	61.3	47.9	None	None

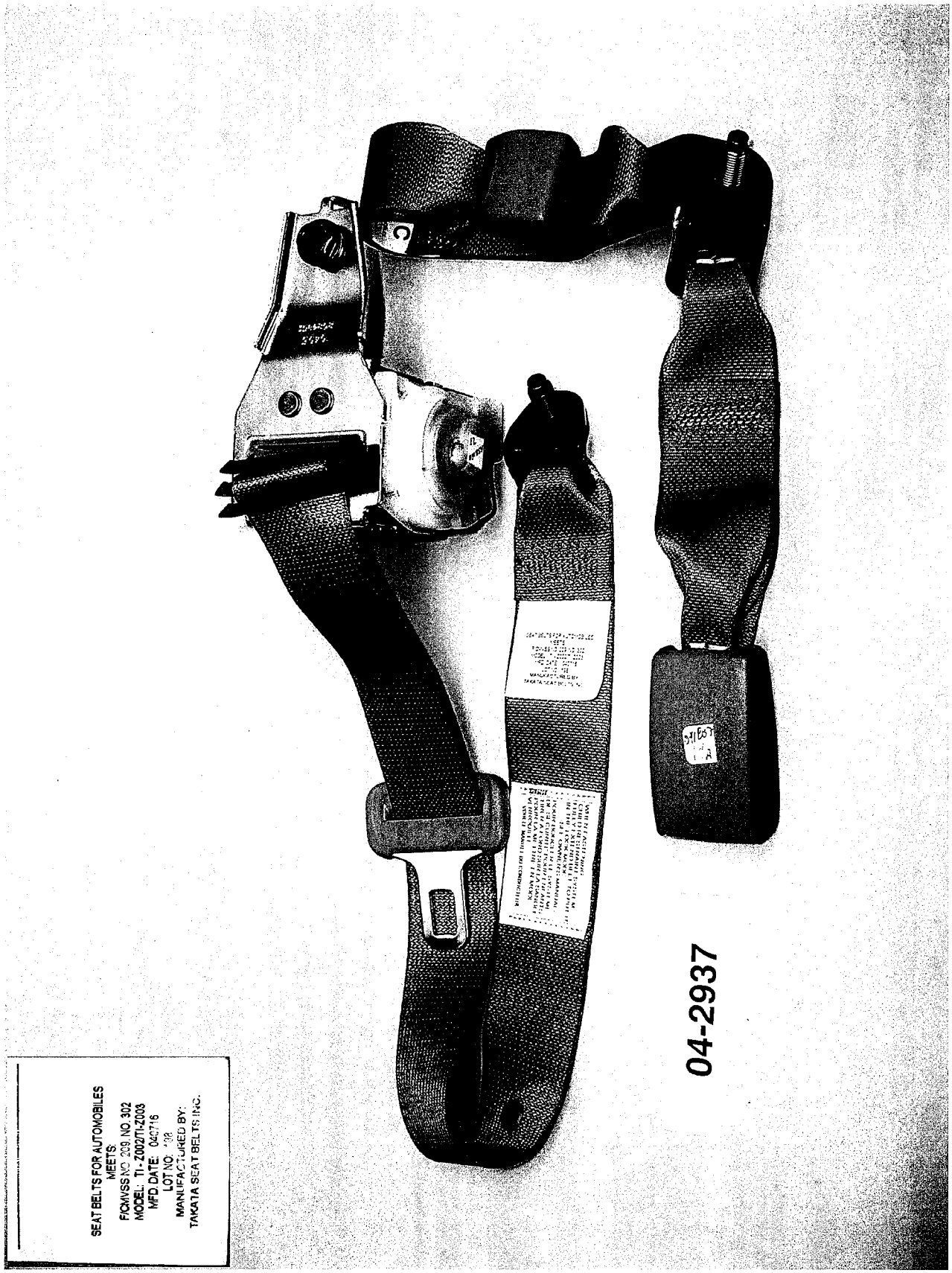
Type 2 Assembly – Torso Portion

Specimen	Proof Load (N)	Loop Extension at 13,345 N (mm)	Cutting of Webbing	Fracture of Hardware
C1	13,345	47.4	None	None
C2	13,345	46.3	None	None
C3	13,345	48.0	None	None
Average	13,345	47.2	None	None

DATA

ASSEMBLY PERFORMANCE

Specimen	Components Common to Pelvic and Upper Torso Proof Load, 13,345 N	Fully Extended Retractor Proof Load Tensile Test Torso, 6,672 N
C1	13,345	6,672
C2	13,345	6,672
C3	13,345	6,672
Average	13,345	6,672



JOB NO. 406056-01-000
DTB04R04-0695

MODEL NO. TI-Z002

19 SEPTEMBER 2004
FILE NO. 04-2937

DAYTON T. BROWN INC.
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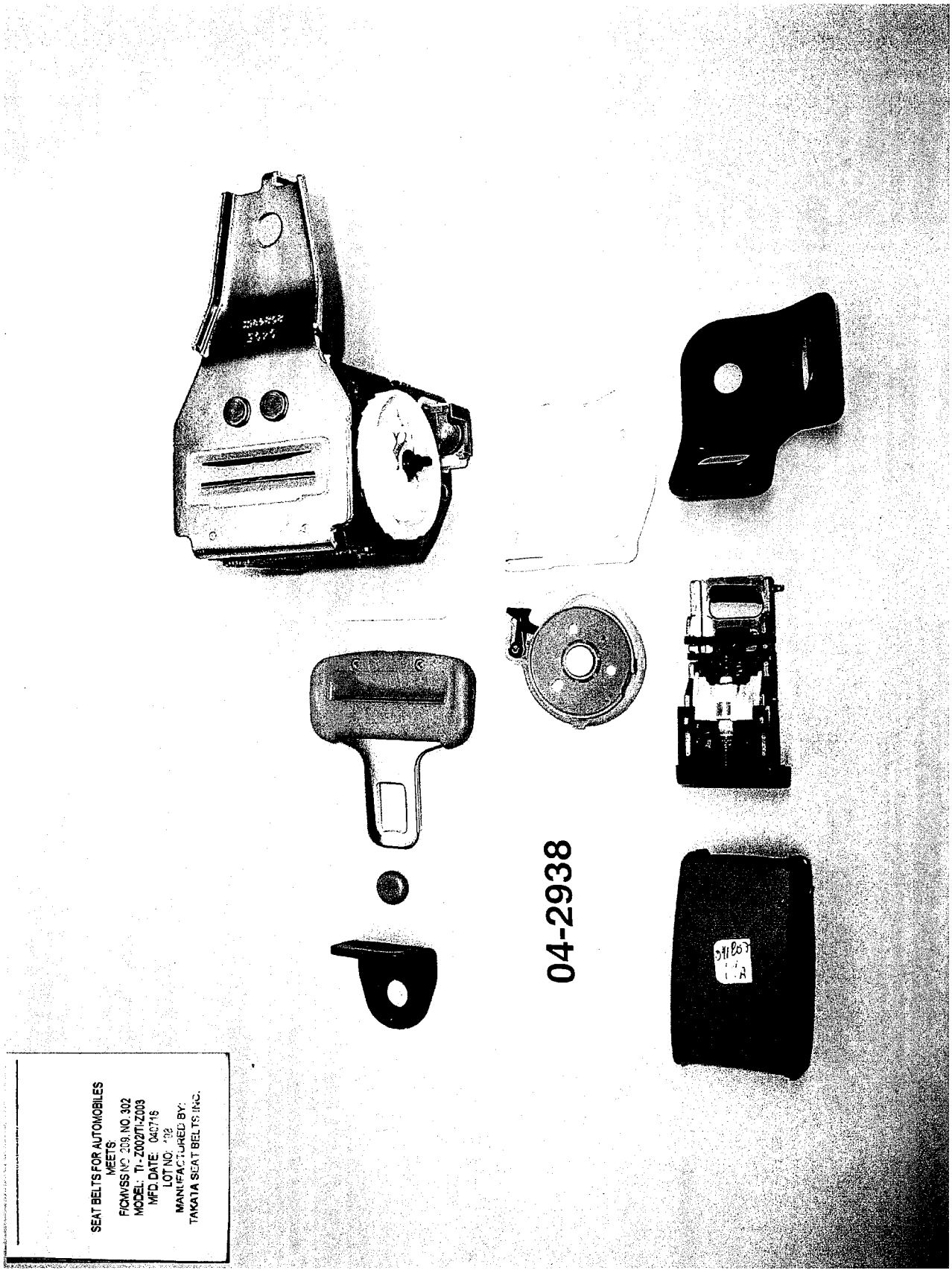

JOB NO. 406056-01-000
DTB04R04-0695

MODEL NO. TI-Z002

19 SEPTEMBER 2004
FILE NO. 04-2938

DAYTON T. BROWN INC.
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PE14-023

HYUNDAI

9/12/2014

ATTACHMENT E

CERTIFICATION REPORTS

DAYTON T. BROWN INC.
Founded 1950

CHURCH STREET • BOHEMIA, LONG ISLAND, NEW YORK 11716
AREA CODE 631 589-6300

TEST REPORT

Test Report No.: DTB04R04-0696 20 September 2004
Job No.: 406056-01-000

CLIENT Takata Seat Belts, Inc.
4611 Wiseman Blvd.
San Antonio, TX 78251

SUBJECT Type 2 Seat Belt Assembly with Emergency Locking Retractor

Assembly Model: TI-Z003

Installation 2005 Hyundai NF Sonata, 2nd LH

SUMMARY

The test results listed herein show that the submitted representative sample meets the cited test requirements of Federal Motor Vehicle Safety Standard No. 209* for the type of assembly tested.

* Federal Motor Vehicle Safety Standard No. 209, Seat Belt Assemblies as Amended 1 October 2003

SAMPLE DESCRIPTION

The seat belt assembly consists of a push-button release-type buckle attached by a stitched loop between the buckle frame and the buckle anchor plate. A length of webbing is attached by a stitched loop to an anchor plate. The webbing passes through the buckle connector tongue, and then into an emergency locking (vehicle and webbing sensitive) retractor. In addition, the retractor is equipped with a "cinch" feature. The retractor operates as an emergency locking retractor until its webbing is fully extended, at which point, it functions as an automatic locking retractor. It remains in the "cinch" mode until all the webbing has been retracted, at which point, it again operates as an emergency locking retractor.

Based on the manufacturer's test data sheet provided with the test specimens, the TI-Z003 retractor is functionally identical in design to the TI-Z002 retractor.

GENERAL

The submitted specimens were inspected upon receipt at Dayton T. Brown, Inc. and found to be undamaged.

The TI-Z003 and TI-Z002 specimens were received on 17 August 2004.

The retractor performance data contained herein was obtained from the Dayton T. Brown, Inc. Test Report No. DTB04R04-0695, dated 20 September 2004 for Model No. TI-Z002.

The retractor performance data is identified with an R.

The retractor performance testing on TI-Z002 was conducted from 18 August through 17 September 2004.

The assembly performance testing was conducted from 18 August through 17 September 2004.

The effective length of the Emergency Locking Retractor for both TI-Z003 and TI-Z002 is 1640 mm.

The installation angle of the Emergency Locking Retractor for both TI-Z003 and TI-Z002 is 0°.

The length of webbing on the retractor spool with the seat belt buckled over a 50%ile male occupant, for this specific vehicle seating position was provided as 600 mm.

The test results contained herein pertain only to the specimens listed in this report.

Dayton T. Brown, Inc. is not involved in any production quality inspections. All tests are based on the samples that are selected by the manufacturer and provided to Dayton T. Brown, Inc. without any Dayton T. Brown, Inc. involvement in said selection.

Dayton T. Brown, Inc. performs testing to FMVSS 209 under laboratory conditions. These tests do not measure and are not intended to measure all possible applications or installations of the seat belt assembly or components, except as so instructed by the manufacturer as to a particular configuration to be tested. In that event, the report will describe the particular application tested in detail. Dayton T. Brown, Inc. is not responsible for actual performance of any seat belt assembly, seat belt retractor, or individual seat belt component as installed in any vehicle.

LABELS

Refer to test specimen photograph, attached.

Very truly yours,

DAYTON T. BROWN, INC.

J. Benincasa
Test Technician

C. Scicluna
Test Engineer

Quality Department

TEST PROCEDURE

The test sample was inspected for the following properties in accordance with the procedures specified in Federal Motor Vehicle Safety Standard No. 209.

S4.1 GENERAL REQUIREMENTS

		Specimen Conformance
d.	Hardware (All hardware parts which contact, under normal usage, a person, clothing, or webbing shall be free of burrs and sharp edges.)	Satisfactory
h.	Webbing (The ends of webbing shall be protected or treated to prevent traveling and shall not pull out of the adjustment hardware at maximum size adjustment.)	Satisfactory
i.	Strap (A strap used in a seat belt assembly to sustain restraint forces shall comply with the requirements for webbing in S4.2, and if the strap is made from a rigid material, it shall comply with applicable requirements in S4.2, S4.3, and S4.4.)	Not Applicable
j.	Marking (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.)	Satisfactory
m.	Workmanship (Seat belt assemblies shall have good workmanship in accordance with good commercial practice.)	Satisfactory

S4.3 REQUIREMENTS FOR HARDWARE R

	Test and Units	Specimen Average Determined	Required
a.	Corrosion Resistance		
	All other hardware	Passed	Shall be free of ferrous or nonferrous corrosion
b.	Temperature Resistance	Passed	Plastic or nonmetallic parts shall not warp or otherwise deteriorate to cause the assembly to operate improperly or fail to comply with the applicable requirements

S4.3 REQUIREMENTS FOR HARDWARE – (Continued)

	Test and Units	Specimen Average Determined	Required
d.	Buckle Release		
	1) Release force, N	40.9	133 N max.
	2) Push-button design		
	a) Area, mm^2	589.0	452 mm^2 min.
	b) Min. linear dimension, mm	15.5	10 mm min.
	3) Buckle crush, 1779 N compressive load	Passed	Shall remain operable and meet the applicable requirements
g.	Buckle Latch		
	1) Latch cycling	Passed	Shall not fail, nor gall or wear to an extent that normal latching and unlatching is impaired
	2) Partial engagement, release force, N	N/A See Note[II]	A metal-to-metal buckle shall separate when in any position of partial engagement by a force of not more than 22 N, See Note[I]

Note[I]: The partial engagement release force test is performed by inserting the buckle tongue straight into the buckle assembly as far as possible without achieving complete engagement. While in this straight-in insertion orientation, force is applied in a straight line to determine the amount of force required to separate the buckle tongue from the buckle assembly in this partial engagement orientation.

Note[II]: This buckle design contains a buckle tongue ejection spring, which precludes achieving a buckle/tongue partial engagement; therefore, partial engagement release force measurements were not taken.

S4.3 REQUIREMENTS FOR HARDWARE R – (Continued)

	Test and Units	Specimen Average Determined	Required
i.	Retractor in "cinch" mode		
	1) Movement between locking positions, mm		25 mm max.
	a) Original	5.50	
	b) After cycling	5.50	
	2) Retraction Force		
	a) Original, N	5.00	Cont. Web. 1 N to 7 N.
	b) After cycling, Percent	90.3	Not Less than 50% of original
	3) Performance (cycling)	Passed	10,000 cycles

S4.3 REQUIREMENTS FOR HARDWARE R– (Continued)

	Test and Units	Specimen Average Determined	Required
j.	Emergency Locking Retractor (vehicle sensitive)		
	1) Movement prior to locking at 7 m/s^2 acceleration in "X" axis, mm		25 mm max.
	a) Original	16.0	
	b) After cycling	14.8	
	2) Movement prior to locking at 7 m/s^2 acceleration on "Y" axis, mm		25 mm max.
	a) Original	17.1	
	b) After cycling	16.6	
	3) Does retractor lock when tilted in any direction to any angle greater than 45° from the angle at which it is installed in the vehicle?	Yes	Does Retractor Lock?
	4) Movement prior to locking at 3 m/s^2 acceleration in "X" axis, mm		51 mm min. Lock/Not Locked
	a) Original	>51.0	
	b) After cycling	>51.0	
	5) Shall not lock when rotated in any direction to any angle of 15° or less from its orientation in the vehicle		Shall Not Lock
	a) Original	Passed	
	b) After cycling	Passed	
	6) Retraction force		
	a) Original, N	5.01	3 N min. Pelvic only 1-5 N Torso only 1-7 N Cont. Webbing
	b) After cycling, percent	92.3	Not less than 50% of original

S4.3 REQUIREMENTS FOR HARDWARE R– (Continued)

	Test and Units	Specimen Average Determined	Required
k.	Performance of Retractor		
	1) Performance (cycling)	Passed	40,000 cycles
	2) Performance (strength)	Passed	Shall comply with applicable requirements

S4.4 ASSEMBLY PERFORMANCE

	Test and Units	Specimen Average Determined	Required
b.	Type 2 Assembly		
	1) Assembly loop force, pelvic, N	22,241	22,241 N min.
	2) Assembly loop force, torso, N	13,345	13,345 N min.
	3) Assembly loop extension, pelvic, mm	63.0	254 mm max.
	4) Assembly loop extension, torso, mm	47.2	254 mm max.
	5) Components common to pelvic and torso, N	13,345	13,345 N tensile load
	6) Fully extended torso retractor, N	6,672	6,672 N tensile load
	7) Cutting of webbing pelvic torso	 None None	Any webbing cut by the hardware during test shall be tested
	8) Fracture of hardware pelvic torso	 None None	Complete fracture through any solid section of metal attachment hardware shall not occur during test

DATA R

HARDWARE

Specimen	Corrosion Resistance	Temperature Resistance
C1 and D1	Passed	Passed
C2 and D2	Passed	Passed
C3 and D3	Passed	Passed
Average	Passed	Passed

DATA

Specimen	Buckle Latch	Partial Engagement Release Force (N)[I]
C1	Passed	N/A
C2	Passed	N/A
C3	Passed	N/A
Average	Passed	N/A See Note[II]

Push-Button Release Buckle

Specimen	Release Area (mm^2)	Minimum Linear Dimension (mm)	Buckle Crush Proof Load
C1	589.0	15.5	Passed
C2	589.0	15.5	Passed
C3	589.0	15.5	Passed
Average	589.0	15.5	Passed

Note[I]: The partial engagement release force test is performed by inserting the buckle tongue straight into the buckle assembly as far as possible without achieving complete engagement. While in this straight-in insertion orientation, force is applied in a straight line to determine the amount of force required to separate the buckle tongue from the buckle assembly in this partial engagement orientation.

Note[II]: This buckle design contains a buckle tongue ejection spring, which precludes achieving a buckle/tongue partial engagement; therefore, partial engagement release force measurements were not taken.

DATA R

RETRACTOR PERFORMANCE

Retractor In "Cinch" Mode

Specimen	Movement Between Locking Positions (mm)		Performance[II]	Retraction Force	
	Original	After Cycling		Original (N)	After Cycling (Percent)
D1	5.50	5.50	Passed	5.00	87.0
D2	5.50	5.50	Passed	5.00	92.0
D3	5.50	5.50	Passed	5.00	92.0
Average	5.50	5.50	Passed	5.00	90.3

[II]Performance Consists of:
2500 cycles after salt spray exposure
2500 cycles after temperature humidity exposure
5000 cycles after dust exposure

DATA R

RETRACTOR PERFORMANCE

Emergency Locking Retractor (Vehicle Sensitive)

Specimen	Retraction Force		Performance[III]	15° Angle No Lock Check	
	Original (N)	After Cycling (Percent)		Original	After Cycling
D1	5.10	90.1	Passed	Passed	Passed
D2	4.95	93.9	Passed	Passed	Passed
D3	5.00	93.0	Passed	Passed	Passed
Average	5.01	92.3	Passed	Passed	Passed

Specimen	Does Retractor Lock at 45° Angle?
D1	Yes
D2	Yes
D3	Yes

Specimen	Acceleration at 7 m/s^2 "X" Axis, Movement (mm)		Acceleration at 7 m/s^2 "Y" Axis, Movement (mm)	
	Original	After Cycling	Original	After Cycling
D1	15.5	14.5	17.5	17.5
D2	17.0	15.0	16.5	16.5
D3	15.5	15.0	17.5	16.0
Average	16.0	14.8	17.1	16.6

Specimen	Acceleration at 3 m/s^2 "X" Axis, Movement (mm)		Proof Load After Cycling
	Original	After Cycling	
D1	>51.0	>51.0	Passed
D2	>51.0	>51.0	Passed
D3	>51.0	>51.0	Passed
Average	>51.0	>51.0	Passed

[III]Performance Consists of:
40,000 cycles after dust exposure (includes 10,000 lockup cycles)

DATA

ASSEMBLY PERFORMANCE

Type 2 Assembly – Pelvic Portion

Specimen	Proof Load (N)	Loop Extension at 22,241 N (mm)	Buckle Release Force (N)	Cutting of Webbing	Fracture of Hardware
C1	22,241	64.2	51.8	None	None
C2	22,241	63.8	44.7	None	None
C3	22,241	61.1	26.4	None	None
Average	22,241	63.0	40.9	None	None

Type 2 Assembly – Torso Portion

Specimen	Proof Load (N)	Loop Extension at 13,345 N (mm)	Cutting of Webbing	Fracture of Hardware
C1	13,345	46.3	None	None
C2	13,345	48.8	None	None
C3	13,345	46.5	None	None
Average	13,345	47.2	None	None

DATA

ASSEMBLY PERFORMANCE

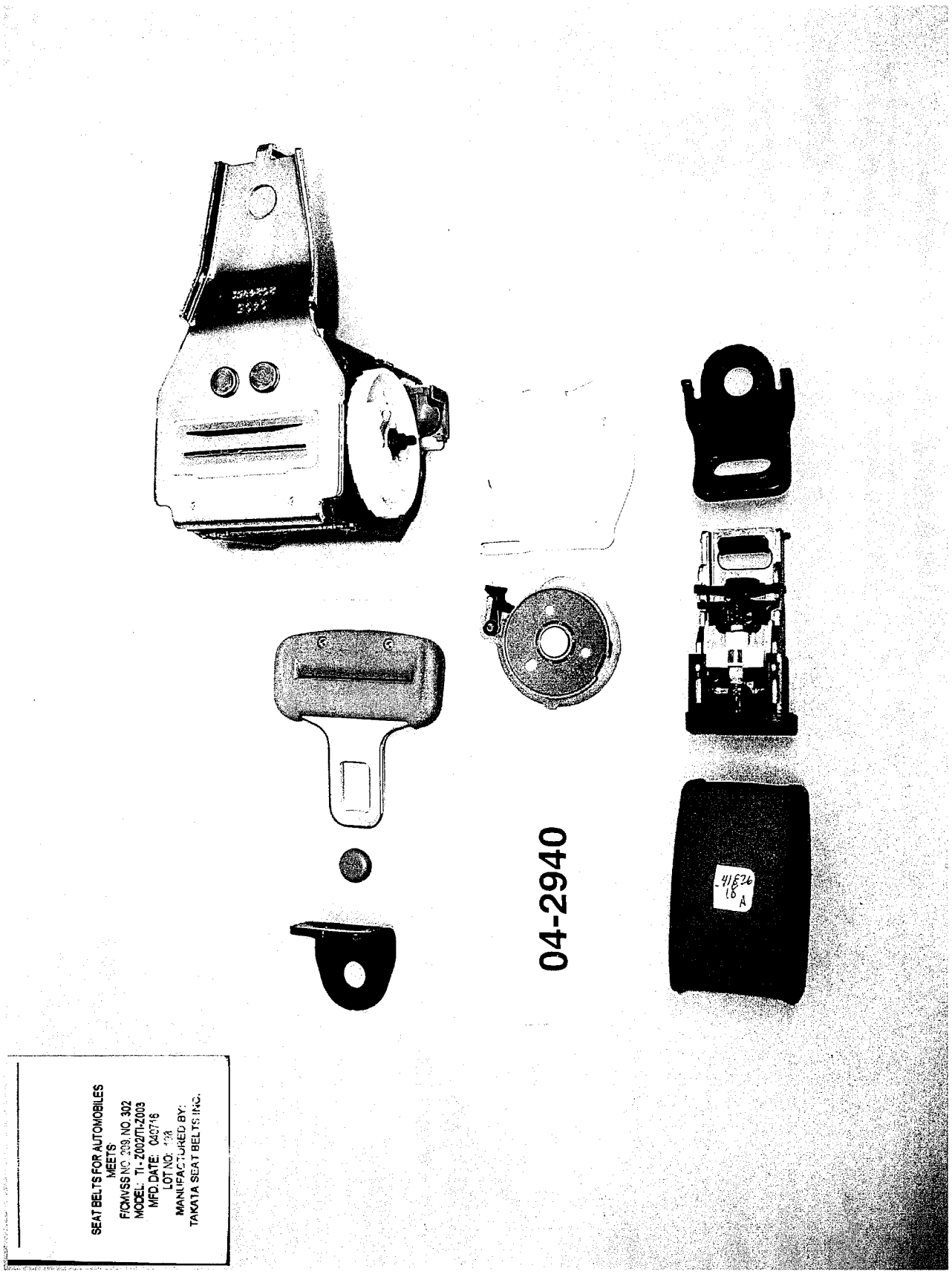
Specimen	Components Common to Pelvic and Upper Torso Proof Load, 13,345 N	Fully Extended Retractor Proof Load Tensile Test Torso, 6,672 N
C1	13,345	6,672
C2	13,345	6,672
C3	13,345	6,672
Average	13,345	6,672

JOB NO. 406056-01-000
DTB04R04-0696

MODEL NO. TI-Z003

19 SEPTEMBER 2004
FILE NO. 04-2939

DAYTON T. BROWN INC.
Founded 1950



JOB NO. 406056-01-000
DTB04R04-0696

MODEL NO. TI-Z003

19 SEPTEMBER 2004
FILE NO. 04-2940

DAYTON T. BROWN INC.
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PE14-023

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9/12/2014

ATTACHMENT E

CERTIFICATION REPORTS

DAYTON T. BROWN INC.
Founded 1950

CHURCH STREET • BOHEMIA, LONG ISLAND, NEW YORK 11716
AREA CODE 631 589-6300

TEST REPORT

Test Report No.: DTB04R04-0761 11 October 2004
Job No.: 406056-01-000

CLIENT Takata Seat Belts, Inc.
4611 Wiseman Blvd.
San Antonio, TX 78251

SUBJECT Type 2 Seat Belt Assembly with Emergency Locking Retractor

Assembly Model: TI-Z001

Installation 2005 Hyundai NF Sonata, FR RH

SUMMARY

The test results listed herein show that the submitted representative sample meets the cited test requirements of Federal Motor Vehicle Safety Standard No. 209* for the type of assembly tested.

* Federal Motor Vehicle Safety Standard No. 209, Seat Belt Assemblies as Amended 1 October 2003

SAMPLE DESCRIPTION

The seat belt assembly consists of a push-button release-type buckle attached by a cable between the buckle frame and the buckle anchor plate. A length of webbing is attached by a stitched loop to an anchor plate. The webbing passes through the buckle connector tongue, continues on and goes through the torso pivot, and then into an emergency locking (vehicle and webbing sensitive) retractor. In addition, the retractor is equipped with a "cinch" feature. The retractor operates as an emergency locking retractor until its webbing is fully extended, at which point, it functions as an automatic locking retractor. It remains in the "cinch" mode until all the webbing has been retracted, at which point, it again operates as an emergency locking retractor. The retractor contains a load limiter which reduces the forces upon the wearer during impact. The assembly has a pyrotechnic pretensioner built within the buckle anchor.

Based on the manufacturer's test data sheet provided with the test specimens, the TI-Z001 assembly is functionally identical in design to the TI-Z005 assembly.

GENERAL

The submitted specimens were inspected upon receipt at Dayton T. Brown, Inc. and found to be undamaged.

The TI-Z001 and TI-Z005 specimens were received on 20 August 2004.

The assembly performance data contained herein was obtained from the Dayton T. Brown, Inc. Test Report No. DTB04R04-0762, dated 11 October 2004 for Model No. TI-Z005.

The assembly performance data is identified with an A.

The assembly performance testing on TI-Z005 was conducted from 4 September through 6 October 2004.

The retractor performance testing was conducted from 4 September through 6 October 2004.

The effective length of the Emergency Locking Retractor is 1790 mm.

The length of webbing on the retractor spool with the seat belt buckled over a 50%ile male occupant, for this specific vehicle seating position was provided as 600 mm.

The installation angle of the Emergency Locking Retractor is 9.6° return spring.

The test results contained herein pertain only to the specimens listed in this report.

Dayton T. Brown, Inc. is not involved in any production quality inspections. All tests are based on the samples that are selected by the manufacturer and provided to Dayton T. Brown, Inc. without any Dayton T. Brown, Inc. involvement in said selection.

Dayton T. Brown, Inc. performs testing to FMVSS 209 under laboratory conditions. These tests do not measure and are not intended to measure all possible applications or installations of the seat belt assembly or components, except as so instructed by the manufacturer as to a particular configuration to be tested. In that event, the report will describe the particular application tested in detail. Dayton T. Brown, Inc. is not responsible for actual performance of any seat belt assembly, seat belt retractor, or individual seat belt component as installed in any vehicle.

LABELS

Refer to test specimen photograph, attached.

Very truly yours,

DAYTON T. BROWN, INC.

J. Benincasa
Test Technician

C. Scicluna
Test Engineer

Quality Department

TEST PROCEDURE

The test sample was inspected for the following properties in accordance with the procedures specified in Federal Motor Vehicle Safety Standard No. 209.

S4.1 GENERAL REQUIREMENTS

		Specimen Conformance
d.	Hardware (All hardware parts which contact, under normal usage, a person, clothing, or webbing shall be free of burrs and sharp edges.)	Satisfactory
h.	Webbing (The ends of webbing shall be protected or treated to prevent traveling and shall not pull out of the adjustment hardware at maximum size adjustment.)	Satisfactory
i.	Strap (A strap used in a seat belt assembly to sustain restraint forces shall comply with the requirements for webbing in S4.2, and if the strap is made from a rigid material, it shall comply with applicable requirements in S4.2, S4.3, and S4.4.)	Not Applicable
j.	Marking (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.)	Satisfactory
m.	Workmanship (Seat belt assemblies shall have good workmanship in accordance with good commercial practice.)	Satisfactory

S4.3 REQUIREMENTS FOR HARDWARE A

	Test and Units	Specimen Average Determined	Required
a.	Corrosion Resistance		
	All other hardware	Passed	Shall be free of ferrous or nonferrous corrosion
b.	Temperature Resistance	Passed	Plastic or nonmetallic parts shall not warp or otherwise deteriorate to cause the assembly to operate improperly or fail to comply with the applicable requirements

S4.3 REQUIREMENTS FOR HARDWARE A – (Continued)

	Test and Units	Specimen Average Determined	Required
d.	Buckle Release		
	1) Release force, N	23.4	133 N max.
	2) Push-button design		
	a) Area, mm^2	602.9	452 mm^2 min.
	b) Min. linear dimension, mm	15.5	10 mm min.
	3) Buckle crush, 1779 N compressive load	Passed	Shall remain operable and meet the applicable requirements
g.	Buckle Latch		
	1) Latch cycling	Passed	Shall not fail, nor gall or wear to an extent that normal latching and unlatching is impaired
	2) Partial engagement, release force, N	N/A See Note[II]	A metal-to-metal buckle shall separate when in any position of partial engagement by a force of not more than 22 N, See Note[I]

Note[I]: The partial engagement release force test is performed by inserting the buckle tongue straight into the buckle assembly as far as possible without achieving complete engagement. While in this straight-in insertion orientation, force is applied in a straight line to determine the amount of force required to separate the buckle tongue from the buckle assembly in this partial engagement orientation.

Note[II]: This buckle design contains a buckle tongue ejection spring, which precludes achieving a buckle/tongue partial engagement; therefore, partial engagement release force measurements were not taken.

S4.3 REQUIREMENTS FOR HARDWARE – (Continued)

	Test and Units	Specimen Average Determined	Required
i.	Retractor in "cinch" mode		
	1) Movement between locking positions, mm		25 mm max.
	a) Original	6.10	
	b) After cycling	6.10	
	2) Retraction Force		
	a) Original, N	3.95	Cont. Web. 1 N to 7 N.
	b) After cycling, Percent	89.0	Not Less than 50% of original
	3) Performance (cycling)	Passed	10,000 cycles

S4.3 REQUIREMENTS FOR HARDWARE – (Continued)

	Test and Units	Specimen Average Determined	Required
j.	Emergency Locking Retractor (vehicle sensitive)		
	1) Movement prior to locking at 7 m/s^2 acceleration in "X" axis, mm		25 mm max.
	a) Original	15.5	
	b) After cycling	17.1	
	2) Movement prior to locking at 7 m/s^2 acceleration on "Y" axis, mm		25 mm max.
	a) Original	15.6	
	b) After cycling	16.3	
	3) Does retractor lock when tilted in any direction to any angle greater than 45° from the angle at which it is installed in the vehicle?	Yes	Does Retractor Lock?
	4) Movement prior to locking at 3 m/s^2 acceleration in "X" axis, mm		51 mm min. Lock/Not Locked
	a) Original	>51.0	
	b) After cycling	>51.0	
	5) Shall not lock when rotated in any direction to any angle of 15° or less from its orientation in the vehicle		Shall Not Lock
	a) Original	Passed	
	b) After cycling	Passed	
	6) Retraction force		
	a) Original, N	4.06	3 N min. Pelvic only 1-5 N Torso only 1-7 N Cont. Webbing
	b) After cycling, percent	88.5	Not less than 50% of original

S4.3 REQUIREMENTS FOR HARDWARE – (Continued)

	Test and Units	Specimen Average Determined	Required
k.	Performance of Retractor		
	1) Performance (cycling)	Passed	40,000 cycles
	2) Performance (strength)	Passed	Shall comply with applicable requirements

S4.4 ASSEMBLY PERFORMANCE A

	Test and Units	Specimen Average Determined	Required
b.	Type 2 Assembly		
	1) Assembly loop force, pelvic, N	22,241	22,241 N min.
	2) Assembly loop force, torso, N	13,345	13,345 N min.
	3) Assembly loop extension, pelvic, mm	54.0	254 mm max.
	4) Assembly loop extension, torso, mm	245.9	254 mm max.
	5) Components common to pelvic and torso, N	13,345	13,345 N tensile load
	6) Fully extended torso retractor, N	6,672	6,672 N tensile load
	7) Cutting of webbing pelvic torso	 None None	Any webbing cut by the hardware during test shall be tested
	8) Fracture of hardware pelvic torso	 None None	Complete fracture through any solid section of metal attachment hardware shall not occur during test

DATA A

HARDWARE

Specimen	Corrosion Resistance	Temperature Resistance
C1 and D1	Passed	Passed
C2 and D2	Passed	Passed
C3 and D3	Passed	Passed
Average	Passed	Passed

Specimen	Buckle Latch	Partial Engagement Release Force (N)[I]
C1	Passed	N/A
C2	Passed	N/A
C3	Passed	N/A
Average	Passed	N/A See Note[II]

Push-Button Release Buckle

Specimen	Release Area (mm^2)	Minimum Linear Dimension (mm)	Buckle Crush Proof Load
C1	602.9	15.5	Passed
C2	602.9	15.5	Passed
C3	602.9	15.5	Passed
Average	602.9	15.5	Passed

Note[I]: The partial engagement release force test is performed by inserting the buckle tongue straight into the buckle assembly as far as possible without achieving complete engagement. While in this straight-in insertion orientation, force is applied in a straight line to determine the amount of force required to separate the buckle tongue from the buckle assembly in this partial engagement orientation.

Note[II]: This buckle design contains a buckle tongue ejection spring, which precludes achieving a buckle/tongue partial engagement; therefore, partial engagement release force measurements were not taken.

DATA

RETRACTOR PERFORMANCE

Retractor In "Cinch" Mode

Specimen	Movement Between Locking Positions (mm)		Performance[II]	Retraction Force	
	Original	After Cycling		Original (N)	After Cycling (Percent)
D1	6.10	6.10	Passed	4.05	87.6
D2	6.10	6.10	Passed	3.90	89.7
D3	6.10	6.10	Passed	3.90	89.7
Average	6.10	6.10	Passed	3.95	89.0

[II]Performance Consists of:
2500 cycles after salt spray exposure
2500 cycles after temperature humidity exposure
5000 cycles after dust exposure

DATA

RETRACTOR PERFORMANCE

Emergency Locking Retractor (Vehicle Sensitive)

Specimen	Retraction Force		Performance[III]	15° Angle No Lock Check	
	Original (N)	After Cycling (Percent)		Original	After Cycling
D1	4.10	87.8	Passed	Passed	Passed
D2	4.00	90.0	Passed	Passed	Passed
D3	4.10	87.8	Passed	Passed	Passed
Average	4.06	88.5	Passed	Passed	Passed

Specimen	Does Retractor Lock at 45° Angle?
D1	Yes
D2	Yes
D3	Yes

Specimen	Acceleration at 7 m/s^2 "X" Axis, Movement (mm)		Acceleration at 7 m/s^2 "Y" Axis, Movement (mm)	
	Original	After Cycling	Original	After Cycling
D1	14.5	17.0	14.0	15.0
D2	16.5	17.5	16.5	17.0
D3	15.5	17.0	16.5	17.0
Average	15.5	17.1	15.6	16.3

Specimen	Acceleration at 3 m/s^2 "X" Axis, Movement (mm)		Proof Load After Cycling
	Original	After Cycling	
D1	>51.0	>51.0	Passed
D2	>51.0	>51.0	Passed
D3	>51.0	>51.0	Passed
Average	>51.0	>51.0	Passed

[III]Performance Consists of:
40,000 cycles after dust exposure (includes 10,000 lockup cycles)

DATA A

ASSEMBLY PERFORMANCE

Type 2 Assembly – Pelvic Portion

Specimen	Proof Load (N)	Loop Extension at 22,241 N (mm)	Buckle Release Force (N)	Cutting of Webbing	Fracture of Hardware
C1	22,241	54.1	27.1	None	None
C2	22,241	54.5	23.0	None	None
C3	22,241	53.6	20.2	None	None
Average	22,241	54.0	23.4	None	None

Type 2 Assembly – Torso Portion

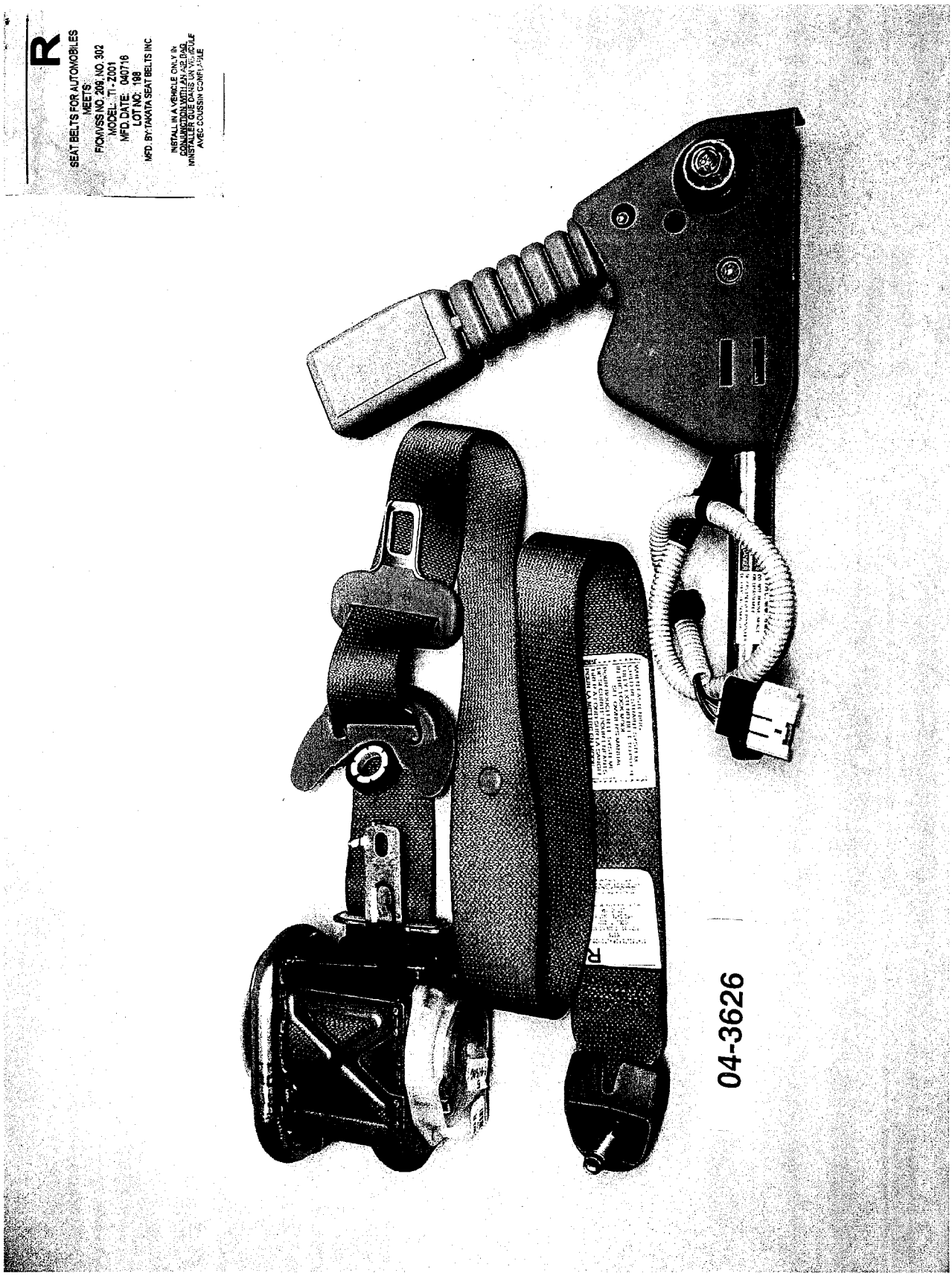
Specimen	Proof Load (N)	Loop Extension at 13,345 N (mm)	Cutting of Webbing	Fracture of Hardware
C1	13,345	320.5*	None	None
C2	13,345	91.7	None	None
C3	13,345	325.7*	None	None
Average	13,345	245.9	None	None

* Note: A type 2 seat belt assembly that includes a load-limiter is not required to comply with the elongation requirements.

DATA A

ASSEMBLY PERFORMANCE

Specimen	Components Common to Pelvic and Upper Torso Proof Load, 13,345 N	Fully Extended Retractor Proof Load Tensile Test Torso, 6,672 N
C1	13,345	6,672
C2	13,345	6,672
C3	13,345	6,672
Average	13,345	6,672



JOB NO. 406056-01-000
DTB04R04-0761

MODEL NO. TI-Z001

10 OCTOBER 2004
FILE NO. 04-3626

DAYTON T. BROWN INC.
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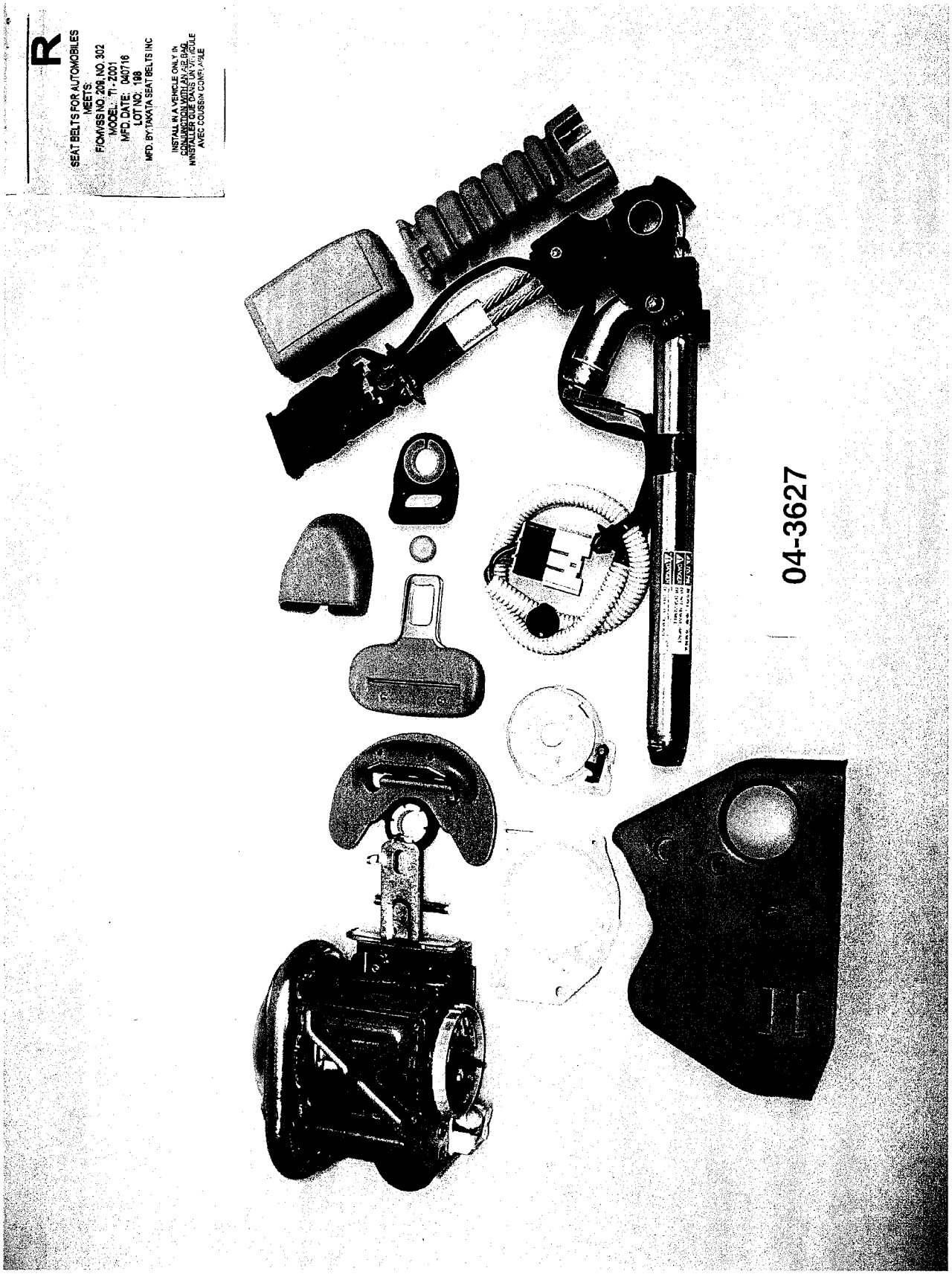

JOB NO. 406056-01-000
DTB04R04-0761

MODEL NO. TI-Z001

10 OCTOBER 2004
FILE NO. 04-3627

DAYTON T. BROWN INC.
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PE14-023

HYUNDAI

9/12/2014

ATTACHMENT E

CERTIFICATION REPORTS

DAYTON T. BROWN INC.
Founded 1950

CHURCH STREET • BOHEMIA, LONG ISLAND, NEW YORK 11716
AREA CODE 631 589-6300

TEST REPORT

Test Report No.: DTB04R04-0762 11 October 2004
Job No.: 406056-01-000

Revision Report No.: DTB04R04-0762, Addendum 1 21 October 2004

CLIENT Takata Seat Belts, Inc.
4611 Wiseman Blvd.
San Antonio, TX 78251

SUBJECT Type 2 Seat Belt Assembly with Emergency Locking Retractor

Assembly Model: TI-Z005

Installation 2005 Hyundai NF Sonata, FR LH

PURPOSE

The purpose of this report is to serve as an addendum to the original test report, inserting a notation on which assembly had an inverted tongue, as well as the additional Elongation measurement on Specimen C2. After the completion of all testing, specimen C2 was sent back to Takata for inspection and then returned back to Dayton T. Brown to perform an additional Elongation Test. This additional Elongation measurement is being included in the report.

SUMMARY

The test results listed herein show that the submitted representative sample meets the cited test requirements of Federal Motor Vehicle Safety Standard No. 209* for the type of assembly tested.

* Federal Motor Vehicle Safety Standard No. 209, Seat Belt Assemblies as Amended 1 October 2003

SAMPLE DESCRIPTION

The seat belt assembly consists of a push-button release-type buckle attached by a cable between the buckle frame and the buckle anchor plate. A length of webbing is attached by a stitched loop to an anchor plate. The webbing passes through the buckle connector tongue, continues on and goes through the torso pivot, and then into an emergency locking (vehicle and webbing sensitive) retractor. The retractor contains a load limiter which reduces the forces upon the wearer during impact. The assembly has a pyrotechnic pretensioner built within the buckle anchor.

GENERAL

The submitted specimens were inspected upon receipt at Dayton T. Brown, Inc. and found to be undamaged.

The specimens were received on 20 August 2004.

The assembly performance testing was conducted from 4 September through 6 October 2004.

The additional Elongation test was conducted on 14 October 2004.

The retractor performance testing was conducted from 4 September through 6 October 2004.

The effective length of the Emergency Locking Retractor is 1785 mm.

The length of webbing on the retractor spool with the seat belt buckled over a 50%ile male occupant, for this specific vehicle seating position was provided as 600 mm.

The installation angle of the Emergency Locking Retractor is 9.6° sensor.

The test results contained herein pertain only to the specimens listed in this report.

Dayton T. Brown, Inc. is not involved in any production quality inspections. All tests are based on the samples that are selected by the manufacturer and provided to Dayton T. Brown, Inc. without any Dayton T. Brown, Inc. involvement in said selection.

Dayton T. Brown, Inc. performs testing to FMVSS 209 under laboratory conditions. These tests do not measure and are not intended to measure all possible applications or installations of the seat belt assembly or components, except as so instructed by the manufacturer as to a particular configuration to be tested. In that event, the report will describe the particular application tested in detail. Dayton T. Brown, Inc. is not responsible for actual performance of any seat belt assembly, seat belt retractor, or individual seat belt component as installed in any vehicle.

LABELS

Refer to test specimen photograph, attached.

Very truly yours,

DAYTON T. BROWN, INC.

J. Benincasa
Test Technician

C. Scicluna
Test Engineer

Quality Department

TEST PROCEDURE

The test sample was inspected for the following properties in accordance with the procedures specified in Federal Motor Vehicle Safety Standard No. 209.

S4.1 GENERAL REQUIREMENTS

		Specimen Conformance
d.	Hardware (All hardware parts which contact, under normal usage, a person, clothing, or webbing shall be free of burrs and sharp edges.)	Satisfactory
h.	Webbing (The ends of webbing shall be protected or treated to prevent traveling and shall not pull out of the adjustment hardware at maximum size adjustment.)	Satisfactory
i.	Strap (A strap used in a seat belt assembly to sustain restraint forces shall comply with the requirements for webbing in S4.2, and if the strap is made from a rigid material, it shall comply with applicable requirements in S4.2, S4.3, and S4.4.)	Not Applicable
j.	Marking (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.)	Satisfactory
m.	Workmanship (Seat belt assemblies shall have good workmanship in accordance with good commercial practice.)	Satisfactory

S4.3 REQUIREMENTS FOR HARDWARE

	Test and Units	Specimen Average Determined	Required
a.	Corrosion Resistance		
	All other hardware	Passed	Shall be free of ferrous or nonferrous corrosion
b.	Temperature Resistance	Passed	Plastic or nonmetallic parts shall not warp or otherwise deteriorate to cause the assembly to operate improperly or fail to comply with the applicable requirements

S4.3 REQUIREMENTS FOR HARDWARE – (Continued)

	Test and Units	Specimen Average Determined	Required
d.	Buckle Release		
	1) Release force, N	23.4	133 N max.
	2) Push-button design		
	a) Area, mm^2	602.9	452 mm^2 min.
	b) Min. linear dimension, mm	15.5	10 mm min.
	3) Buckle crush, 1779 N compressive load	Passed	Shall remain operable and meet the applicable requirements
g.	Buckle Latch		
	1) Latch cycling	Passed	Shall not fail, nor gall or wear to an extent that normal latching and unlatching is impaired
	2) Partial engagement, release force, Newtons	N/A See Note[II]	A metal-to-metal buckle shall separate when in any position of partial engagement by a force of not more than 22 Newtons, See Note[I]

Note[I]: The partial engagement release force test is performed by inserting the buckle tongue straight into the buckle assembly as far as possible without achieving complete engagement. While in this straight-in insertion orientation, force is applied in a straight line to determine the amount of force required to separate the buckle tongue from the buckle assembly in this partial engagement orientation.

Note[II]: This buckle design contains a buckle tongue ejection spring, which precludes achieving a buckle/tongue partial engagement; therefore, partial engagement release force measurements were not taken.

S4.3 REQUIREMENTS FOR HARDWARE – (Continued)

	Test and Units	Specimen Average Determined	Required
j.	Emergency Locking Retractor (vehicle sensitive)		
	1) Movement prior to locking at 7 m/s^2 acceleration in "X" axis, mm		25 mm max.
	a) Original	16.5	
	b) After cycling	16.6	
	2) Movement prior to locking at 7 m/s^2 acceleration on "Y" axis, mm		25 mm max.
	a) Original	15.8	
	b) After cycling	16.5	
	3) Does retractor lock when tilted in any direction to any angle greater than 45° from the angle at which it is installed in the vehicle?	Yes	Does Retractor Lock?
	4) Movement prior to locking at 3 m/s^2 acceleration in "X" axis, mm		51 mm min. Lock/Not Locked
	a) Original	>51.0	
	b) After cycling	>51.0	
	5) Shall not lock when rotated in any direction to any angle of 15° or less from its orientation in the vehicle		Shall Not Lock
	a) Original	Passed	
	b) After cycling	Passed	
	6) Retraction force		
	a) Original, N	4.01	3 N min. Pelvic only 1-5 N Torso only 1-7 N Cont. Webbing
	b) After cycling, percent	91.2	Not less than 50% of original

S4.3 REQUIREMENTS FOR HARDWARE – (Continued)

	Test and Units	Specimen Average Determined	Required
k.	Performance of Retractor		
	1) Performance (cycling)	Passed	50,000 cycles
	2) Performance (strength)	Passed	Shall comply with applicable requirements

S4.4 ASSEMBLY PERFORMANCE

	Test and Units	Specimen Average Determined	Required
b.	Type 2 Assembly		
	1) Assembly loop force, pelvic, N	22,241	22,241 N min.
	2) Assembly loop force, torso, N	13,345	13,345 N min.
	3) Assembly loop extension, pelvic, mm	54.0	254 mm max.
	4) Assembly loop extension, torso, mm	245.9	254 mm max.
	5) Components common to pelvic and torso, N	13,345	13,345 N tensile load
	6) Fully extended torso retractor, N	6,672	6,672 N tensile load
	7) Cutting of webbing pelvic torso	 None None	Any webbing cut by the hardware during test shall be tested
	8) Fracture of hardware pelvic torso	 None None	Complete fracture through any solid section of metal attachment hardware shall not occur during test

DATA

HARDWARE

Specimen	Corrosion Resistance	Temperature Resistance
C1 and D1	Passed	Passed
C2 and D2	Passed	Passed
C3 and D3	Passed	Passed
Average	Passed	Passed

Specimen	Buckle Latch	Partial Engagement Release Force (N)[I]
C1	Passed	N/A
C2	Passed	N/A
C3	Passed	N/A
Average	Passed	N/A See Note[II]

Push-Button Release Buckle

Specimen	Release Area (mm^2)	Minimum Linear Dimension (mm)	Buckle Crush Proof Load
C1	602.9	15.5	Passed
C2	602.9	15.5	Passed
C3	602.9	15.5	Passed
Average	602.9	15.5	Passed

Note[I]: The partial engagement release force test is performed by inserting the buckle tongue straight into the buckle assembly as far as possible without achieving complete engagement. While in this straight-in insertion orientation, force is applied in a straight line to determine the amount of force required to separate the buckle tongue from the buckle assembly in this partial engagement orientation.

Note[II]: This buckle design contains a buckle tongue ejection spring, which precludes achieving a buckle/tongue partial engagement; therefore, partial engagement release force measurements were not taken.

DATA

RETRACTOR PERFORMANCE

Emergency Locking Retractor (Vehicle Sensitive)

Specimen	Retraction Force		Performance[III]	15° Angle No Lock Check	
	Original (N)	After Cycling (Percent)		Original	After Cycling
D1	4.00	91.2	Passed	Passed	Passed
D2	4.05	91.3	Passed	Passed	Passed
D3	4.00	91.2	Passed	Passed	Passed
Average	4.01	91.2	Passed	Passed	Passed

Specimen	Does Retractor Lock at 45° Angle?
D1	Yes
D2	Yes
D3	Yes

Specimen	Acceleration at 7 m/s^2 "X" Axis, Movement (mm)		Acceleration at 7 m/s^2 "Y" Axis, Movement (mm)	
	Original	After Cycling	Original	After Cycling
D1	16.5	15.0	15.0	15.0
D2	16.5	18.0	17.5	17.0
D3	16.5	17.0	15.0	17.5
Average	16.5	16.6	15.8	16.5

Specimen	Acceleration at 3 m/s^2 "X" Axis, Movement (mm)		Proof Load After Cycling
	Original	After Cycling	
D1	>51.0	>51.0	Passed
D2	>51.0	>51.0	Passed
D3	>51.0	>51.0	Passed
Average	>51.0	>51.0	Passed

[III]Performance Consists of:
2,500 cycles after salt spray exposure
2,500 cycles after temperature humidity exposure
45,000 cycles after dust exposure (includes 10,000 lockup cycles)

DATA

ASSEMBLY PERFORMANCE

Type 2 Assembly – Pelvic Portion

Specimen	Proof Load (N)	Loop Extension at 22,241 N (mm)	Buckle Release Force (N)	Cutting of Webbing	Fracture of Hardware
C1	22,241	54.1	27.1	None	None
C2	22,241	54.5	23.0	None	None
C3 *	22,241	53.6	20.2	None	None
Average	22,241	54.0	23.4	None	None

* The tongue was inverted for these tests.

Type 2 Assembly – Torso Portion

Specimen	Proof Load (N)	Loop Extension at 13,345 N (mm)	Cutting of Webbing	Fracture of Hardware
C1	13,345	320.5*	None	None
C2	13,345	91.7	None	None
C3	13,345	325.7*	None	None
C2 (dated 10/14/04)	13,345	328.2**	None	None
Average	13,345	245.9	None	None

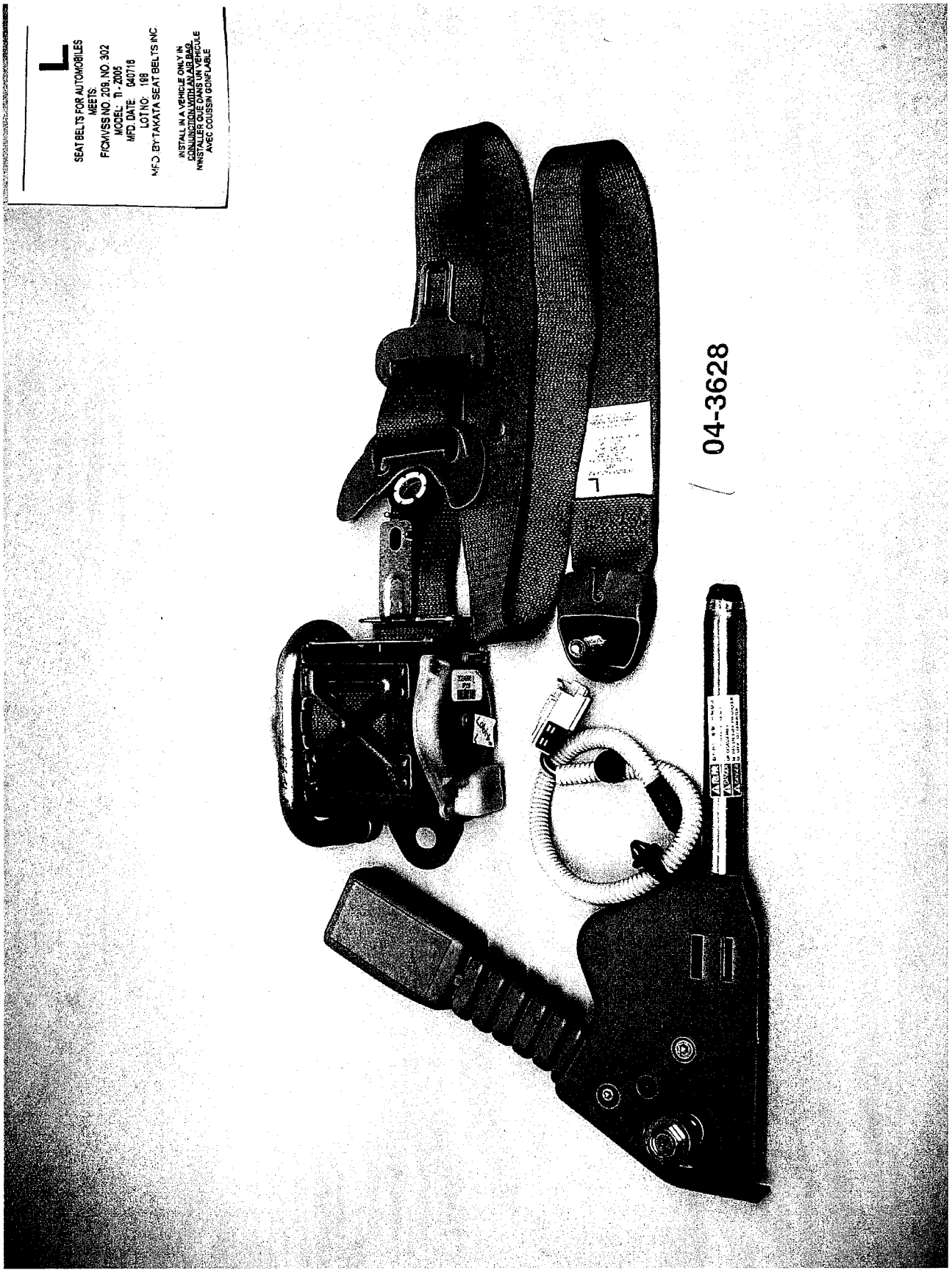
* Note: A type 2 seat belt assembly that includes a load-limiter is not required to comply with the elongation requirements.

** After the completion of all testing, specimen C2 was sent back to Takata for inspection and later returned back to Dayton T. Brown to perform an additional Elongation Test only. This additional Elongation measurement is being included in the report but not to be included in the overall average.

DATA

ASSEMBLY PERFORMANCE

Specimen	Components Common to Pelvic and Upper Torso Proof Load, 13,345 N	Fully Extended Retractor Proof Load Tensile Test Torso, 6,672 N
C1	13,345	6,672
C2	13,345	6,672
C3	13,345	6,672
Average	13,345	6,672



JOB NO. 406056-01-000
DTB04R04-0762

MODEL NO. TI-Z005

10 OCTOBER 2004
FILE NO. 04-3628

DAYTON T. BROWN INC.
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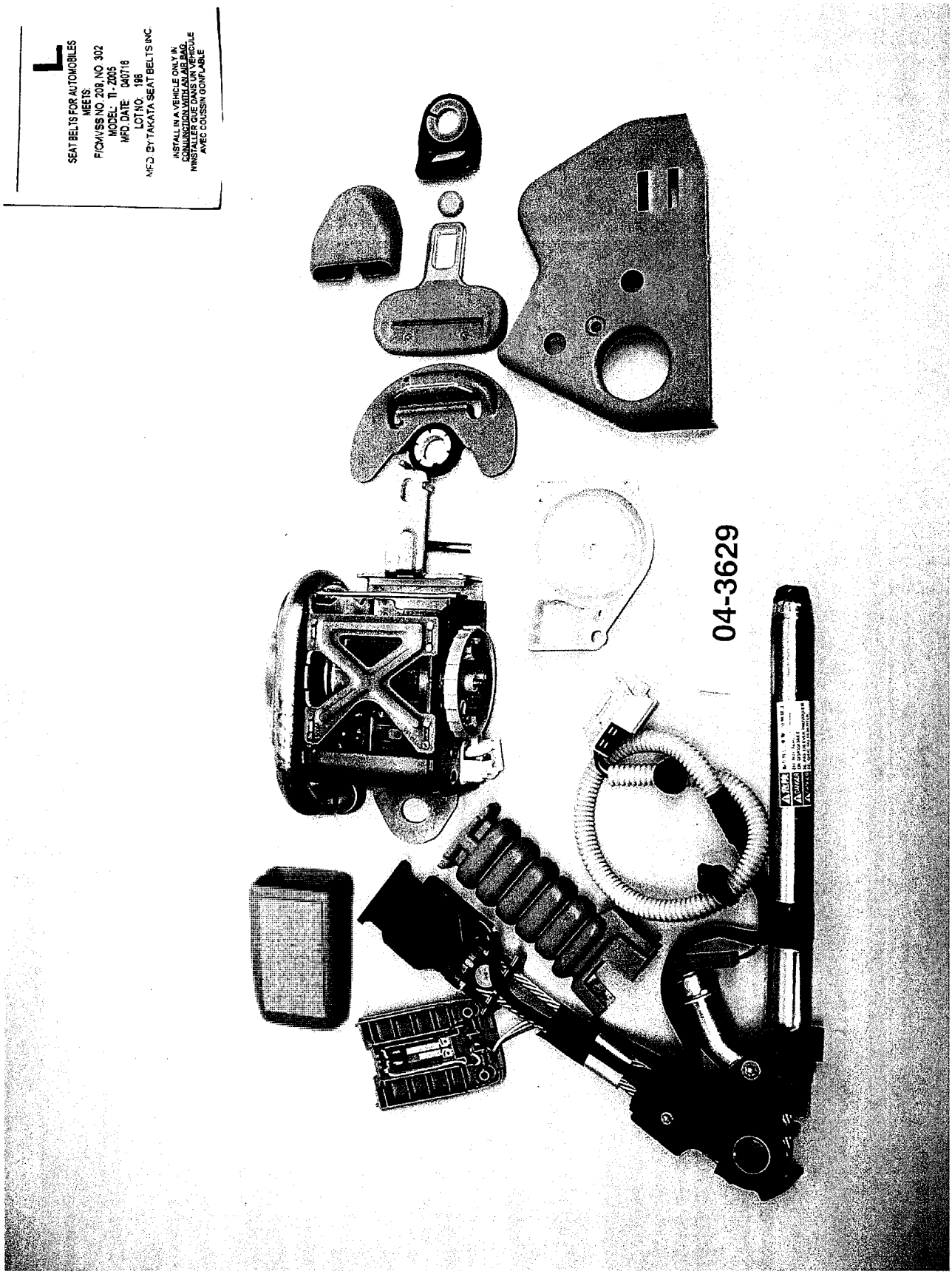


JOB NO. 406056-01-000
DTB04R04-0762

MODEL NO. TI-Z005

10 OCTOBER 2004
FILE NO. 04-3629

DAYTON T. BROWN INC.
Founded 1950

PE14-023

HYUNDAI

9/12/2014

ATTACHMENT F

NCAP Simulation_Dual vs. Single PT

Hyundai Response to PE14-023

Response to Request 8

유형	
연구	
해석	●
조사	
기획	
품질	
정보	
출장	
교육	
일반	

NF FL USNCAP
(Dual vs. Single PT)

구분	
의사결정	
지시사항	
정보전달	●

협조처	
협조처1	의장안전부품설계팀
협조처2	시험4팀
협조처3	프로젝트2팀
협조처4	

Engineer	Group Leader	Team Leader
Signed	Signed	Signed

지시사항 / COMMENT

Advanced CAE Team

2006. 8. 22

NF FL USNCAP (Dual vs. Single PT)

Background

- PROTO Test (PROTO #1 '06. 10, US '08. 2)

Purpose

- <Dual PT → Single PT > Crashworthiness → PROTO Test

Model

- Crash Pulse : NF Test
- Restraint : Mobis, TAKATA LL/PT, ADVANCED(ADH) Airbag

Result

- Compare injury : Dual PT, Single PT
- NCAP

NF	PT	HIC/CG	Injury Combined	Predict Test
Test (NHTSA 050825)	Dual	268 / 42.5	8.6%	8.6% (5★)
Simulation	Dual	339 / 41.2	8.2%	8.6% (5★)
Simulation	Single	323 / 44.4	9.4%	9.8% (5★)

Conclusion

- Dual PT → Single PT : Injury Combined 1.2% ↑ Performance of dual pre-tensioner is slightly better than the performance of single pretensioner. But single pretensioners and dual pretensioners both satisfy the performance of 5 ★.
  → Chest G 3G ↑
  → Satisfy 5★ (9.8%)
- TAKATA Single PT, Simulation/SLED and PROTO Test F/Up (10 PROTO Car)

PE14-023

HYUNDAI

9/12/2014

ATTACHMENT G

HYUNDAI

QUALITY INFORMATION REPORT

CONFIDENTIAL

Model Code	Subject Code*		HMA Report Number
NF	Electrical		QANF-L-051213
Creation date/time/user:	**Analyst:***	**Co-analyst(s):**	**Modified date/time/user:**
12/13/2005	Thai Vu		

Distributor*	Country*	Date	HMC Report Number	Attachments
HMA	USA	12/13/2005		

Model*	Engine or Transmission Number*	Production Date*	Attachments
Sonata	G4KC5099345	6/02/2005	[x] Photo

Vehicle Identification Number*	Mileage*	Delivery Date*	Attachments
KMHEU46C56A[redacted]	641	8/20/2005	[x] Part

Subject*	Attachments
[B] FRONT SEAT BELT BUCKLE ASSEMBLY INOPERATIVE (BOTH – HMC)	[ ] Other

Condition:

Customer complaint the air bag light is illuminated.

Analysis:

- HMA received 9 incident seat belt buckles from the field.
- All incident seat belt buckles indicate the air bag light illuminated.
- Exterior inspection of the seat belt buckle harnesses does not show signs of the wire chafing.
- The incident seat belt buckles were installed to a known “good” vehicle for evaluation.
- All dealers reported conditions (SRS light illuminated and diagnostic codes stored) could not be duplicated when the seat belt buckles were installed in the test vehicle.
- Three incident parts could not be evaluated due to the dealerships deploying the seat belt buckle pretensioners before shipping them to HMA.

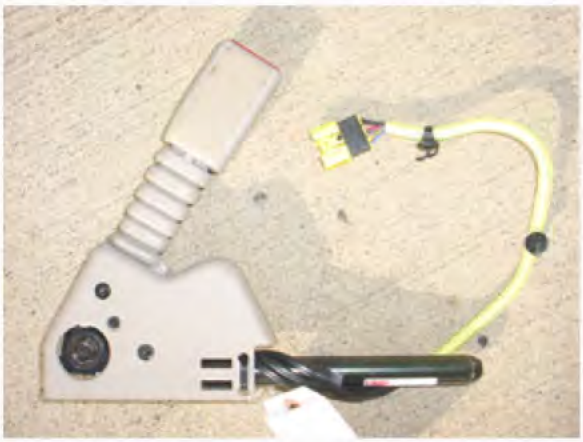
No.	VIN Number	Prod Date	Mileage	Description	HMA Investigation
1	5NPEU46F36H[redacted]	5/25/2005	1,377	Seat belt buckle inop	Could not duplicate condition. No trouble codes stored.
2	KMHEU46C56A[redacted]	6/7/2005	641	SRS light on. Code B1517 (Driver seat belt buckle switch instability)	Could not duplicate condition. No trouble codes stored.
3	5NPEU46FX6H[redacted]	6/2/2005	12	SRS light on. Code B1362 stored (Driver pretensioner low resistance).	Could not duplicate condition. No trouble codes stored.
4	KMHEU46C66A[redacted]	4/20/2005	10,137	SRS light on	Seat belt buckle has already been deployed by the dealer before shipment to HMA
5	5NPEU46F76H[redacted]	5/4/2005	5,906	SRS light on. Code B1701 stored. Replaced right front seat belt buckle	Seat belt buckle has already been deployed by the dealer before shipment to HMA
6	5NPEU46F46H[redacted]	5/14/2005	1,632	SRS light on. Replaced right front seat belt buckle	Could not duplicate condition. No trouble codes stored.

7	KMHEU46C26	[redacted]	5/17/2005	4,670	SRS light on. Code B1518 (Pass seat belt buckle switch instability)	Could not duplicate condition. No trouble codes stored.
8	5NPEU46F86	[redacted]	5/28/2005	7,085	Air bag light is on	Seat belt buckle has already been deployed by the dealer before shipment to HMA
9	5NPEU46F16	[redacted]	4/30/2005	7,452	Air bag light is on. Code B1706 (Passenger Buckle Pretentioner Resistance High)	Could not duplicate condition. No trouble codes stored.

ADDITIONAL VINs WITH THE FRONT SEAT BELT BUCKLE CONDITION:

No.	VIN Number	Prod Date	Mileage	Technician Comments
1	5NPEU46F86 [redacted]	2005-07-01	8,588.	AIR BAG LIGHT ON FOUND DRIVER SIDE SEAT BELT INOP FOUND CODE B1701REPLACED SEATBELT ASM ATT FOR CLEAR CODE
2	5NPEU46FX6 [redacted]	2005-07-09	4,675.	INSPECTED & FOUND SRS LITE ON.REPLACED DRIVERSSIDE BUCKLE ASSEMBLY.OK AT THIS TIME
3	5NPEU46FX6 [redacted]	2005-07-28	4,735.	PER SCANNER CODE B1701 REPLACE BUCKEL ASSY
4	5NPEU46F96 [redacted]	2005-07-25	11,543.	REPLACED BUCKLE ON SEAT
5	5NPEU46FX6 [redacted]	2005-06-11	9,877.	AIR BAG LIGHT ON REPLACE SEAT BELT BUCKLE
6	5NPEU46F36 [redacted]	2005-06-15	12.	SEAT PRETENSIONER- SCAN TEST CODE B1707 PASS BUCKLE HIGH RESISTANCE REPLACED SEAT BELT BUCKLE PASSENGER SIDE
7	5NPEU46F36 [redacted]	2005-05-27	13,825.	SCAN TOOL TEST B1513 RT SEAT BUCKLE SWITCH OPEN REPL RT FRT SEAT BELT BUCKLE
8	5NPEU46F36 [redacted]	2005-06-06	4,121.	AIR BAG LIGHT ON B1518 CODE REPLACE RIGHT SEAT BELT BUCKLE
9	5NPEU46FX6 [redacted]	2005-05-28	10,402.	AIR BAG LIGHT ON B1701 SEAT BELT BUCKLE REPLACE BUCKLE
10	5NPEU46F36 [redacted]	2005-06-03	8,284.	RIGHT SEAT BELT BUCKLE SHORTED TO GROUND REPLACE BUCKLE

NF Sonata Front Seat Belt Buckle Assembly



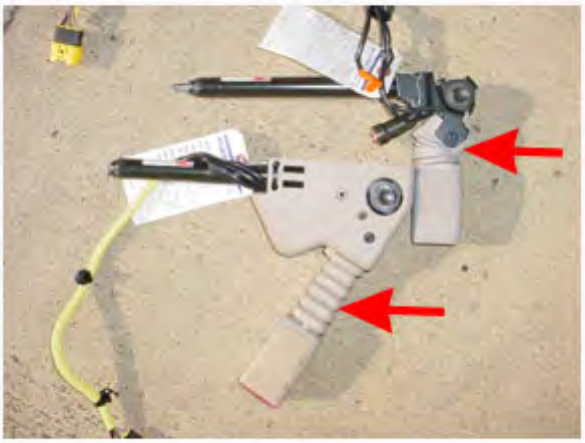
Incident LH seat belt buckles were test installed to a known "good" vehicle for evaluation

The seat belt buckle failure condition could not be duplicated when test installed in the vehicle

Seat belt buckle has already been deployed by the dealer before shipment to HMA

KMHEU46C66A[redacted] P/D: 4/20/2005 10137 Miles

Deployed seat belt buckle (top) compared to a non-deployed buckle



RH seat belt buckle assembly installed to known good vehicle for evaluation

Incident RH seat belt buckle failure condition could not be duplicated when test installed in a known good vehicle

FIELD PRODUCT OBSERVATION REPORT (FPOR):

HYUNDAI

Field Product Observation Report

Sent to National on 12/05/2005 09:05:10 PM by John Sokol.
Document created by John Sokol on 12/05/2005 08:57:32 PM.

To: Harrison Aye <-- optional
Note: An e-mail copy is always sent to National, in addition to above e-mail recipient(s).

Subject: SRS Light On **UPC:**

Originator: John Sokol **Report #:** 1201 **Date:** 12/05/2005

Dealer Code: TX016 **Contact Person:** Rick Lawver
VIN: KMHET46C56A[redacted] **Mileage:** 10,010
Model: Sonata* **Model Year:** 2006*
Production Date: **Category:** 15 Seat belts*
Part Name: Buckle Assy. **Part Number:** 88840-0A000-QD

Customer Complaint:
Air Bag Light On
Dealer Observations:
Found code B1518
Corrective Action:
Replace right front seat belt buckle.

Did this action resolve condition? Yes
Condition verified by personal inspection of company employee? No
Were Photos Taken? No
Parts Inspected? No
Parts Sent? No

Comment:

TECH-LINE DATA:

Case No.: 195704 **Date & Time Opened:** 07/12/2005 03:11 PM by: Keith Pusl

Dealer Code:	CA243	**Dealer Name:**	NORTH COUNTY HYUNDAI
Region Code:	W	**DPSM:**	JEFF PHILLIPS
District Code:	B	**Soc. Sec. Number:**	
Salutation:		**First Name:**	Corey
Middle Name:		**Last Name:**	
Dealer Phone #:	(760) 929-4900	**Fax:**	(760) 929-4915
Urgency:	Normal	**E Mail:**	
Model Year:	06	**Model:**	NF
VIN:	5NPEU46F36H[redacted]	**Miles:**	10
	17 digits		
Part Number:		**Production Date:**	
Customer Name:		**Repair Order #:**	
Condition:		**Component Code:**	
		(UPC)	
Condition Code:		Diagnostic Code	B1707

Description: HMMA. Wants diagnostic assistance with this code. Says that code is current.

Recommendation:

Sean McAlister on 07/21/2005 11:11:43 AM:
Replaced the passenger seatbelt buckle and pretensioner to resolve.
<---->
Sean McAlister closed on 07/21/2005 11:12:42 AM
Keith Pusl on 07/12/2005 03:37:43 PM:
Suggested unplugging the Passenger seat buckle switch and clearing code, does code change to "passenger buckle high"? If so, with srs module and passenger buckle unplugged, check for continuity to ground in the red wire betweeen A01 pin #31 and A11 pin #3.
<---->

Call Status : Closed **Date & Time Closed :** 07/21/2005 11:12 AM

Modified on :07/21/2005 11:12:42 AM by:Sean McAlister
07/21/2005 11:11:45 AM - Sean McAlister

Replaced the passenger seatbelt buckle and pretensioner to resolve.59.02195699

SEAN MCALISTER ON 07/21/2005 11:11:43 AM: REPLACED THE PASSENGER SEATBELT BUCKLE AND PRETENSIONER TO RESOLVE. <----> SEAN MCALISTER CLOSED ON 07/21/2005 11:12:42 AM KEITH PUSL ON 07/12/2005 03:37:43 PM: SUGGESTED UNPLUGGING THE PASSENGER SEAT BUCKLE SWITCH AND CLEARING CODE, DOES CODE CHANGE TO "PASSENGER BUCKLE HIGH"? IF SO, WITH SRS MODULE AND PASSENGER BUCKLE UNPLUGGED, CHECK FOR CONTINUITY TO GROUND IN THE RED WIRE BETWEEEN A01 PIN #31 AND A11 PIN #3. <---->

Case No.: 209652 **Date & Time Opened:** 11/22/2005 01:15 PM by: Elias Salas

Dealer Code:	KY012	**Dealer Name:**	KERRY HYUNDAI
Region Code:	C	**DPSM:**	JOSEPH PERRY
District Code:	4	**Soc. Sec. Number:**	
Salutation:		**First Name:**	Jimmy
Middle Name:		**Last Name:**	
Dealer Phone #:	(859) 635-6400	**Fax:**	(859) 635-6580
Urgency:	Normal	**E Mail:**	
Model Year:	06	**Model:**	NF
VIN:	5NPEU46F16H[redacted]	**Miles:**	12995
	17 digits		
Part Number:		**Production Date:**	
Customer Name:		**Repair Order #:**	
Condition:	SRS Malfunction	**Component Code:**	
		(UPC)	
Condition Code:	EL14	Diagnostic Code	B1701

Description: TECH states code B1701 was setting tech disconnected the buckle connector and reconnected. Tech states code has not reset they have tested the car for over 50 miles and the code has not reset. Tech is calling to get a case number. Tech states car is fixed.

Recommendation:

Elias Salas closed on 11/22/2005 01:21:44 PM
Elias Salas on 11/22/2005 01:22:52 PM:
Gave tech case number.
<---->

Call Status : Closed **Date & Time Closed :** 11/22/2005 01:21 PM

Modified on :11/22/2005 01:21:44 PM by:Elias Salas
11/22/2005 01:22:59 PM - Elias Salas

0.1209650

ELIAS SALAS CLOSED ON 11/22/2005 01:21:44 PM ELIAS SALAS ON 11/22/2005 01:22:52 PM: GAVE TECH CASE NUMBER. <---->

Case No.: 207212 **Date & Time Opened:** 10/27/2005 02:34 PM by: Jason Snyder

Dealer Code:	**CA211**	**Dealer Name:**	**SCOTT HYUNDAI**
Region Code:	**W**	**DPSM:**	**SCOTT SNYDER**
District Code:	**A**	**Soc. Sec. Number:**	
Salutation:		**First Name:**	**Gaberial**
Middle Name:		**Last Name:**	
Dealer Phone #:	**(626) 575-8200**	**Fax:**	**(626) 575-8895**
Urgency:	Normal	**E Mail:**	
Model Year:	**06**	**Model:**	**NF**
VIN:	**5NPEU46F36H[redacted]**	**Miles:**	**275**
	17 digits		
Part Number:		**Production Date:**	
Customer Name:		**Repair Order #:**	
Condition:	**Electrical Malfunction - Other**	**Component Code: (UPC)**	
Condition Code:	**EL05**	Diagnostic Code	

Description: HMMA - Customer states red passenger seat belt indicator on solid. Tech verified concern, indicator was on solid and not flashing. Tech replaced passenger seat belt buckle to resolve concern.

Recommendation:

Jason Snyder on 10/27/2005 03:06:04 PM:
Tech called to report repair.
<---->

Call Status : **Open**

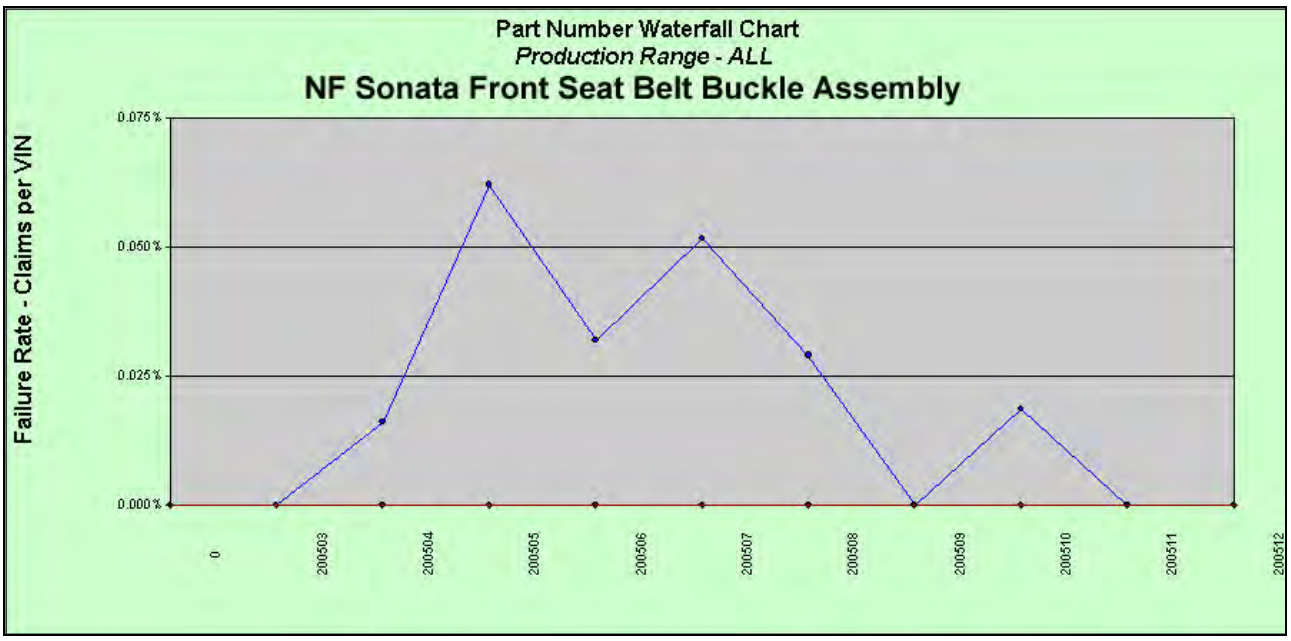
Modified on :10/27/2005 02:23:38 PM by:Jason Snyder
10/27/2005 03:06:04 PM - Jason Snyder

Tech called to report repair.207201

JASON SNYDER ON 10/27/2005 03:06:04 PM: TECH CALLED TO REPORT REPAIR. <---->

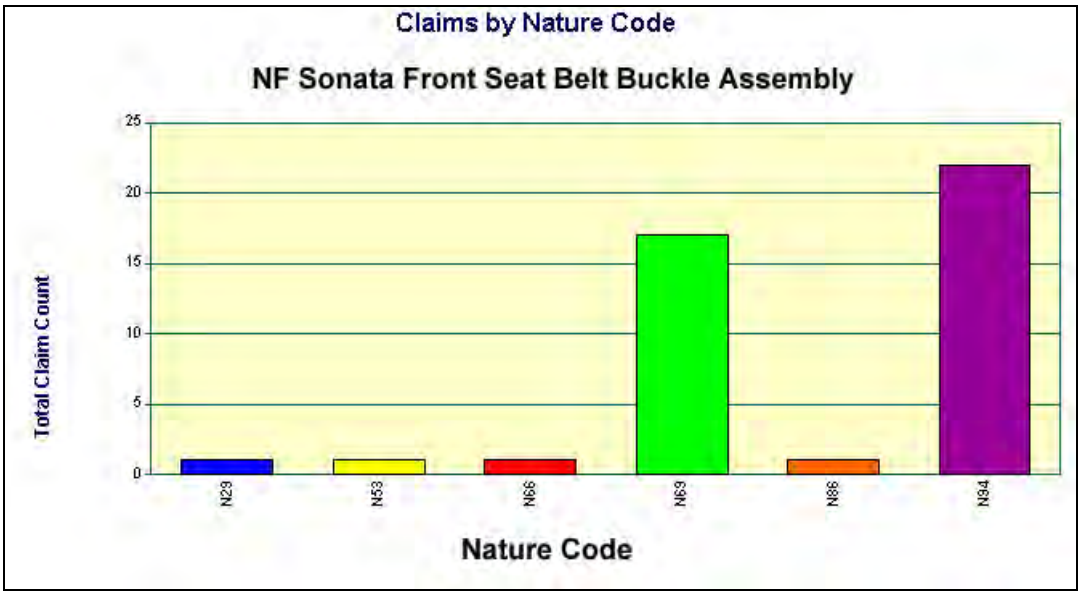
WARRANTY INFORMATION:

- 41 front seat belt buckle assemblies have been replaced for the 2006 NF Sonata.



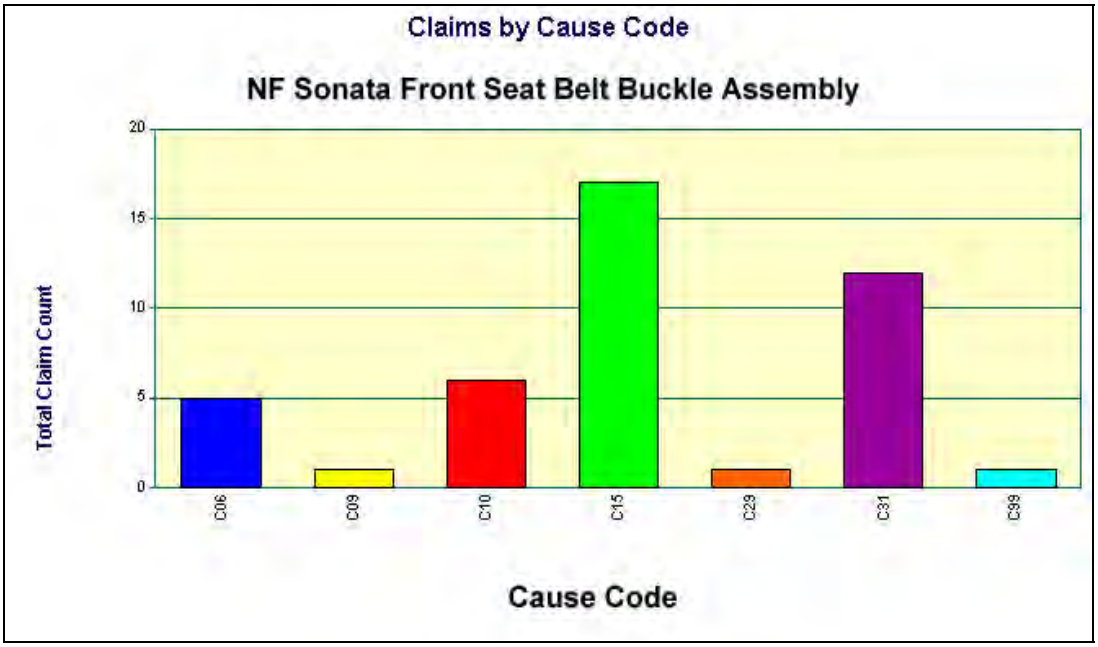
Warranty Claims by Nature Code:

- 51% of all claims are for Nature Code N94 (Inoperative)
- 40% of all claims are for Nature Code N69 (Warning Lights On).



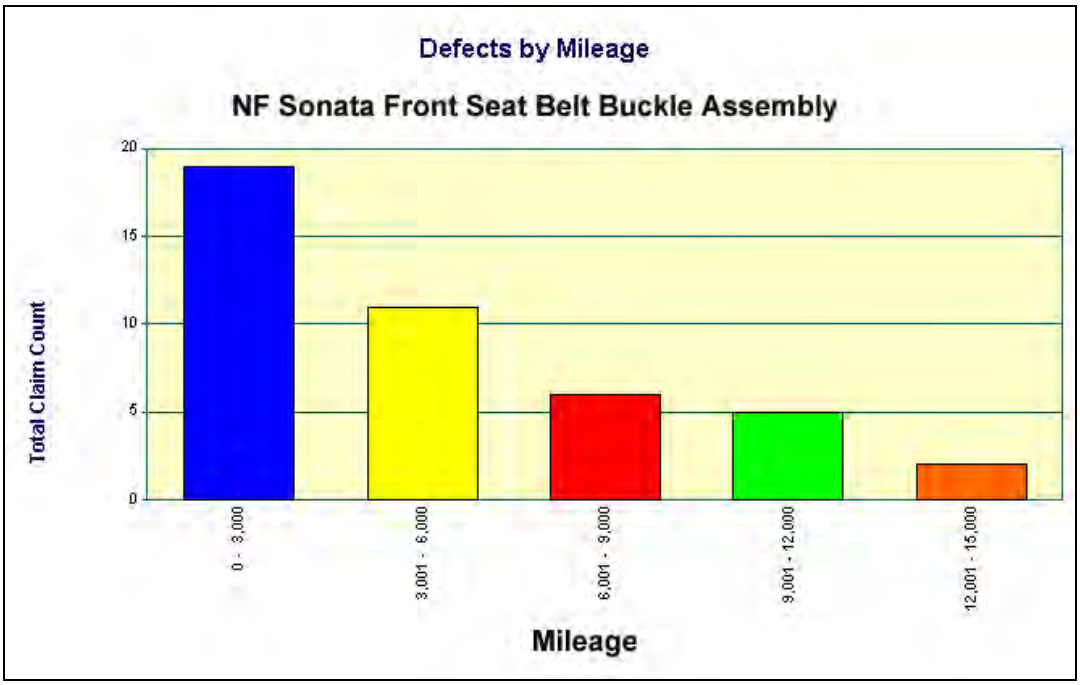
Warranty Claims by Cause Code:

- 40% of all claims are for Cause Code C15 (Poor Contact & Short, Open Circuit).
- 28% of all claims are for Cause Code C31 (Sticking, Seized).



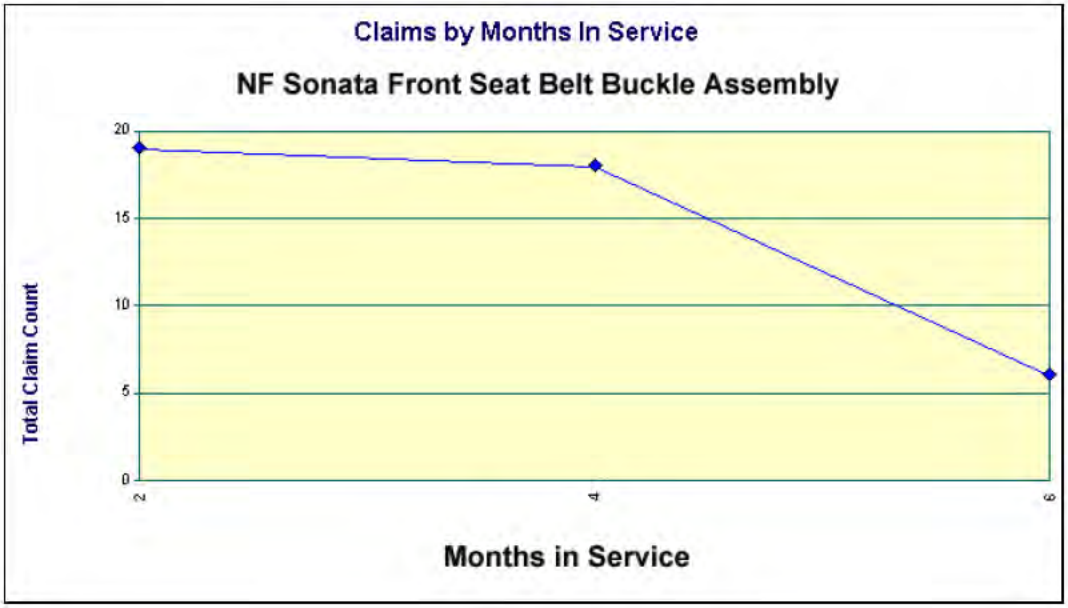
Warranty Claims by Mileage:

- 44% of all warranty claims are within the first 3,000 miles of operation.



Warranty Claims by Months in Service:

- 86% of all warranty claims are within the first 4 months of service.



Corrective Action:

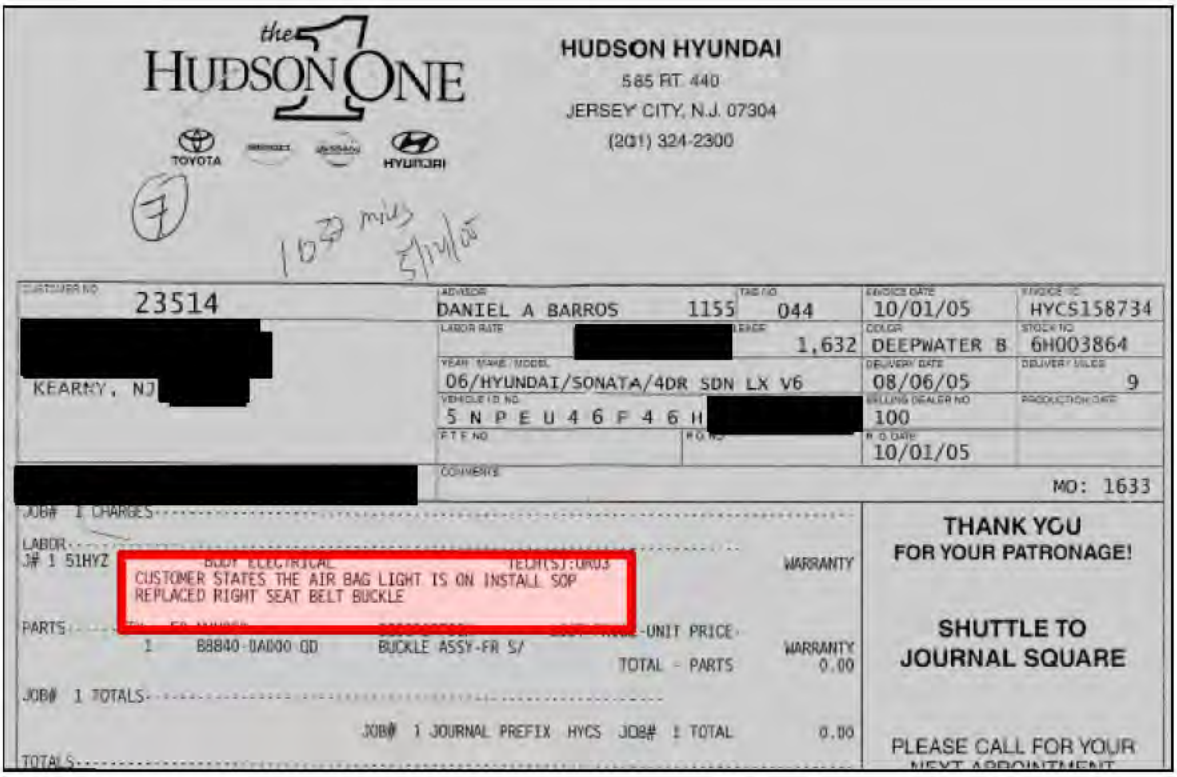
- Replace front seat belt buckle assembly (88830-0A000-QS/QD or 88840-0A000-QS/QD).

Recommendation:

- HMA could not duplicate the seat belt buckle malfunction.
- The seat belt malfunction condition may be intermittent. One tech-line case above reported the vehicle had code B1701 (front driver seat belt buckle pretensioner resistance too high) stored. When the seat belt buckle connector was disconnected and reconnected, the code did not reset.
- HMMA/HMC should inspect the incident parts forwarded with this report and take necessary action to correct the condition.
- 9 incident front seat belt buckle assemblies will be forwarded to HMMA and HMC for evaluation.
- 15 additional front seat belt buckle assemblies have already been forwarded to NAQC for further analysis.

Attachments:

INCIDENT VEHICLE'S REPAIR ORDERS:



the HUDSON ONE

TOYOTA HYUNDAI

HUDSON HYUNDAI
585 RT. 440
JERSEY CITY, N.J. 07304
(201) 324-2300

(7)
107 miles 5/31/05

CUSTOMER NO 23514	ADVISOR DANIEL A BARROS 1155	TAG NO 044	INVOICE DATE 10/01/05	INVOICE NO HYCS158734	
[redacted]	LABOR RATE [redacted]	LEASE 1,632	COLOR DEEPWATER B	STOCK NO 6H003864	
KEARNY, NJ [redacted]	YEAR/MAKE/MODEL 06/HYUNDAI/SONATA/4DR SDN LX V6		DELIVERY DATE 08/06/05	DELIVERY MILES 9	
	VEHICLE I.D. NO 5NPEU46F46H[redacted]		SELLING DEALER NO 100	PRODUCTION DATE	
	F.T.F. NO	P.O. NO	R.O. DATE 10/01/05		
[redacted]	COMMENTS			MO: 1633	

JOB# 1 CHARGES

LABOR

J# 1 51HYZ BODY ELECTRICAL TECH(S):UK03 WARRANTY

CUSTOMER STATES THE AIR BAG LIGHT IS ON INSTALL SOP
REPLACED RIGHT SEAT BELT BUCKLE

PARTS

1	88840-0A000 QD	BUCKLE ASSY-FR S/	UNIT PRICE	WARRANTY
			TOTAL - PARTS	0.00

JOB# 1 TOTALS

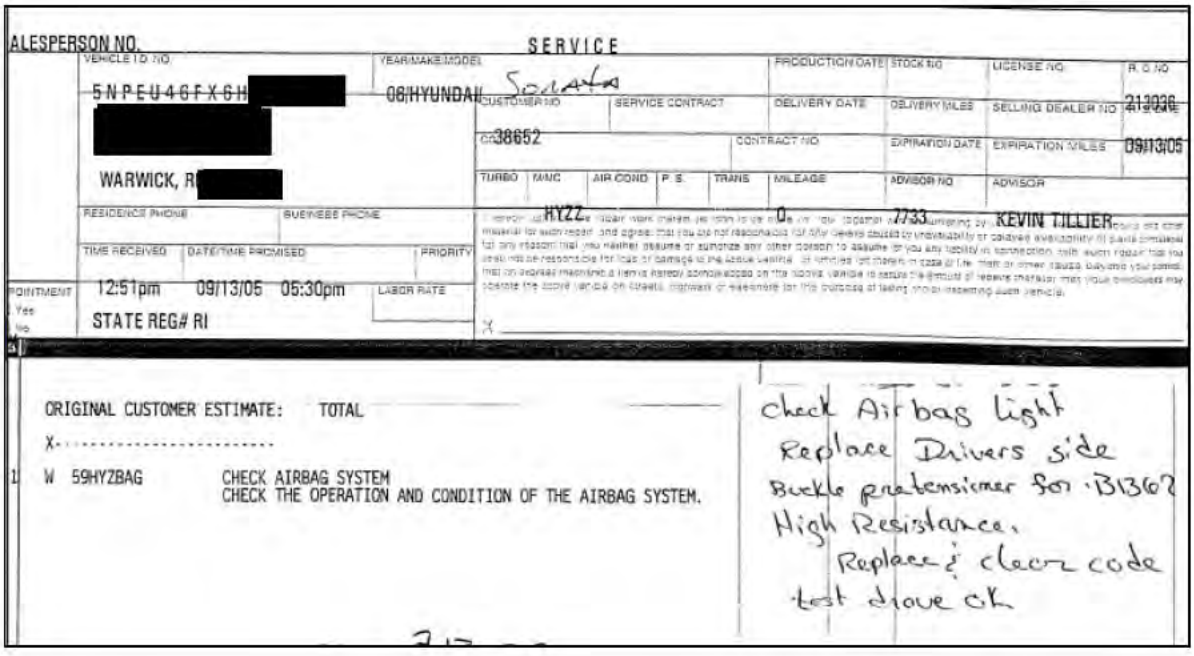
JOB# 1 JOURNAL PREFIX HYCS JOB# 1 TOTAL 0.00

TOTALS

THANK YOU FOR YOUR PATRONAGE!

SHUTTLE TO JOURNAL SQUARE

PLEASE CALL FOR YOUR NEXT APPOINTMENT



SALESPERSON NO. SERVICE

VEHICLE I.D. NO 5NPEU46FX6H[redacted]	YEAR/MAKE/MODEL 06/HYUNDAI Sonata		PRODUCTION DATE	STOCK NO	LICENSE NO	R.O. NO	
[redacted]	CUSTOMER NO	SERVICE CONTRACT	DELIVERY DATE	DELIVERY MILES	SELLING DEALER NO	213026	
WARWICK, R[redacted]	CO 38652	CONTRACT NO	EXPIRATION DATE	EXPIRATION MILES	09/13/05		
	TURBO / MAN / AIR COND / P.S. / TRANS	MILEAGE	ADVISOR NO	ADVISOR			
RESIDENCE PHONE	BUSINESS PHONE	HYZZ	0	7733	KEVIN TILLIER		
TIME RECEIVED	DATE/TIME PROMISED	PRIORITY					
APPOINTMENT Yes No	12:51pm 09/13/05 05:30pm	LABOR RATE					
	STATE REG# RI						

ORIGINAL CUSTOMER ESTIMATE: TOTAL

X

1 W 59HYZBAG CHECK AIRBAG SYSTEM
CHECK THE OPERATION AND CONDITION OF THE AIRBAG SYSTEM.

check Airbag light
Replace Drivers side
Buckle pretensioner for B1362
High Resistance.
Replace & clear code
test drive ok

Quality Improvement Status

To			
Attn	HMA		
CC	HMA Service Staff	Date	2006-01-26
From	KWONHANGLIM /	QIR Issue Date	2005-12-20
Subject	(QANF-L-051213) [B] FRONT SEAT BELT BUCKLE ASSEMBLY INOPERATIVE (BOTH – HMC)		
Report No.	B28AA2005122001	Model	Sonata(NF)

Status			
TSB No.		Claim Monitoring	N
Attachment	Seat belt airbag lamp countermeasure(051228).ppt		

Improvement Status

Condition	Customer complaint the air bag light is illuminated.		
Cause	Confirmed the defective part(3ea) received but not appeared reproduction test		
Countermeasure	Changed the fixing hook of connector button portion : December 30, 2005 Refer to the attached report		
Effective Date	2005-12-30	Vehicle ID No.	
Field Fix Method			

Comments

Parts Information

Seq	Part Name	Previous P/No	New P/No	Interchangeability
Queried data does not exist.				

PE14-023

HYUNDAI

9/12/2014

ATTACHMENT G

HYUNDAI

QUALITY INFORMATION REPORT

CONFIDENTIAL

Model Code	Subject Code*		HMA Report Number
NF	Electrical		QANF-L-051220
Creation date/time/user:	**Analyst:***	**Co-analyst(s):**	**Modified date/time/user:**
12/13/2005	Thai Vu		

Distributor*	Country*	Date	HMC Report Number	Attachments
HMA	USA	12/13/2005		

Model*	Engine or Transmission Number*	Production Date*	Attachments
Sonata	G6DB5S004052	6/02/2005	[x] Photo

Vehicle Identification Number*	Mileage*	Delivery Date*	Attachments
5NPEU46FX6H[redacted]	12	6/30/2005	[x] Part

Subject*	Attachments
[B] FRONT SEAT BELT BUCKLE ASSEMBLY INOPERATIVE (BOTH – HMMA)	[ ] Other

Condition:

Customer complaint the air bag light is illuminated.

Analysis:

- HMA received 9 incident seat belt buckles from the field.
- All incident seat belt buckles indicate the air bag light illuminated.
- Exterior inspection of the seat belt buckle harnesses does not show signs of the wire chafing.
- The incident seat belt buckles were installed to a known “good” vehicle for evaluation.
- All dealers reported conditions (SRS light illuminated and diagnostic codes stored) could not be duplicated when the seat belt buckles were installed in the test vehicle.
- Three incident parts could not be evaluated due to the dealerships deploying the seat belt buckle pretensioners before shipping them to HMA.

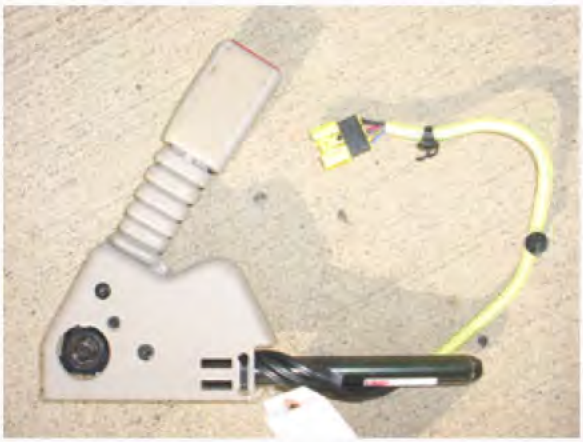
No.	VIN Number	Prod Date	Mileage	Description	HMA Investigation
1	5NPEU46F36H[redacted]	5/25/2005	1,377	Seat belt buckle inop	Could not duplicate condition. No trouble codes stored.
2	KMHEU46C56A[redacted]	6/7/2005	641	SRS light on. Code B1517 (Driver seat belt buckle switch instability)	Could not duplicate condition. No trouble codes stored.
3	5NPEU46FX6H[redacted]	6/2/2005	12	SRS light on. Code B1362 stored (Driver pretensioner low resistance).	Could not duplicate condition. No trouble codes stored.
4	KMHEU46C66A[redacted]	4/20/2005	10,137	SRS light on	Seat belt buckle has already been deployed by the dealer before shipment to HMA
5	5NPEU46F76H[redacted]	5/4/2005	5,906	SRS light on. Code B1701 stored. Replaced right front seat belt buckle	Seat belt buckle has already been deployed by the dealer before shipment to HMA
6	5NPEU46F46H[redacted]	5/14/2005	1,632	SRS light on. Replaced right front seat belt buckle	Could not duplicate condition. No trouble codes stored.

7	KMHEU46C26A[redacted]	5/17/2005	4,670	SRS light on. Code B1518 (Pass seat belt buckle switch instability)	Could not duplicate condition. No trouble codes stored.
8	5NPEU46F86H[redacted]	5/28/2005	7,085	Air bag light is on	Seat belt buckle has already been deployed by the dealer before shipment to HMA
9	5NPEU46F16H[redacted]	4/30/2005	7,452	Air bag light is on. Code B1706 (Passenger Buckle Pretentioner Resistance High)	Could not duplicate condition. No trouble codes stored.

ADDITIONAL VINs WITH THE FRONT SEAT BELT BUCKLE CONDITION:

No.	VIN Number	Prod Date	Mileage	Technician Comments
1	5NPEU46F86H[redacted]	2005-07-01	8,588.	AIR BAG LIGHT ON FOUND DRIVER SIDE SEAT BELT INOP FOUND CODE B1701REPLACED SEATBELT ASM ATT FOR CLEAR CODE
2	5NPEU46FX6H[redacted]	2005-07-09	4,675.	INSPECTED & FOUND SRS LITE ON.REPLACED DRIVERSSIDE BUCKLE ASSEMBLY.OK AT THIS TIME
3	5NPEU46FX6H[redacted]	2005-07-28	4,735.	PER SCANNER CODE B1701 REPLACE BUCKEL ASSY
4	5NPEU46F96H[redacted]	2005-07-25	11,543.	REPLACED BUCKLE ON SEAT
5	5NPEU46FX6H[redacted]	2005-06-11	9,877.	AIR BAG LIGHT ON REPLACE SEAT BELT BUCKLE
6	5NPEU46F36H[redacted]	2005-06-15	12.	SEAT PRETENSIONER- SCAN TEST CODE B1707 PASS BUCKLE HIGH RESISTANCE REPLACED SEAT BELT BUCKLE PASSENGER SIDE
7	5NPEU46F36H[redacted]	2005-05-27	13,825.	SCAN TOOL TEST B1513 RT SEAT BUCKLE SWITCH OPEN REPL RT FRT SEAT BELT BUCKLE
8	5NPEU46F36H[redacted]	2005-06-06	4,121.	AIR BAG LIGHT ON B1518 CODE REPLACE RIGHT SEAT BELT BUCKLE
9	5NPEU46FX6H[redacted]	2005-05-28	10,402.	AIR BAG LIGHT ON B1701 SEAT BELT BUCKLE REPLACE BUCKLE
10	5NPEU46F36H[redacted]	2005-06-03	8,284.	RIGHT SEAT BELT BUCKLE SHORTED TO GROUND REPLACE BUCKLE

NF Sonata Front Seat Belt Buckle Assembly



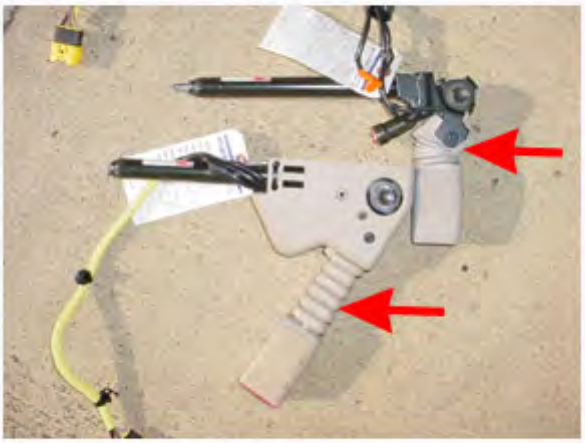
Incident LH seat belt buckles were test installed to a known "good" vehicle for evaluation

The seat belt buckle failure condition could not be duplicated when test installed in the vehicle

Seat belt buckle has already been deployed by the dealer before shipment to HMA

KMHEU46C66A[redacted] P/D: 4/20/2005 10137 Miles

Deployed seat belt buckle (top) compared to a non-deployed buckle



RH seat belt buckle assembly installed to known good vehicle for evaluation

Incident RH seat belt buckle failure condition could not be duplicated when test installed in a known good vehicle

FIELD PRODUCT OBSERVATION REPORT (FPOR):

HYUNDAI

Field Product Observation Report

Sent to National on 12/05/2005 09:05:10 PM by John Sokol.
Document created by John Sokol on 12/05/2005 08:57:32 PM.

To: Harrison Aye <-- optional
Note: An e-mail copy is always sent to National, in addition to above e-mail recipient(s).

Subject: SRS Light On **UPC:**

Originator: John Sokol **Report #:** 1201 **Date:** 12/05/2005

Dealer Code: TX016 **Contact Person:** Rick Lawver
VIN: KMHET46C56A[redacted] **Mileage:** 10,010
Model: Sonata* **Model Year:** 2006*
Production Date: **Category:** 15 Seat belts*
Part Name: Buckle Assy. **Part Number:** 88840-0A000-QD

Customer Complaint:
Air Bag Light On
Dealer Observations:
Found code B1518
Corrective Action:
Replace right front seat belt buckle.

Did this action resolve condition? Yes
Condition verified by personal inspection of company employee? No
Were Photos Taken? No
Parts Inspected? No
Parts Sent? No

Comment:

TECH-LINE DATA:

Case No.: 195704 **Date & Time Opened:**07/12/2005 03:11 PM by:Keith Pusl

Dealer Code:	CA243	**Dealer Name:**	NORTH COUNTY HYUNDAI
Region Code:	W	**DPSM:**	JEFF PHILLIPS
District Code:	B	**Soc. Sec. Number:**	
Salutation:		**First Name:**	Corey
Middle Name:		**Last Name:**	
Dealer Phone #:	(760) 929-4900	**Fax:**	(760) 929-4915
Urgency:	Normal	**E Mail:**	
Model Year:	06	**Model:**	NF
VIN:	5NPEU46F36H[redacted]	**Miles:**	10
	17 digits		
Part Number:		**Production Date:**	
Customer Name:		**Repair Order #:**	
Condition:		**Component Code:**	
		(UPC)	
Condition Code:		Diagnostic Code	B1707

Description: HMMA. Wants diagnostic assistance with this code. Says that code is current.

Recommendation:

Sean McAlister on 07/21/2005 11:11:43 AM:
Replaced the passenger seatbelt buckle and pretensioner to resolve.
<---->
Sean McAlister closed on 07/21/2005 11:12:42 AM
Keith Pusl on 07/12/2005 03:37:43 PM:
Suggested unplugging the Passenger seat buckle switch and clearing code, does code change to "passenger buckle high"? If so, with srs module and passenger buckle unplugged, check for continuity to ground in the red wire betweeen A01 pin #31 and A11 pin #3.
<---->

Call Status : Closed **Date & Time Closed :** 07/21/2005 11:12 AM

Modified on :07/21/2005 11:12:42 AM by:Sean McAlister
07/21/2005 11:11:45 AM - Sean McAlister

Replaced

the passenger seatbelt buckle and pretensioner to resolve.59.02195699

SEAN MCALISTER ON 07/21/2005 11:11:43 AM: REPLACED THE PASSENGER SEATBELT BUCKLE AND PRETENSIONER TO RESOLVE. <----> [redacted] CLOSED ON 07/21/2005 11:12:42 AM [redacted] ON 07/12/2005 03:37:43 PM: SUGGESTED UNPLUGGING THE PASSENGER SEAT BUCKLE SWITCH AND CLEARING CODE, DOES CODE CHANGE TO "PASSENGER BUCKLE HIGH"? IF SO, WITH SRS MODULE AND PASSENGER BUCKLE UNPLUGGED, CHECK FOR CONTINUITY TO GROUND IN THE RED WIRE BETWEEEN A01 PIN #31 AND A11 PIN #3. <---->

Case No.: 209652 **Date & Time Opened:** 11/22/2005 01:15 PM by: Elias Salas

Dealer Code:	KY012	**Dealer Name:**	KERRY HYUNDAI
Region Code:	C	**DPSM:**	JOSEPH PERRY
District Code:	4	**Soc. Sec. Number:**	
Salutation:		**First Name:**	Jimmy
Middle Name:		**Last Name:**	
Dealer Phone #:	(859) 635-6400	**Fax:**	(859) 635-6580
Urgency:	Normal	**E Mail:**	
Model Year:	06	**Model:**	NF
VIN:	5NPEU46F16H[redacted]	**Miles:**	12995
	17 digits		
Part Number:		**Production Date:**	
Customer Name:		**Repair Order #:**	
Condition:	SRS Malfunction	**Component Code:**	
		(UPC)	
Condition Code:	EL14	Diagnostic Code	B1701

Description: TECH states code B1701 was setting tech disconnected the buckle connector and reconnected. Tech states code has not reset they have tested the car for over 50 miles and the code has not reset. Tech is calling to get a case number. Tech states car is fixed.

Recommendation:

Elias Salas closed on 11/22/2005 01:21:44 PM
Elias Salas on 11/22/2005 01:22:52 PM:
Gave tech case number.
<---->

Call Status : Closed **Date & Time Closed :** 11/22/2005 01:21 PM

Modified on :11/22/2005 01:21:44 PM by:Elias Salas
11/22/2005 01:22:59 PM - Elias Salas

0.1209650

[redacted] CLOSED ON 11/22/2005 01:21:44 PM [redacted] ON 11/22/2005 01:22:52 PM: GAVE TECH CASE NUMBER. <---->

Case No.: 207212 **Date & Time Opened:** 10/27/2005 02:34 PM by: Jason Snyder

Dealer Code:	CA211	**Dealer Name:**	SCOTT HYUNDAI
Region Code:	W	**DPSM:**	SCOTT SNYDER
District Code:	A	**Soc. Sec. Number:**	
Salutation:		**First Name:**	Gaberial
Middle Name:		**Last Name:**	
Dealer Phone #:	(626) 575-8200	**Fax:**	(626) 575-8895
Urgency:	Normal	**E Mail:**	
Model Year:	06	**Model:**	NF
VIN:	5NPEU46F36H[redacted]	**Miles:**	275
	17 digits		
Part Number:		**Production Date:**	
Customer Name:		**Repair Order #:**	
Condition:	Electrical Malfunction - Other	**Component Code:**	
		(UPC)	
Condition Code:	EL05	Diagnostic Code	

Description: HMMA - Customer states red passenger seat belt indicator on solid. Tech verified concern, indicator was on solid and not flashing. Tech replaced passenger seat belt buckle to resolve concern.

Recommendation:

Jason Snyder on 10/27/2005 03:06:04 PM:
Tech called to report repair.
<---->

Call Status : Open

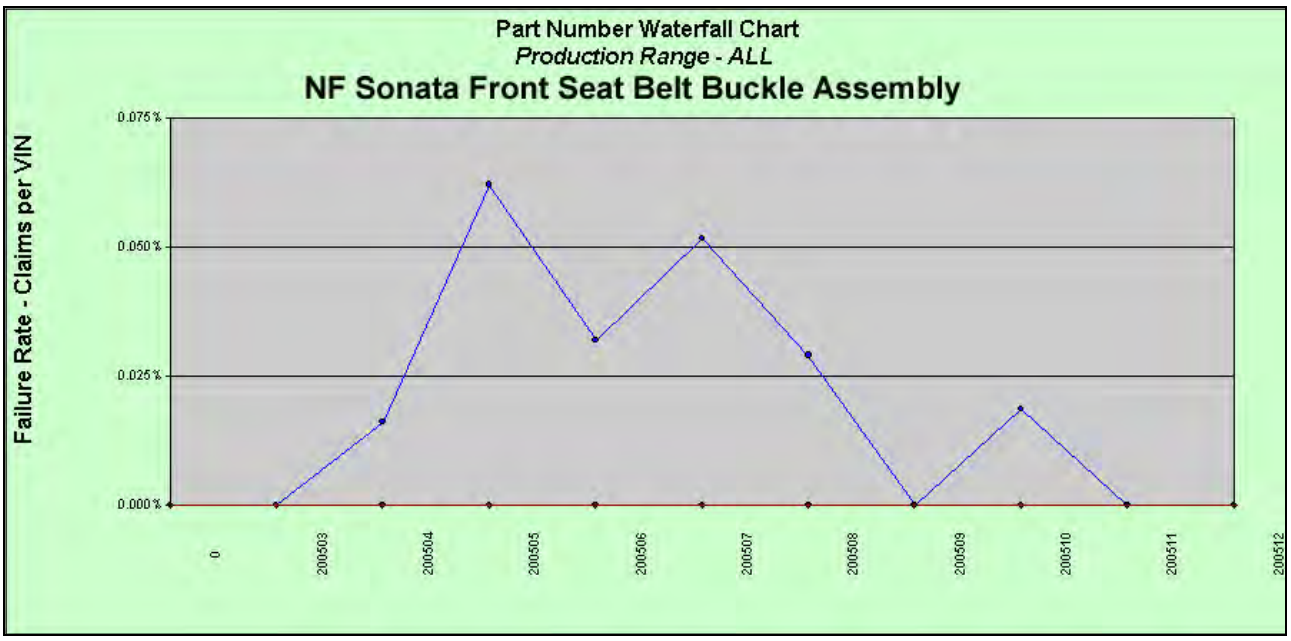
Modified on :10/27/2005 02:23:38 PM by:Jason Snyder
10/27/2005 03:06:04 PM - [redacted]

Tech called to report repair.207201

[redacted] ON 10/27/2005 03:06:04 PM: TECH CALLED TO REPORT REPAIR. <---->

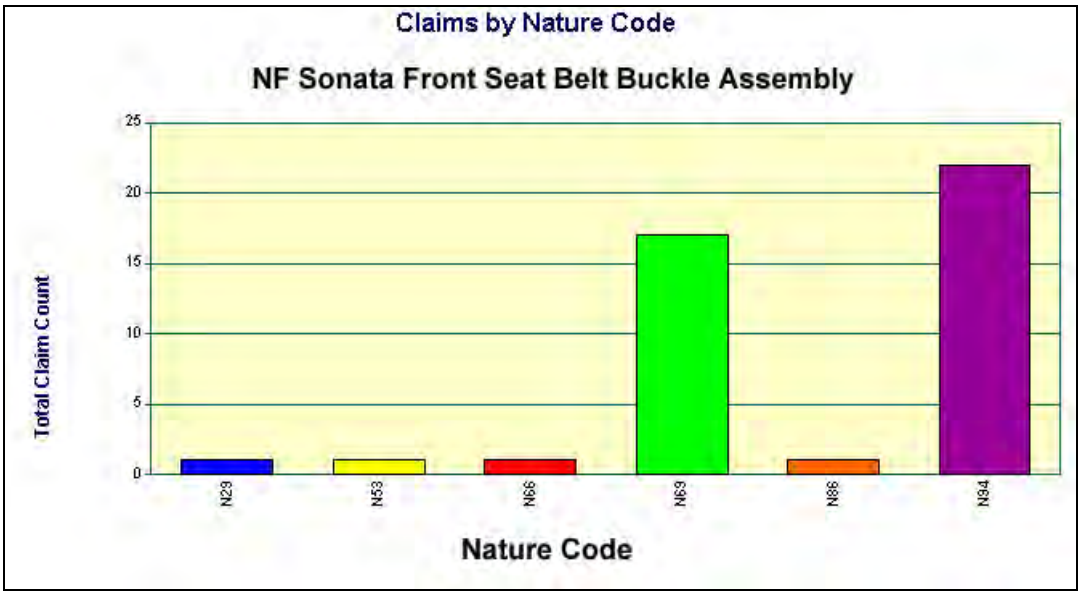
WARRANTY INFORMATION:

- 41 front seat belt buckle assemblies have been replaced for the 2006 NF Sonata.



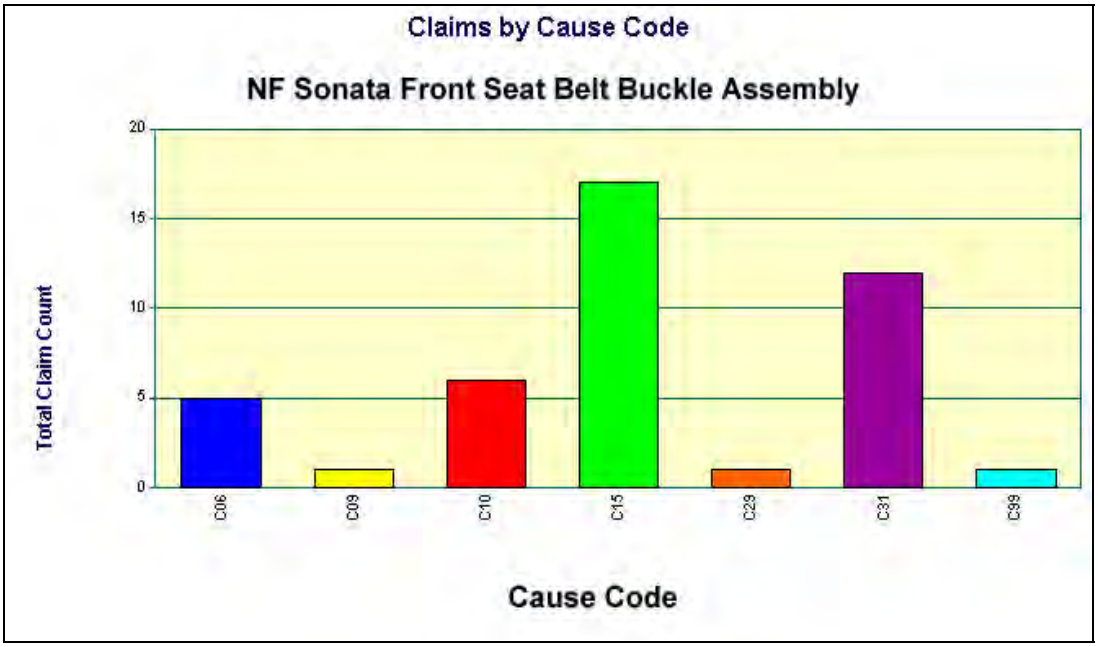
Warranty Claims by Nature Code:

- 51% of all claims are for Nature Code N94 (Inoperative)
- 40% of all claims are for Nature Code N69 (Warning Lights On).



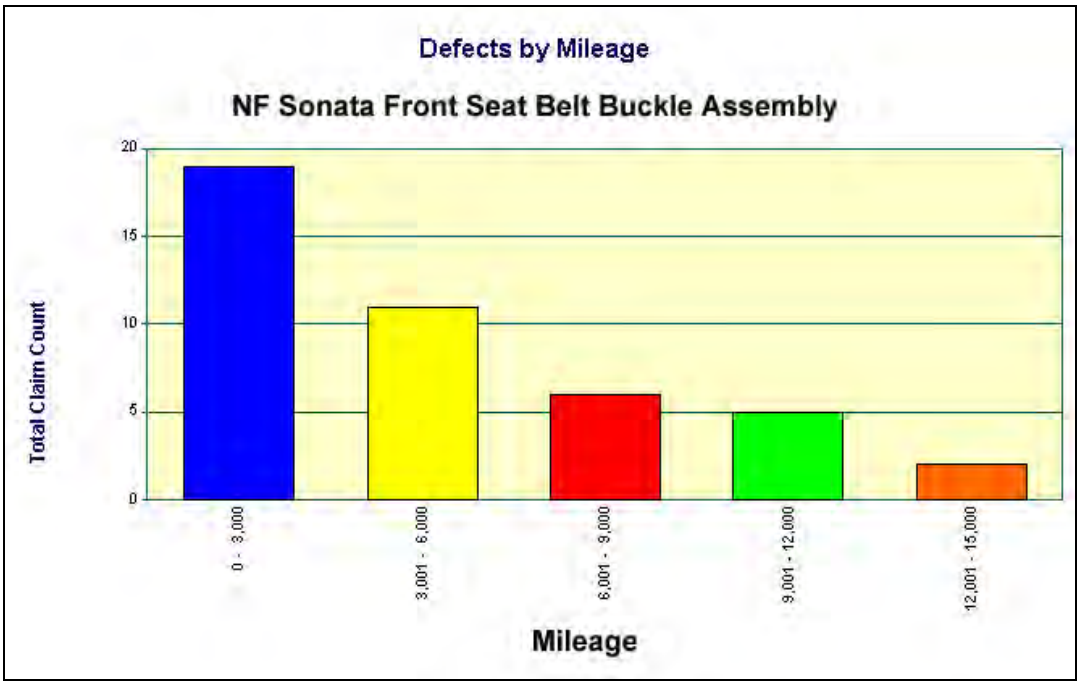
Warranty Claims by Cause Code:

- 40% of all claims are for Cause Code C15 (Poor Contact & Short, Open Circuit).
- 28% of all claims are for Cause Code C31 (Sticking, Seized).



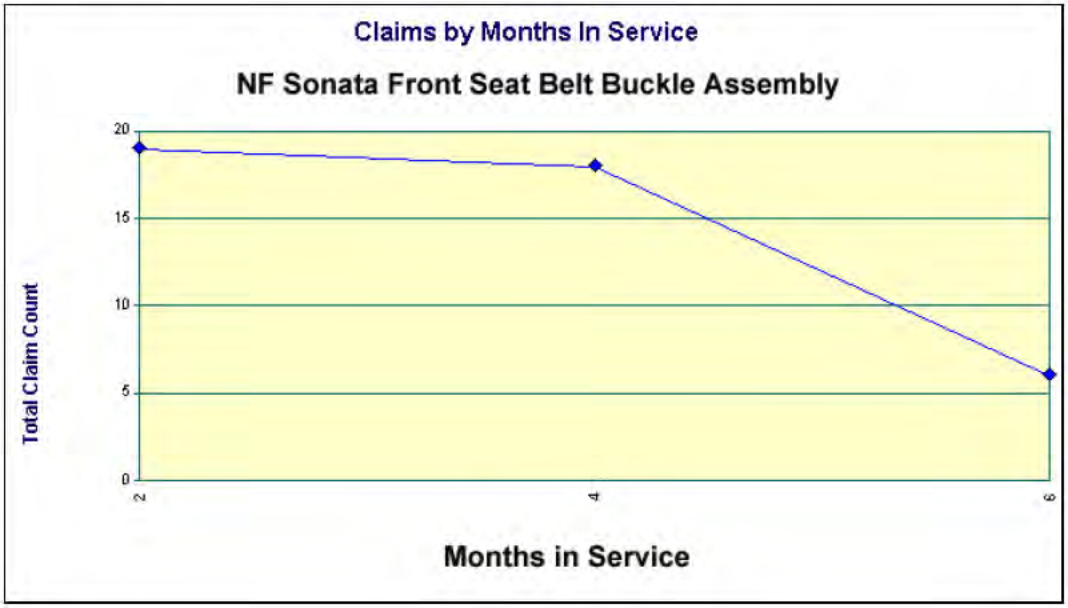
Warranty Claims by Mileage:

- 44% of all warranty claims are within the first 3,000 miles of operation.



Warranty Claims by Months in Service:

- 86% of all warranty claims are within the first 4 months of service.



Corrective Action:

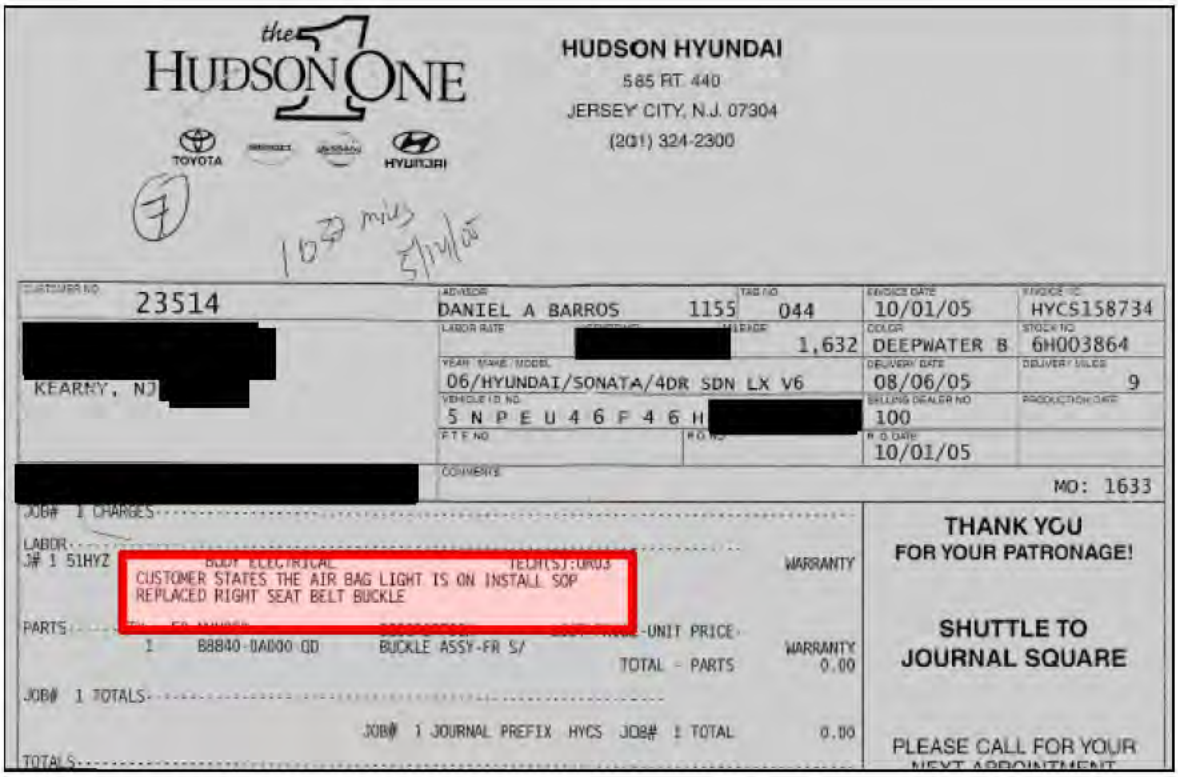
- Replace front seat belt buckle assembly (88830-0A000-QS/QD or 88840-0A000-QS/QD).

Recommendation:

- HMA could not duplicate the seat belt buckle malfunction.
- The seat belt malfunction condition may be intermittent. One tech-line case above reported the vehicle had code B1701 (front driver seat belt buckle pretensioner resistance too high) stored. When the seat belt buckle connector was disconnected and reconnected, the code did not reset.
- HMMA/HMC should inspect the incident parts forwarded with this report and take necessary action to correct the condition.
- 9 incident front seat belt buckle assemblies will be forwarded to HMMA and HMC for evaluation.
- 15 additional front seat belt buckle assemblies have already been forwarded to NAQC for further analysis.

Attachments:

INCIDENT VEHICLE'S REPAIR ORDERS:



the HUDSON ONE

TOYOTA HYUNDAI

HUDSON HYUNDAI
585 RT. 440
JERSEY CITY, N.J. 07304
(201) 324-2300

(7)
107 miles 5/31/05

CUSTOMER NO: 23514	ADVISOR: DANIEL A BARROS 1155	TAG NO: 044	INVOICE DATE: 10/01/05	INVOICE NO: HYCS158734	
[redacted] KEARNY, NJ [redacted]	LABOR RATE: [redacted]	MILEAGE: 1,632	COLOR: DEEPWATER B	STOCK NO: 6H003864	
	YEAR/MAKE/MODEL: 06/HYUNDAI/SONATA/4DR SDN LX V6		DELIVERY DATE: 08/06/05	DELIVERY MILES: 9	
	VEHICLE I.D. NO: 5NPEU46F46H[redacted]		SELLING DEALER NO: 100	PRODUCTION DATE:	
	F.T.E. NO:	P.O. NO:	R.O. DATE: 10/01/05		
[redacted]	COMMENTS:			MO: 1633	

JOB# 1 CHARGES

LABOR

J# 1 51HYZ BODY ELECTRICAL TECH(S):UK03 — WARRANTY

CUSTOMER STATES THE AIR BAG LIGHT IS ON INSTALL SOP
REPLACED RIGHT SEAT BELT BUCKLE

PARTS — QTY | P/N | DESCRIPTION | UNIT PRICE | WARRANTY

1 88840-0A000 QD BUCKLE ASSY-FR S/ WARRANTY 0.00

TOTAL - PARTS 0.00

JOB# 1 TOTALS

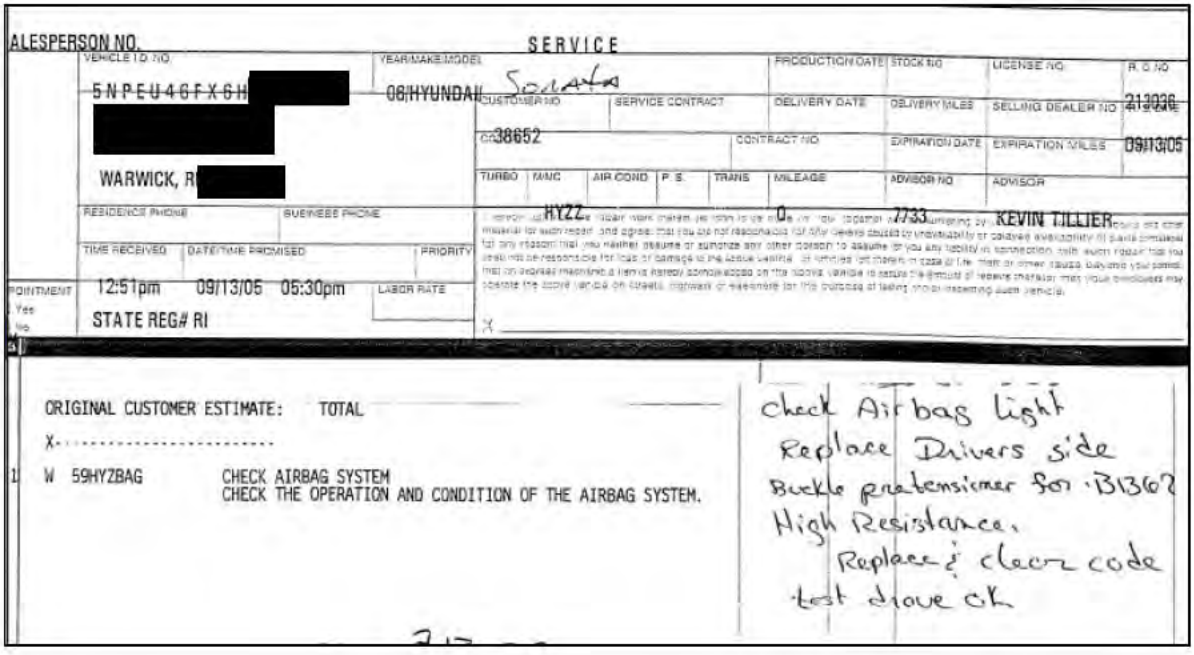
JOB# 1 JOURNAL PREFIX HYCS JOB# 1 TOTAL 0.00

TOTALS

THANK YOU FOR YOUR PATRONAGE!

SHUTTLE TO JOURNAL SQUARE

PLEASE CALL FOR YOUR NEXT APPOINTMENT



SALESPERSON NO. SERVICE

VEHICLE I.D. NO: 5NPEU46FX6H[redacted]	YEAR/MAKE/MODEL: 06/HYUNDAI Sonata		PRODUCTION DATE	STOCK NO	LICENSE NO	R.O. NO		
[redacted] WARWICK, RI [redacted]	CUSTOMER NO	SERVICE CONTRACT	DELIVERY DATE	DELIVERY MILES	SELLING DEALER NO	213026		
	CO 38652	CONTRACT NO	EXPIRATION DATE	EXPIRATION MILES	09/13/05			
	TURBO	MAKE	AIR COND	P.S.	TRANS	MILEAGE	ADVISOR NO	ADVISOR
		HYZZ				0	7733	KEVIN TILLIER
RESIDENCE PHONE	BUSINESS PHONE							
TIME RECEIVED	DATE/TIME PROMISED	PRIORITY						
APPOINTMENT Yes No	12:51pm 09/13/05 05:30pm	LABOR RATE						
STATE REG# RI								

ORIGINAL CUSTOMER ESTIMATE: TOTAL

X

1 W 59HYZBAG CHECK AIRBAG SYSTEM
CHECK THE OPERATION AND CONDITION OF THE AIRBAG SYSTEM.

check Airbag light
Replace Drivers side
Buckle pretensioner for B1360
High Resistance.
Replace & clear code
test drive ok

Quality Improvement Status

To			
Attn	U.S.A		
CC	HMMA Service Staff	Date	2006-02-25
From	System /	QIR Issue Date	2005-12-21
Subject	(QANF-L-051220) [B] FRONT SEAT BELT BUCKLE ASSEMBLY INOPERATIVE (BOTH – HMMA)		
Report No.	B28MM2005122152	Model	Sonata(NFA)

Status			
TSB No.	NULL	Claim Monitoring	N
Attachment			

Improvement Status

Condition	Customer complaint - the air bag light is illuminated.		
Cause	Not known. - Takata has tested the defective warranty products at the test/evaluation laboratory with no trace of root cause. (see attached) Possible root causes: 1)OCS sensor failure due to current seat design. 2) Squib connector design is causing intermittent contact and is setting off lamp.		
Countermeasure	1) OCS sensor is being redesigned and enginneering change being looked at by HMC. Temporary countermeasure is supplier Lear massaging seat cushions and performing additional checks on OCS when building seat. 2) Squib connector change on EO # HOA60004 for part #'s 88810-0A000 and 88820-0A000 (LH and RH front seat belt assemblies) has been issued by HMC and will be implemented in Summer of 2006 at HMMA. QIR will be closed based on temporary countermeasure by Lear with permanent improvement in the future based on the 2 EO changes.		
Effective Date		Vehicle ID No.	5NPEU46FX6H[redacted]
Field Fix Method			

Comments

Parts Information

Seq	Part Name	Previous P/No	New P/No	Interchangeability
Queried data does not exist.				

PE14-023

HYUNDAI

9/12/2014

ATTACHMENT G

HYUNDAI

QUALITY INFORMATION REPORT

CONFIDENTIAL

Model Code	Subject Code*		HMA Report Number
NF	Electrical		QANF-L-070705
Creation date/time/user:	**Analyst:***	**Co-analyst(s):**	**Modified date/time/user:**
7/03/2007	Thai Vu	Bob Stepanovich	

Distributor*	Country*	Date	HMC Report Number	Attachments
HMA	USA	7/03/2007		

Model*	Engine or Transmission Number*	Production Date*	Attachments
Sonata	G6DB6K119540	4/06/2006	[x] Photo

Vehicle Identification Number*	Mileage*	Delivery Date*	Attachments
5NPEU46F07H[redacted]	16399	5/22/2006	[x] Part

Subject*	Attachments
[B] FRONT SEAT BELT BUCKLE ASSEMBLY INOPERATIVE – SECOND REPORT (HMMA)	[ ] Other

Condition:

Customer complaint the air bag light is illuminated.

Analysis:

- HMA received 16 incident seat belt buckles from the field.
- All incident seat belt buckles repair orders indicate the air bag light illuminated with various diagnostic codes.
- Exterior inspection of the seat belt buckle harnesses does not show signs of the wire chafing.
- The incident seat belt buckles were installed to a known “good” vehicle for evaluation.
- All dealers reported conditions (SRS light illuminated and diagnostic codes stored) could not be duplicated when the seat belt buckles were installed in the test vehicle.

No.	VIN Number	Prod Date	Mileage	Description	HMA's Investigation
1	5NPEU46F56H[redacted]	6/3/2005	18,354.	Airbag light is on.	Could not duplicate condition. No trouble codes stored.
2	5NPEU46F16H[redacted]	11/29/2005	33245	Seat belt buckle short/open	Could not duplicate condition. No trouble codes stored.
3	5NPEU46FX7H[redacted]	5/11/2006	3845	B1701 - Driver buckle resistance too high. Internal problem	Buckle already deployed by dealership before shipping to HMA
4	5NPEU46F76H[redacted]	8/27/2005	17225	B1701 - Check connector and connection - ok. Replaced seat belt buckle pretensioner	Could not duplicate condition. No trouble codes stored.
5	5NPEU46F46H[redacted]	1/5/2006	14,205.	Set code B1701	Could not duplicate condition. No trouble codes stored.
6	5NPEU46F86H[redacted]	8/26/2005	29,610.	B1701 - Driver buckle resistance. Internal problem	Could not duplicate condition. No trouble codes stored.

7	5NPEU46F47H	4/25/2006	23,338.	Airbag light on = B1701	Could not duplicate condition. No trouble codes stored.
8	5NPEU46F67H	4/11/2006	23,060.	B1517	Could not duplicate condition. No trouble codes stored.
9	5NPEU46F96H	1/20/2006	29,244.	B1517 and B1701	Could not duplicate condition. No trouble codes stored.
10	5NPEU46F07H	4/21/2006	21,876.	B1701	Could not duplicate condition. No trouble codes stored.
11	5NPEU46F06H	3/22/2006	18,674.	B1517 and B1701	Could not duplicate condition. No trouble codes stored.
12	5NPEU46F47H	4/6/2006	26,347.	B1701	Could not duplicate condition. No trouble codes stored.
13	5NPEU46F07H	4/6/2006	16399	B1517	Could not duplicate condition. No trouble codes stored.
14	5NPEU46FX7	5/2/2006	24799	B1706 - RF seat belt buckle resistance too high	Could not duplicate condition. No trouble codes stored.
15	5NPEU46F76H	7/19/2005	17896	Airbag light is on.	Could not duplicate condition. No trouble codes stored.
16	5NPEU46F66H	3/17/2006	16660	Airbag light on. Internal problem. B1701.	Could not duplicate condition. No trouble codes stored.

- Given that all incident parts tested “Good”, the cause of the airbag light illumination may originate from the seat belt buckle connector.
- The cause of the Seat Belt Buckle connector not connecting may be due to one or more of the following:
    1. Connector not connected properly from the factory.
    2. Connector separates due to vehicle vibration.
    3. Poor wire routing causing movement when the seat is slide back and forth (HMA did not observe any movement of seat belt buckle connector when the seat was moved fore and aft).
    4. Poor quality connector (does not mate properly or release tab separates connector easily).

- HMA could not determine the root cause of why the seat belt buckle is setting the diagnostic codes.
- Reports (QANF-L-051213 and QANF-L-051220) on inoperative Seat Belt Buckle Assemblies were submitted in December 2005.
- The majority of the returned incident Seat Belt Buckle Assemblies from the previous report tested “Good” also.
- The QIS reports from HMC and HMMA did not address any countermeasure actions for the NF Seat Belt Buckle condition.

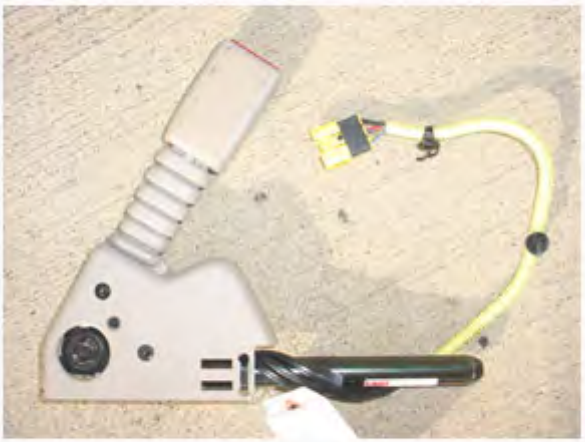
ADDITIONAL VINs WITH THE FRONT SEAT BELT BUCKLE CONNECTOR CONDITION:

NO.	VIN	MILEAGE	DIAGNOSTIC CODE	REPAIR ORDER COMMENTS
1	5NPEU46F97H[redacted]	18,267	Not Documented	Connector under driver's seat not secure. Found connector under driver's seat not fully secure. Locked and checked. Air bag light off.
2	5NPEU46F76H[redacted]	28,914	B1706	Passenger buckle pretensioner resistance too high. Trace circuit to passenger buckle connector and found loose. Remove, inspect and reconnected. Clear code.
3	5NPEU46F56H[redacted]	30,886	Not Documented	Connection poor/ not mate on right seat belt buckle connector. Cleaned connector & pins, deleted code, no code returned.
4	5NPEU46F36H[redacted]	19,268	B1701	Seat belt pretensioner connector. Hi-scan pro & Diag test displayed. Removed driver seat, corrected loose/ poor mating seat buckle pretensioner connecter.
5	5NPEU46F16H[redacted]	17,096	B1706	Hi-scan pro, "Passenger Buckle High Resist". Unplugged and inspected terminals, ok. Reconnected & clear code. Light stays off code gone.
6	5NPEU46F76H[redacted]	22,537	B1701	Driver seat belt buckle pretensioner high resistance. Pinpoint test trace circuit found poor connection at driver seat belt buckle harness connector. Reinstall connector.
7	5NPEU46F06H[redacted]	26,485	B1701	Connected Hyundai scan tool, ran pinpoint test, checked wiring & connections. Loose connection under drivers seat. O/B wire loose in connector, repaired connection connector.
8	5NPEU46F66H[redacted]	21,704	P1703	Loose connection at drivers buckle connection. Connect scan tool, pinpoint test. Traced problem to connector. Removed, clean, reinstalled, & secured connector under driver's seat.
9	5NPEU46F86H[redacted]	24,032	B1706	Hooked up scan tool. Performed KOEO test passenger's seat belt buckle pretensioners. Checked connector, found connector loose, tightened connector.
10	5NPEU46F66H[redacted]	28,835	B1706	Passenger pretensioner high resistance. Checked passenger seatbelt buckle connector; not connected, reconnected until it locked.
11	5NPEU46F06H[redacted]	29,152	B1701	Connector A02 disconnected. Driver pretensioners yellow-red wires. Driver seat buckle pretensioner resistance high. Perform system test, inspect, A02 disconnected, reconnected until lock.
12	5NPEU46F26H[redacted]	23,652	B1701	Poor connection for driver's seat belt buckle under driver's seat. Repaired connection.

13	5NPEU46FX7	21,683	B1701	Connector loose from pretensioner under driver seat. Scan tool, driver seat buckle hi resistance- checked connector buckle, disconnect and reconnect. Remove & secure connector.
14	5NPEU46F67	16,302	B1701	Driver seat buckle pretensioner high resistance. Secure connection to pretensioner under driver seat.
15	5NPEU46F27	22,752	B1706	Hi-scan tool, disconnect and check pins for buckle. Reconnect
16	5NPEU46F67	22,333	B1704	Passenger buckle has poor connection. Hi-scan, check connector under seat. Disconnect, check pins, and reconnect
17	5NPEU46F66	22,909	B1701	Poor connection under driver's seat for seat belt buckle Repaired poor connection.
18	5NPEU46FX6	26,266	B1706	Poor connection under driver's seat for seat belt buckle Repaired poor connection.
19	5NPEU46F27	19,580	B1706, B1701	Hook up scan tool, KOEO test, check SRS Air Bag pass seat belt buckle connectors. Adjust pins on buckle connectors.
20	5NPEU46FX7	24,213	B1706	Passenger buckle has high resistance. Checked buckle circuit, faulty connection a pretensioner digital connector. Repaired faulty connection,
21	5NPEU46F76	24,960	B1706	Resistance high, poor connection, reconnect.
22	5NPEU46F47	16,616	B1701	Hi-scan, perform KOEO test. Driver's seat belt buckle has poor connection. Adjust pins.
23	5NPEU46F06	31,165	B1706	Passenger buckle pretensioner resistance high. Checked wiring, faulty connection, re-routed wiring harness. Reinstalled and secured connector.
24	5NPEU46F37	17,423	B1701, B1706	Connection poor, secured loose connections under front seats.
25	5NPEU46F87	3,572	B1701, B1706	Loose connections under front seats. Secure connections.
26	5NMSG13D77	6,146	B1706	Open circuit at RF seat belt buckle connector. Secured loose connection under passenger seat.
27	5NPEU46F86	24,175	B1701	Open circuit- Driver's seatbelt buckle pretensioner high. Connector to driver's buckle pretensioner not fully seated (vibration). Disconnect and reconnect buckle pretensioner connector.
28	5NPEU46F77	19,365	Not Documented	Suspect connection poor, check connections under front seats. Unplugged and reinstalled all connectors.
29	KMHDU46D87	1,562	B1517	Poor connection at drive seat belt buckle.
30	5NPEU46F46	16,546	B1701	Open circuit at driver's seat belt buckle pretensioner high not fully connected, seated (vibration, pulled loose when adjusted) Repaired loose connection.

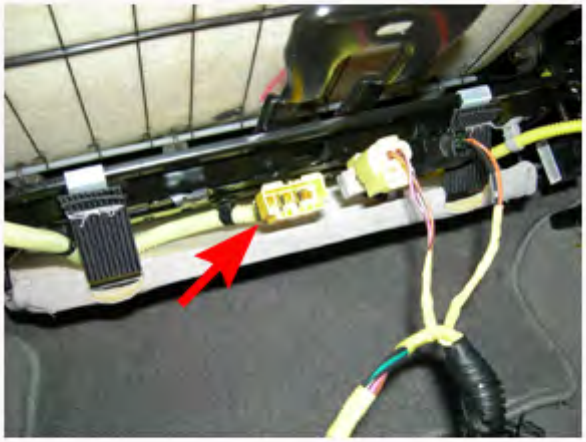
31	5NPEU46F47H[redacted]	24,132	Not Documented	Loose connection under passenger seat. Reattached and secured connection.
32	5NPEU46F46H[redacted]	25,716	Not Documented	Loose connection under front passenger seat. Inspect electrical connections. Secured connectors under passenger seat.
33	5NPEU46F36H[redacted]	22,097	B1701	Poor connection at drive seat belt buckle.
34	5NPEU46F37H[redacted]	16,593	B1706	Poor connection. Passenger seat buckle circuit unplugged & replugged.
35	5NPEU46F86H[redacted]	25,505	B1706	Poor connection. Checked all buckle connections and reset.
36	5NPEU46F36H[redacted]	24,817	B1701	Poor connection. Inspect driver seat belt buckle.
37	5NPEU46F06H[redacted]	26,811	B1701	Poor connection. Secured loose connection at drivers pretensioner and reset.
38	5NPEU46FX6H[redacted]	21,863	B1701, B1706	Doesn't operate properly, used scan tool, secured loose connections under front seats.
39	5NPEU46F77H[redacted]	17,597	Not Documented	Checked all connectors under seat and pins good. Reinstalled all connectors. Suspect poor connection under driver seat.
40	5NPEU46F56H[redacted]	23,437	Not Documented	Passenger seat had a lot of trash under. Making loose connector unsecured, removed all trash and secure the connector.
41	5NPEU46F47H[redacted]	20,074	Not Documented	Removed driver and passenger seat. Checked all connections, loose connection under driver's seat secure connection, reinstall seats.
42	5NPEU46F66H[redacted]	24,716	Not Documented	Removed driver and passenger seat. Checked all connections, loose connection under passenger's seat secure connection, reinstall seats.

NF Sonata Front Seat Belt Buckle Assembly

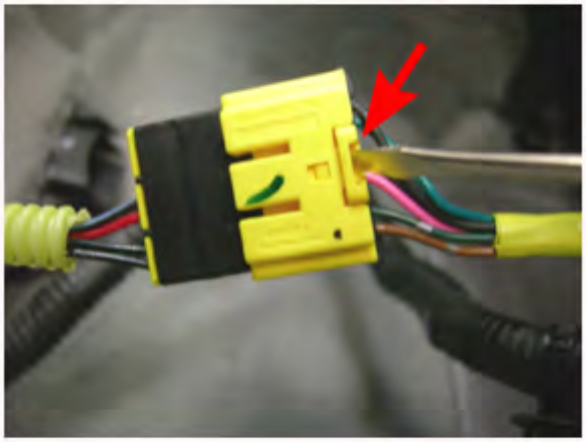


Incident seat belt buckles were test installed into a known good vehicle for evaluation

Seat belt buckle connector is located underneath the seat



Connector does not appear to be secure.
A slight force on the tab will release the connector



Seat belt buckle connector tab

There was noticeable play when the seat belt connector was pulled in the closed position

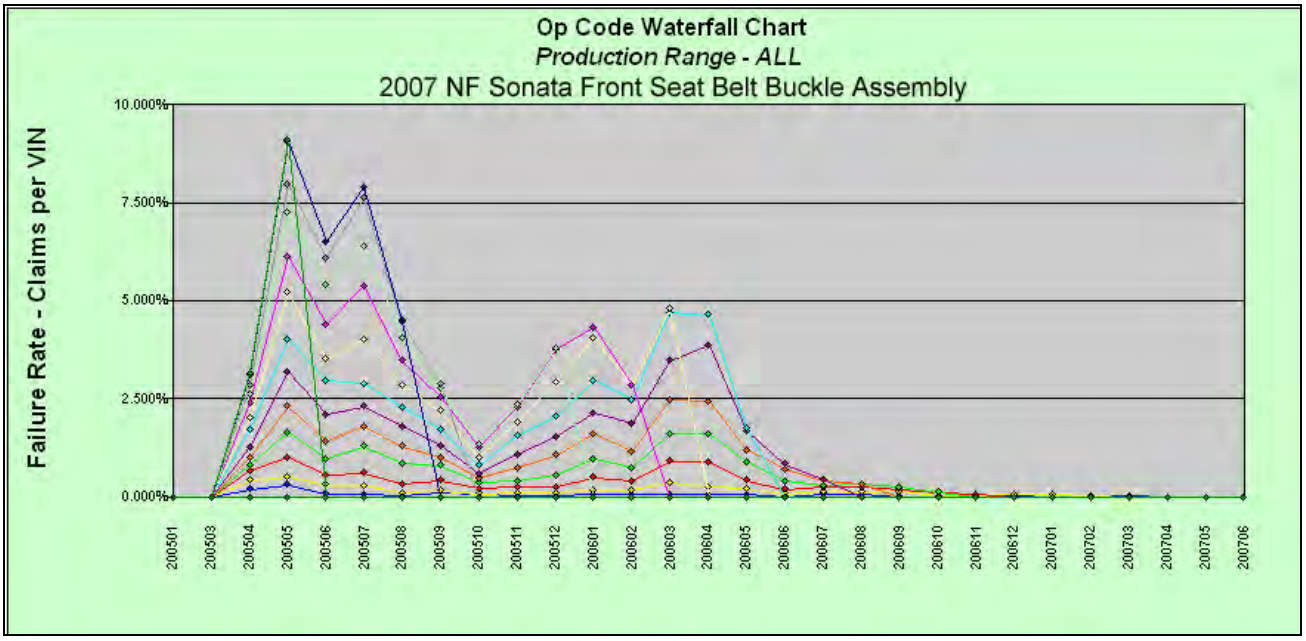
Seat belt buckle connector does not have a secondary latch

Seat belt buckle connector

WARRANTY INFORMATION:

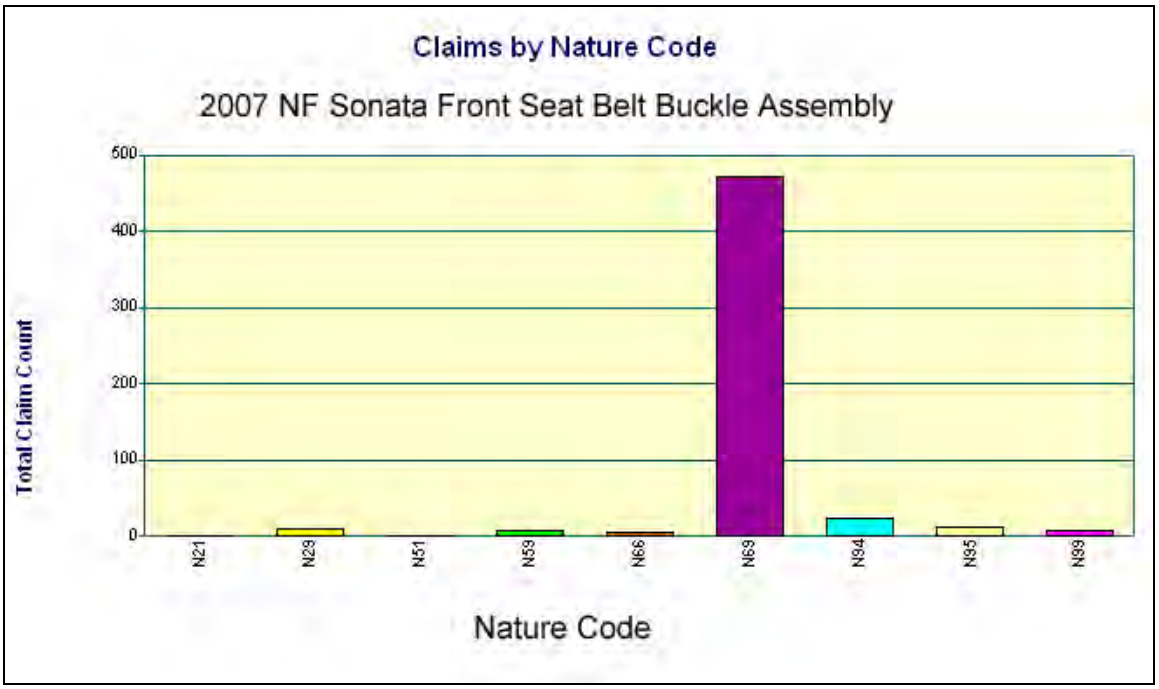
- 532 front seat belt buckle assemblies have been replaced for the 2007 NF Sonata.
- The defect rate is 0.50% (532 claims and 106,460 vehicles sold).
- Out of the 510 claims, only 15 VINs have repeated repairs for the seat belt buckle condition.

- In most cases, the seat belt buckle connectors were found disconnected.
- Loose/poor connection can turn the SRS light on and set diagnostic codes.
- Dealership Technicians may not be aware of the loose connection, or connector not fully pushed in, and replace the seat belt buckle assembly with a new part.
- The Technician may think that he has fixed the concern but the repair was to simply reconnect the connector.
- When the replaced seat belt buckle assembly is sent in from the dealership, the part is tested and labeled “No Trouble Found (NTF)”.



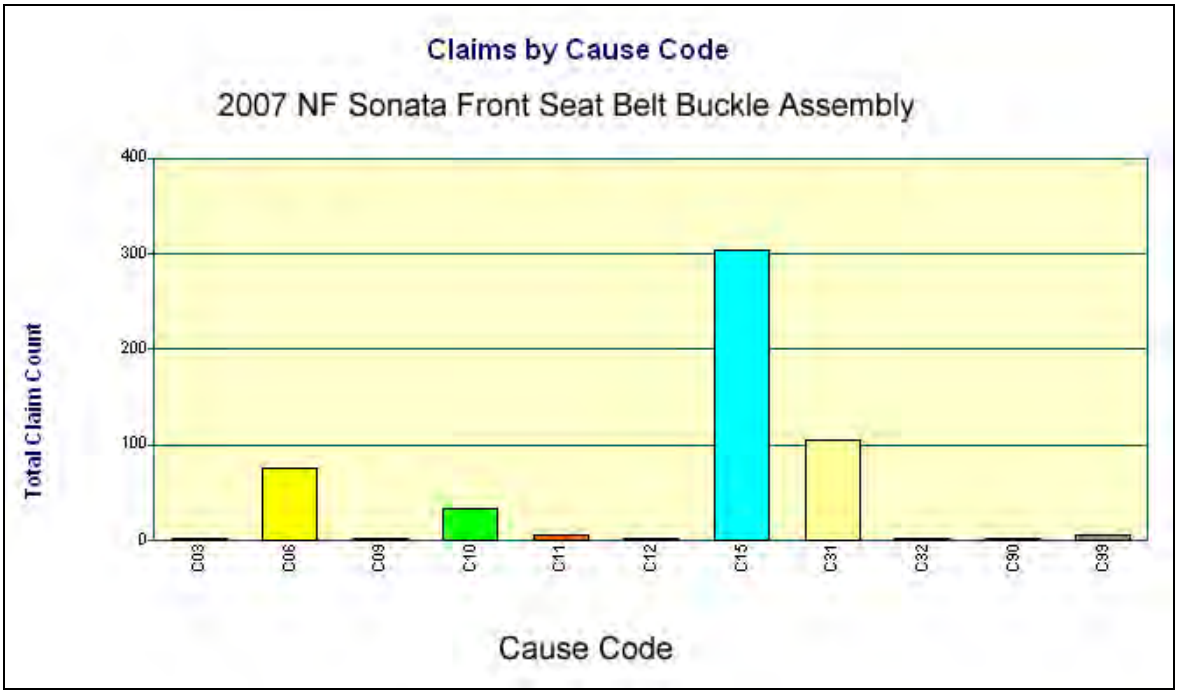
Warranty Claims by Nature Code:

- 89% of all claims are for Nature Code N69 (Warning Lights On).

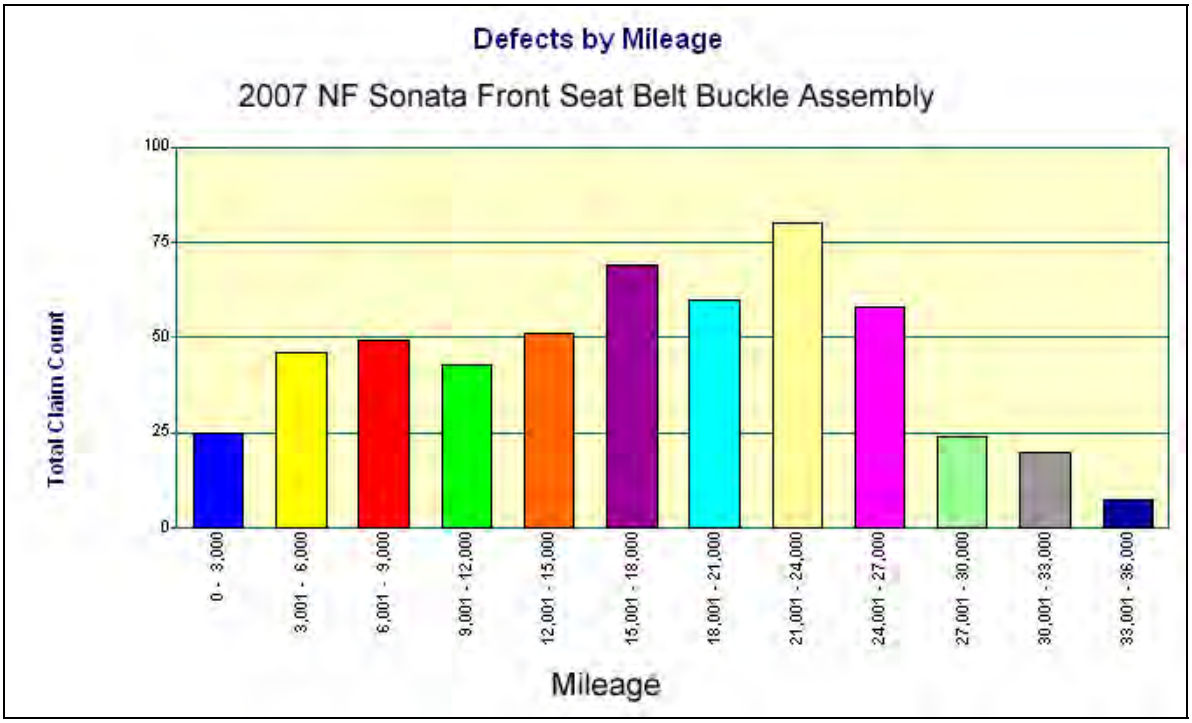


Warranty Claims by Cause Code:

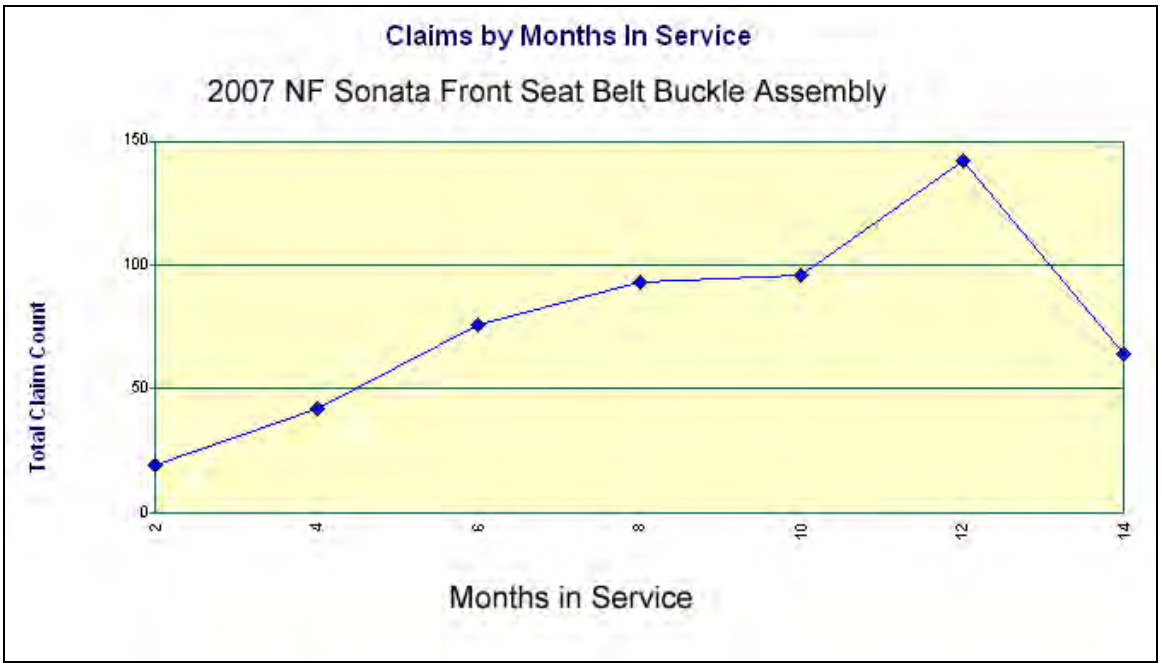
- 57% of all claims are for Cause Code C15 (Poor Contact & Short, Open Circuit).
- 19% of all claims are for Cause Code C31 (Sticking, Seized).



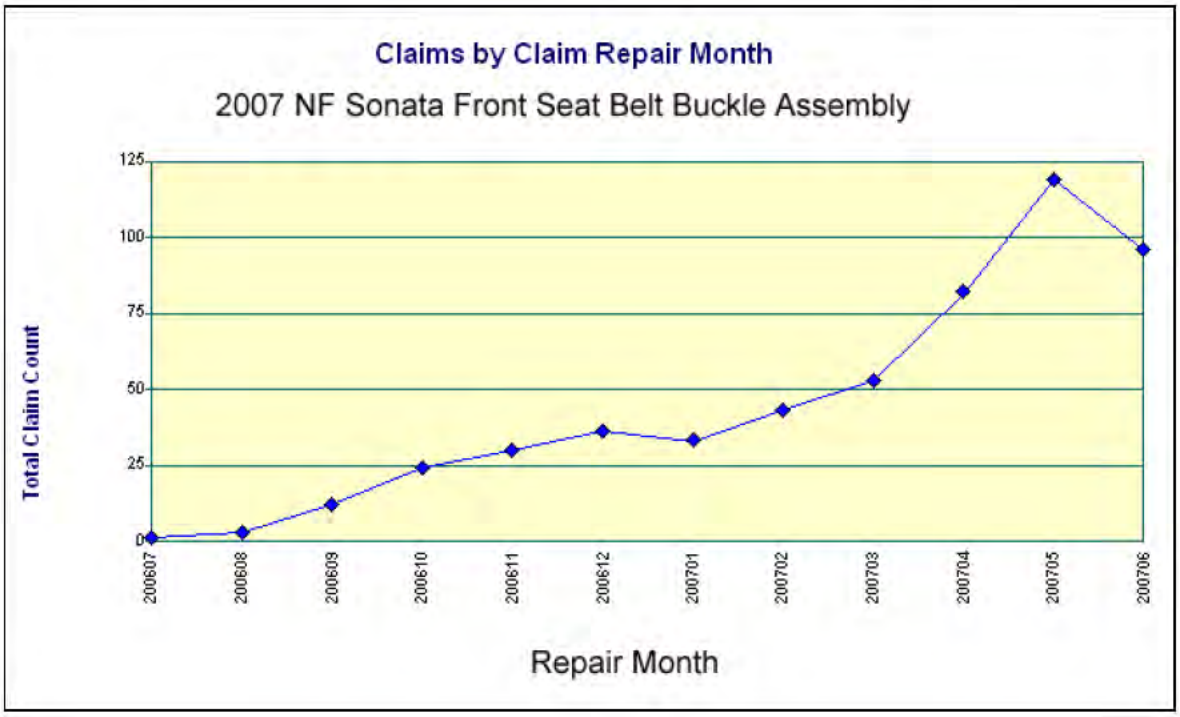
Warranty Claims by Mileage:



Warranty Claims by Months in Service:



- Warranty Claims by Repair Month shows a steady increase from start of production.



Corrective Action:

- Replace front seat belt buckle assembly (88830-0A000-QS/QD or 88840-0A000-QS/QD).

Recommendation:

- HMA could not duplicate the seat belt buckle malfunction condition.
- The seat belt malfunction condition may be intermittent or may be due to poor quality connector.
- HMMA should inspect the incident parts forwarded with this report and take necessary action to correct the condition.
- 16 incident front seat belt buckle assemblies will be forwarded to HMMA for evaluation.

Attachments:

Quality Improvement Status

To			
Attn	HMMA		
CC	HMMA Service Staff	Date	2007-07-31
From	System /	QIR Issue Date	2007-07-21
Subject	(QANF-L-070705) [B] FRONT SEAT BELT BUCKLE ASSEMBLY INOPERATIVE – SECOND REPORT (HMMA)		
Report No.	B28MM2007072151	Model	Sonata(NFA)

Status			
TSB No.		Claim Monitoring	N
Attachment			

Improvement Status

Condition	Customer complaint the air bag light is illuminated		
Cause	Connector separates due to vehicle vibration		
Countermeasure	Mar 07 H0A 60225 Changed connector to a more robust design HMMA Implementation March 6 2007 with the MY 08 Production. VIN 5NPET46C68H[redacted]		
Effective Date	2007-03-06	Vehicle ID No.	5NPEU46F07H[redacted]
Field Fix Method			

Comments

Parts Information

Seq	Part Name	Previous P/No	New P/No	Interchangeability
Queried data does not exist.				

PE14-023

HYUNDAI

9/12/2014

ATTACHMENT H

10102006 Meeting Minutes

Hyundai Response to PE14-023

Response to Request 8

NFA S/belt buckle connector change(AMP→JST) background
NFA S/BELT BUCKLE CONNECTOR CHANGE

회 의 록

결재	팀원	팀장	담당중역
	SIGNED		SIGNED
	10월 13일	/	10월 13일

회의 구분	□정보수집전달 □이해조정 □의견교환 □문제해결 □계획입안 □통지 □재검토		
주관(팀)부서	설계개선2팀		
일 시	2006년 10월10일		
장 소	남양연구소 설계개선2팀 6550 회의실		
작 성 자	정병태	소요시간	1시간
배 포 처			
회의참석자	첨부참조		
	참석률	%	명/ 명
	미참석 팀		
주 제	버클 와이어링 컨넥터 타입 변경 적용 회의		

회의내용

1. 목적

HD 차종부터 적용된 DOUBLE LOCK'G 타입의 버클 와이어링 컨넥터를 타차종에 확대 적용하기 위함

2. 회의결과

1) 변경추진 사유

- 신차종부터 적용키로 한 DOUBLE LOCK'G (예: JST사 제품) 타입을 현 양산차종에 대해서도 확대적용키로 함
- SINGLE LOCK'G TYPE (AMP사) 과 DOUBLE LOCK'G TYPE (JST사) 내구 및 신뢰성 시험결과 두 타입 모두 SPEC 만족하나 작업자 체결불량방지 측면에서 우수함

2) 적용 차종

- 대상 : HMC 양산 전차종 (KMC 차종은 수평전개)
- 적용순서 : 아산공장 차종부터 선추진하고 울산공장 차종으로 확대 적용
  HMMA 공장 생산차량은 HMC 생산차종 적용시 동시적용
  - 아산 NF, HMMA NFA 동시적용, 울산공장 CM, HMMA CMA 동시적용
  - NF/TG 차종은 10/13부터 EO 발행
- 적용시점 : 차종별 적용가능시점 확인하여 R/CHANGE 적용

BF-CM-215

Meeting Minutes

/ Approval / Team member / Team leader / Assigned Exec
SIGNED SIGNED
Oct. 13 / Oct. 13

Main(Team) Department: Design Enhancement Team 2
Date: Oct. 10, 2006
Place: Namyang R&D Center Design Enhance Team 2, Conference Room 6550
Preparer: Chung, Byung Tae **Time spent: 1 Hour**
Meeting attendees: Refer to attachment
Subject: Buckle wiring connector type change application meeting

Meeting content

1. PURPOSE
   Double-lock type buckle wiring connector applied from HD to extend to other models.

2. MEETING RESULT
   1) Cause for pushing for change
   - Double-lock type buckle wiring connector (example: JST Co.), applied from new car, will extend to production cars.
   - Single lock'g type(AMP) and double lock'g type(JST) meet all spec. for durability and reliability. JST is good for preventing worker's operation failure.

   2)Applied model
   - Subject : HMC mass production for all models (KMC models deployed horizontally)
   - Application sequence: Asan plant models to be pre-advanced and expanded application to Ulsan plant models. HMMA plant production vehicles shall be simultaneously applied upon application to HMC production models.
     - Asan NF, HMMA NFA simultaneous application, Ulsan plant CM, HMMA CMA simultaneous application
     - NF/TG models issued EO from 10/13
   - Applied point in time: Applicable time verified per model for R/CHANGE application.

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PE14-023

HYUNDAI

9/12/2014

ATTACHMENT I

JST Presentation

Hyundai Response to PE14-023

Response to Request 8

Presented to HYUNDAI

8 Position Wire to Wire Connector for Airbag

J.S.T. Mfg. Co., Ltd.

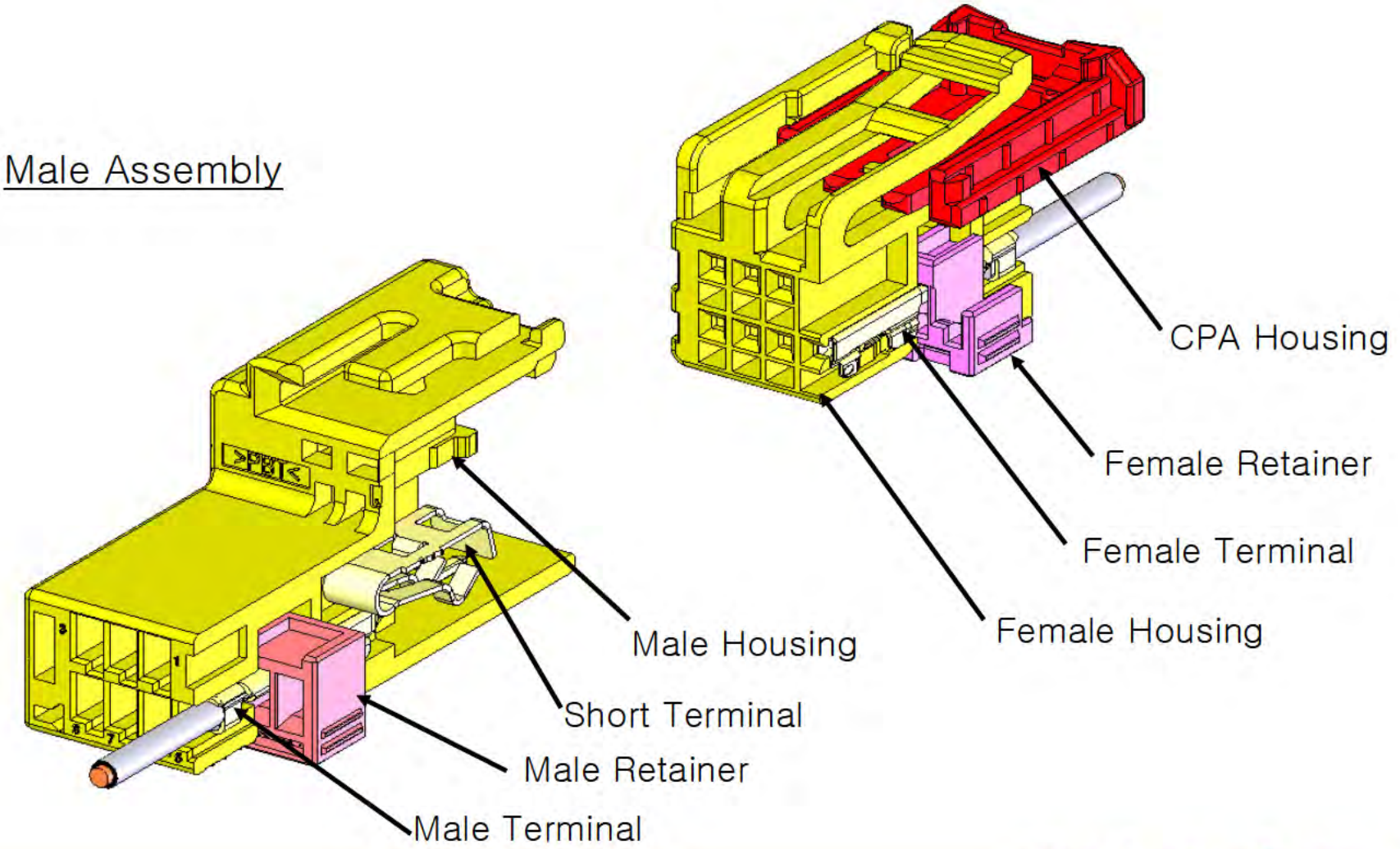
2006. 10. 12.

Table of Contents

1. Concept

Female Assembly

Male Assembly



2. Insertion Force

1. Standards

- Design concept: < 70N (Apply for ergonomics)

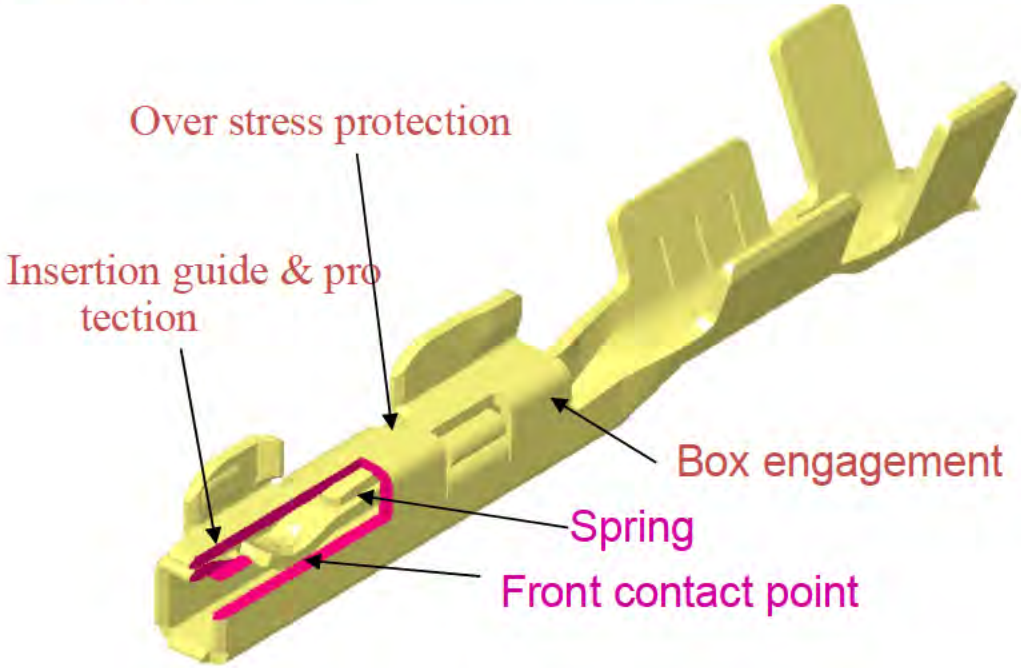
2. Test result (MAX value)

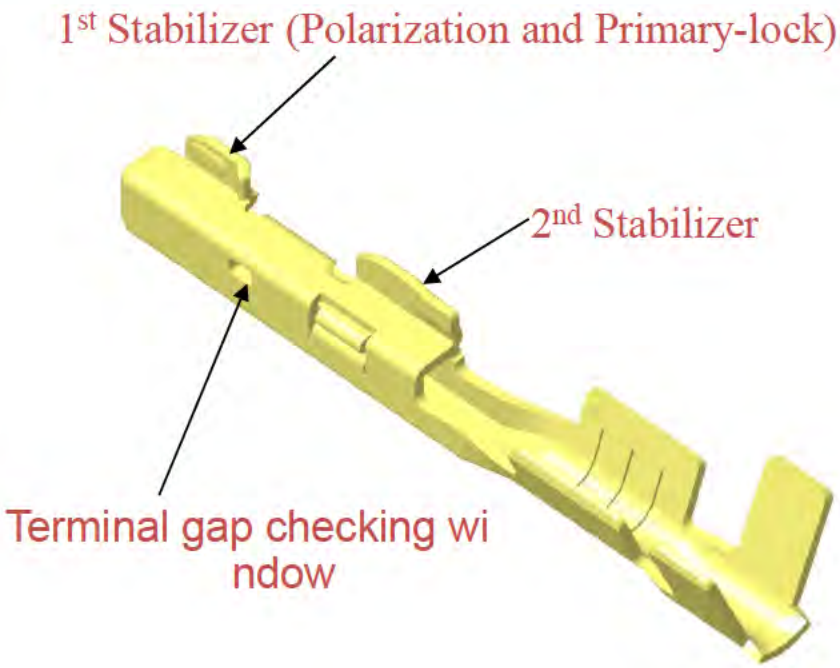
	8 Pin		
Terminal	0.64	Short	CPA
Pin	8	2	1
Insertion force	35.4		

Unit(N)

MAX Value (8Pin): 35.4N≦70N: Design concept

3. 0.64Female Terminal

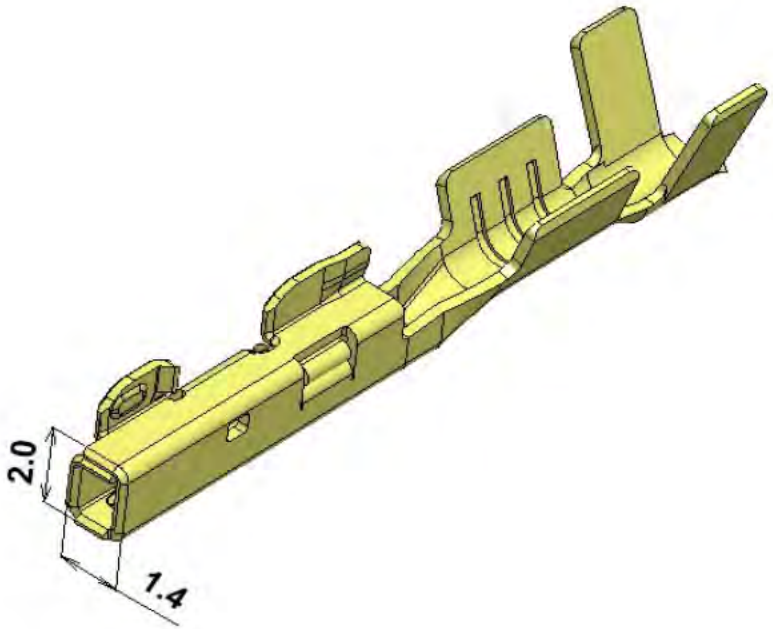


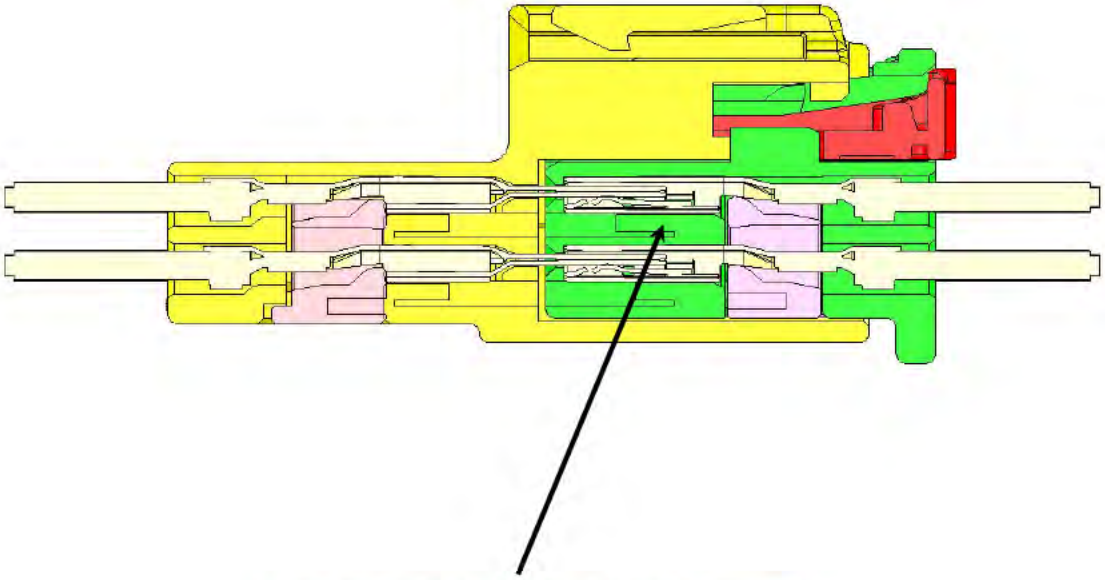


1. Dual layers spring.
2. Box design fully protects the spring.
3. Front contact point for miniaturize.

Applicable wire:
Signal 22-20AWG (0.3-0.5mm^2)
Current rating: 5A DC

4. Terminal- Miniaturizing





Horizontal direction lance

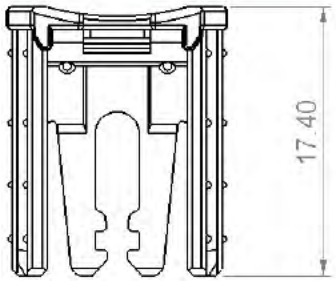
Width pitch = 2.2mm

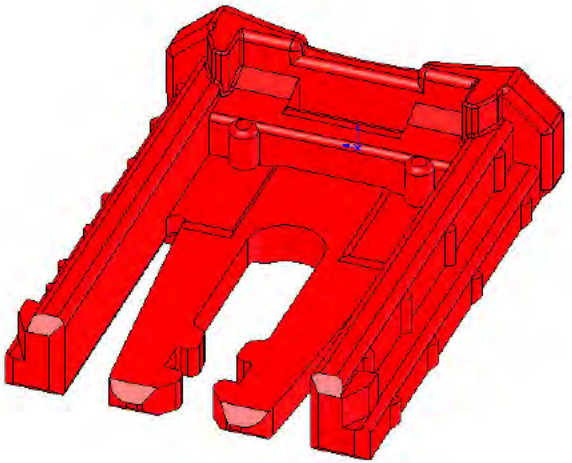
Height pitch = 3.8 mm

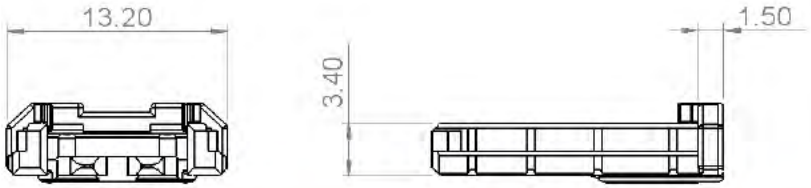
5. CPA function

CPA Design Concepts:

1. Prevent from "half mating connection" (When pushing the CPA)
2. Prevent from unexpected disengagement of connector
3. Pre-installed CPA for easy handling.
4. Tool required to release the CPA
5. To meet SAE/USCAR-2 Rev.3 performance standard.

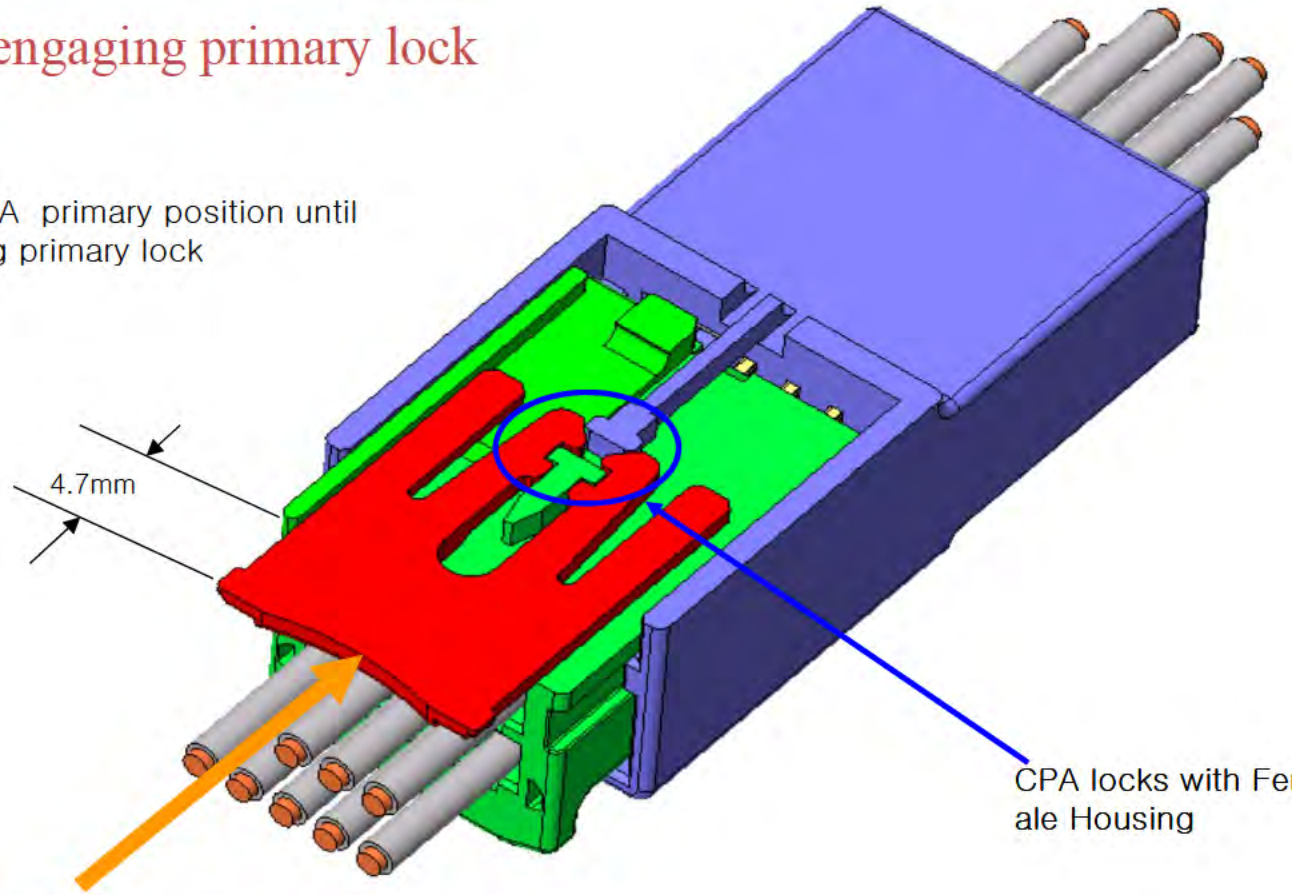






CPA Mechanism: Stage 1

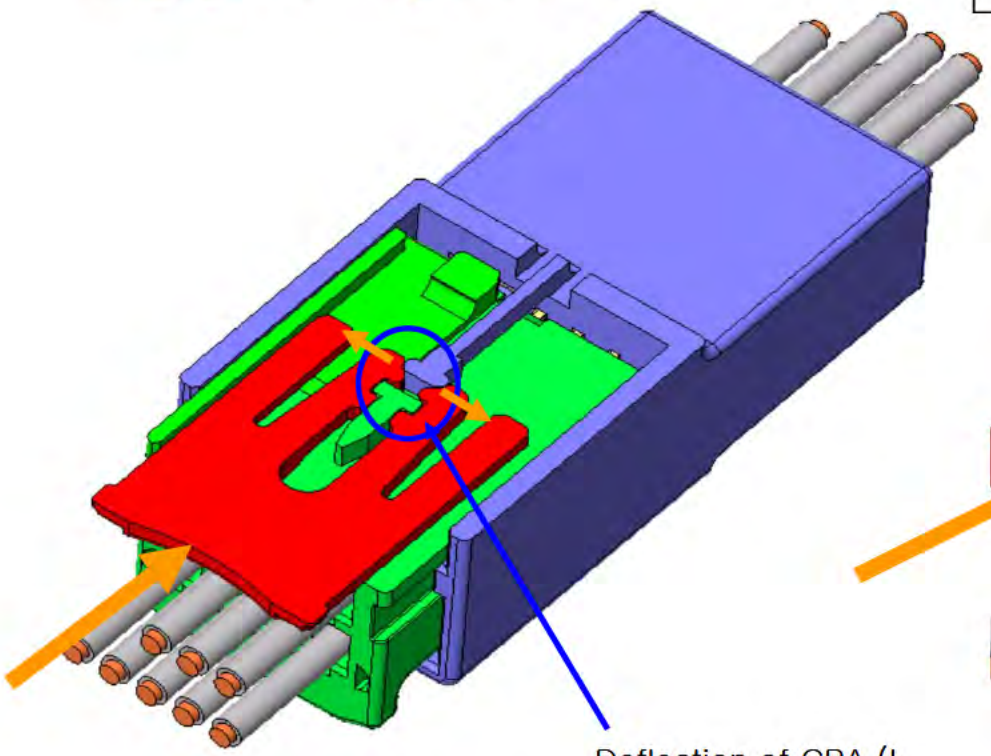
Before engaging primary lock



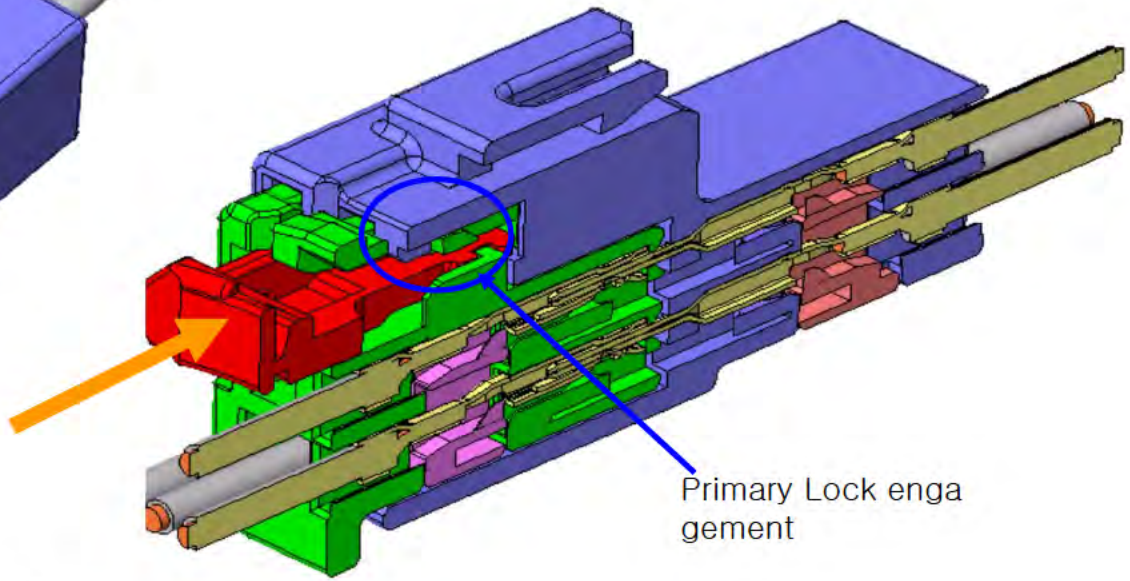
CPA Mechanism: Stage 2

Engage Primary lock

After the primary lock is engaged, the CPA is now able to be inserted into it's lock position.



Deflection of CPA (I nterfere with Male h ousing)

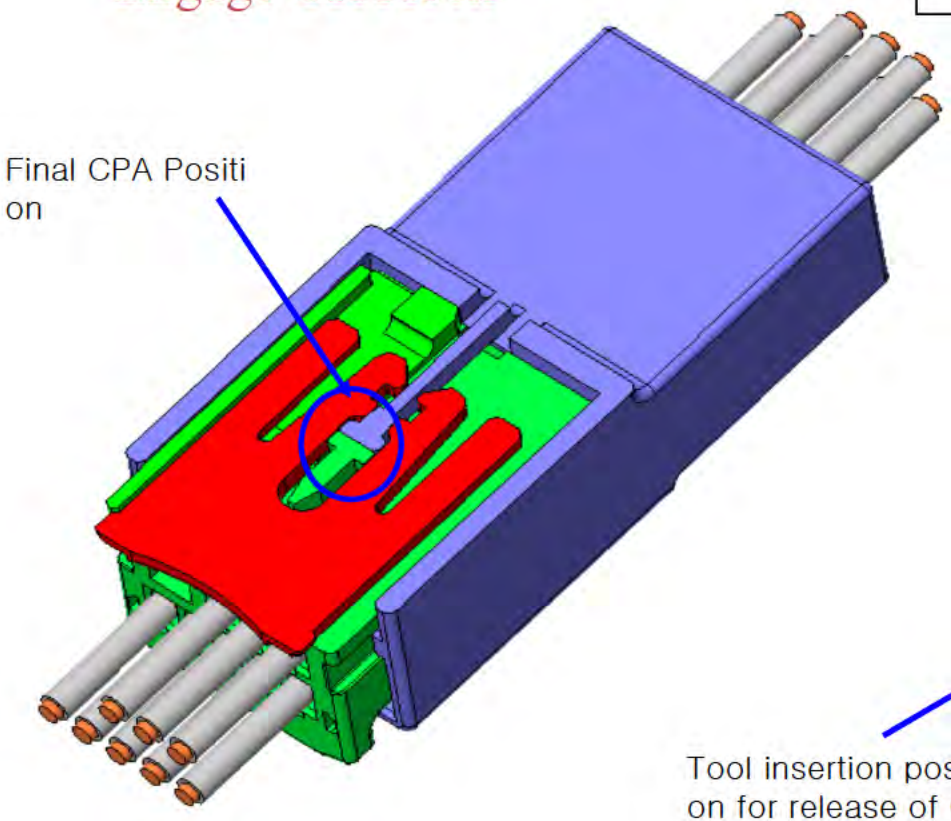


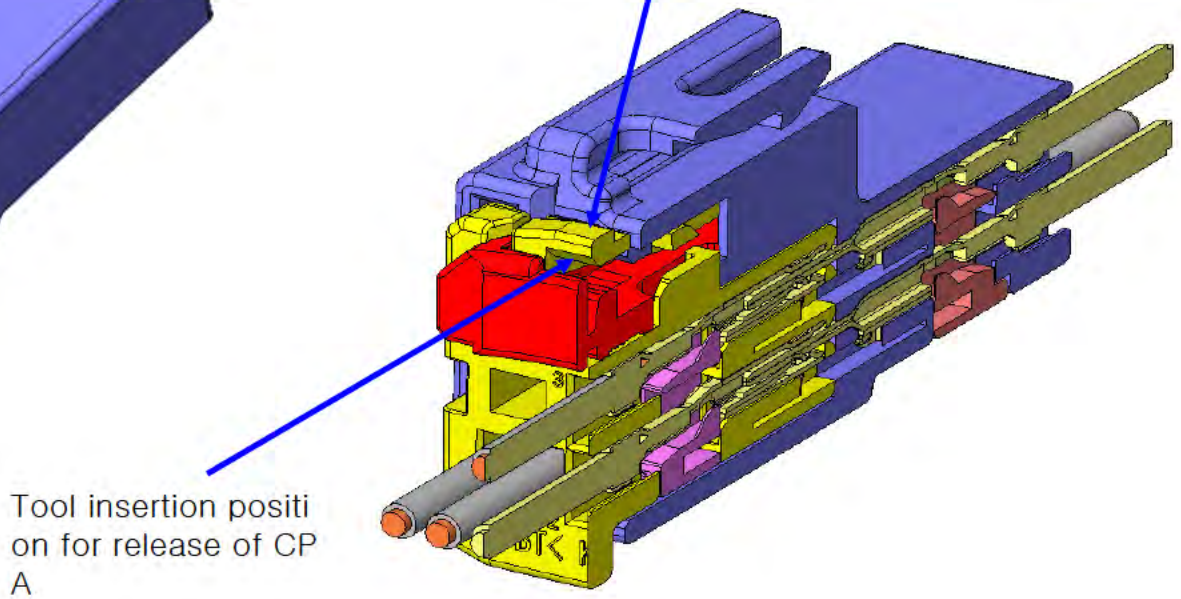
Primary Lock enga gement

CPA Mechanism: Final Stage

Once the primary lock is fully engaged, the CPA can be engage d with the Male housing.

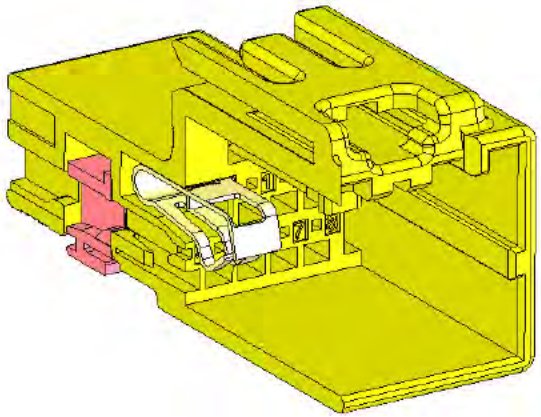
Engage CPA lock





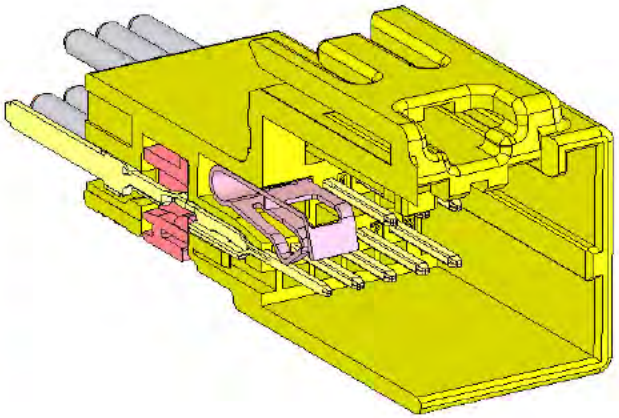
6. Short Terminal Function

Before terminal assembly



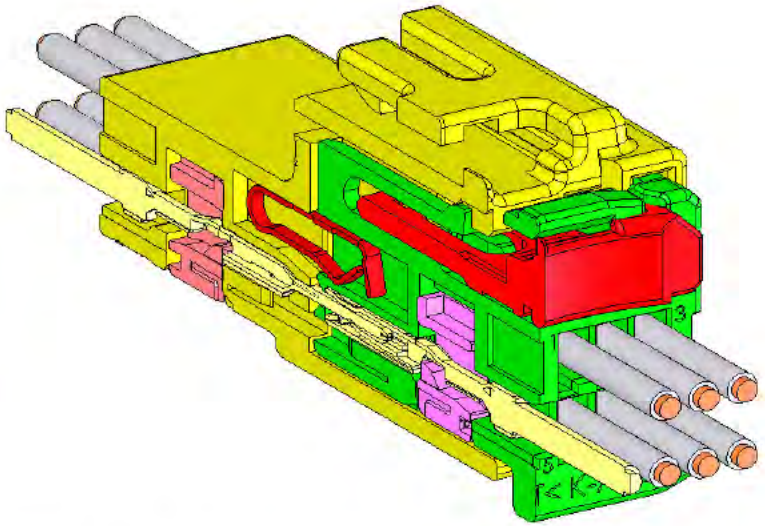
Customer supply condition

Male terminal assembly (Before mating)



Short terminal always contact with 2 male terminals.

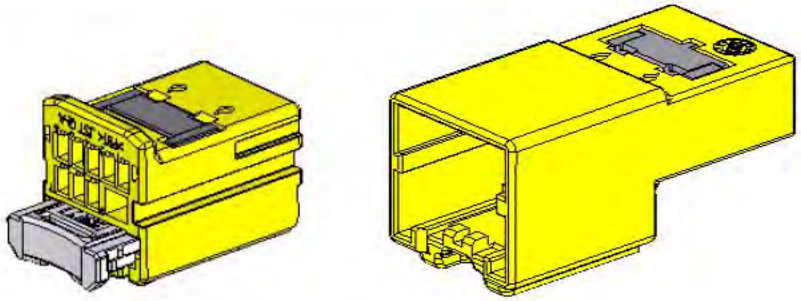
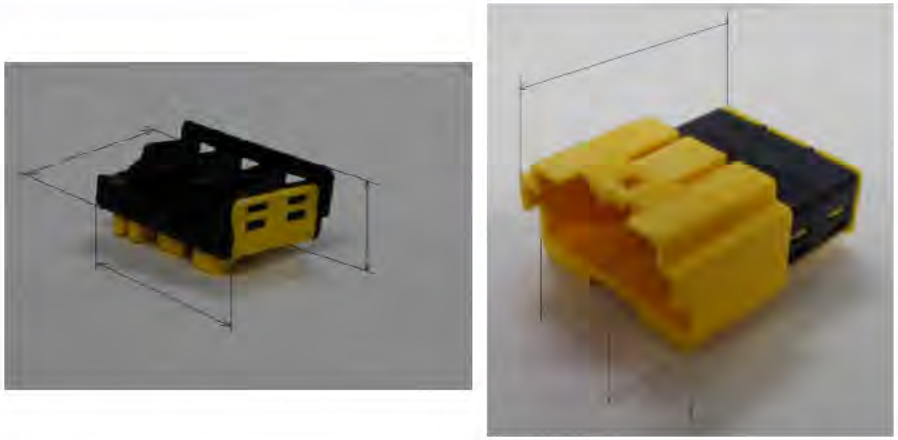
Mating completed



Short terminal deflected by fe male housing. Short circuit opened.

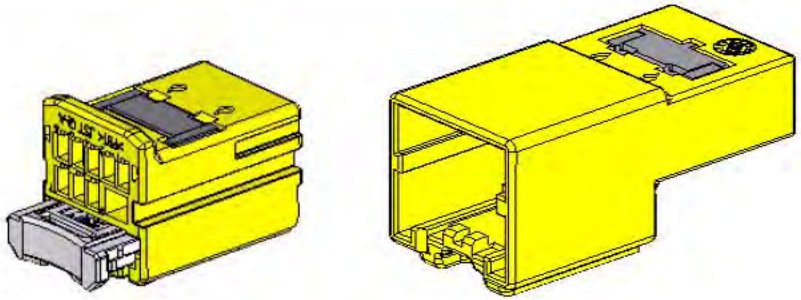
7. Comparison with competitor product.

1. CONNECTOR

JST 8P	Tyco 6P (AMP)
	
• External view size reduction (Upon AMP product volume 100% standard JST 67.00%) • 8Pin,Short pin, CPA entire insertion under 35.4N ergonomics application • Using an automatic assembler, assembly and inspection are simultaneously conducted to minimize the ratio of flaw	• Transversal direction row 1 Pin alignment arrangement Connector external view size increase.

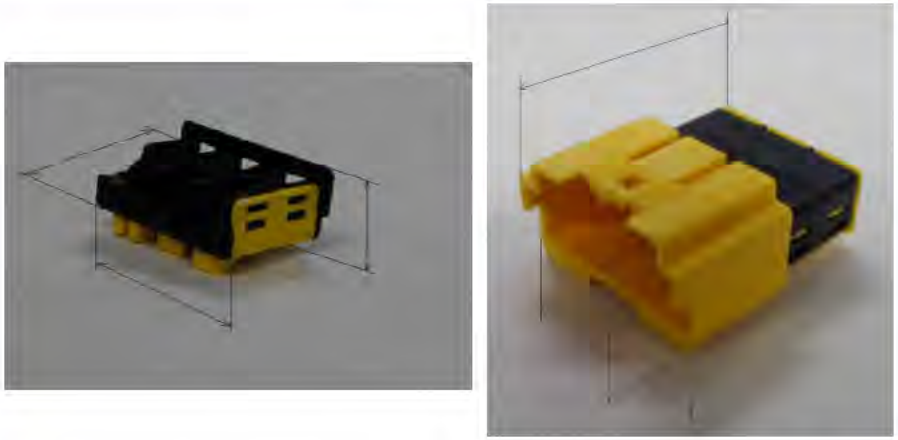
2. RETAINER

JST 8P



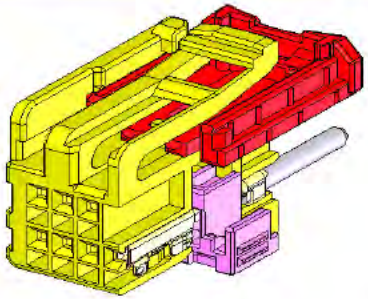
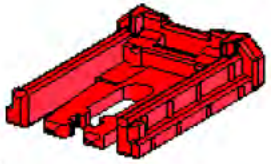
- Terminal's double gauge terminal push prevention
- RETAINER is located inside HOUSING for W/H workmanship excellence(2nd Ass'y)
- LOCK located inside HOUSING for REWORK workmanship excellence(1 time work)
- Upon REWORK work, prevents parts displacement
- Upon combining with the other matter in a condition of semi-combination, prevention of IN-LINE assembly mistake due to occurrence of interference.

Tyco 6P (AMP)



- RETAINER is located outside of HOUSING for W/H workmanship decline (2nd assembly)
- LOCK is located outside of HOUSING for upon REWORK work, due to dual Locking release, workmanship decline(2-time work)
- As LOCK is located outside of HOUSING, due to outside interference, RETAINER release possible.

3. CPA

JST 8P	Tyco 6P (AMP)
  • With Connector Position Assurance application, Connector's semi-combination prevention • As Housing is shipped in a semi-combination condition CPA, basic exclusion of omission cause and breakage prevention • Upon Male Connector fastening, with CPA using thumb, simple Connector fastening possible with Pushing (Easy work even in a poor work environment) • Upon non-union with Male Connector, CPA operation not allowable. System (Assembly flaw prevention) • After combining with Male Connector, LOCK release not allowable. System(Solid combination maintained)	Non-application

4. TERMINAL

JST 8P

・With 1piece plate usage, Terminal's structural stability secured.
・With Housing Lance application, Terminal and Housing's 1st union maintained / Upon terminal compression and flow, due to Lance's interference prevention, Lance breakage and measurement change prevention.
・JST's own gold plating, plating stability maintained
・Upon contact with female terminal, superior valid contact interval secured (over 3.9㎜)
・With double STABILIZER structure, mis-insertion of terminal prevention in advance

Tyco 6P (AMP)

・With terminal lance application, upon terminal compression and flow, due to lance interference worry, lance breakage and measurement change possible.
・With 2Piece plate structure, material cost elevation following the usage of composite materials.
・After REWORK work, due to LANCE deformation, problem occurs in the re-usage of terminal.

PE14-023

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9/12/2014

ATTACHMENT J

8_2014 Research Trip Report

Hyundai Response to PE14-023

Response to Request 8

1. Overview

▣ Issue

- NF Sonata SRS indicator illuminated due to seat belt buckle pretensioner resistance out of DTC range limit.

<A/bag warning light "ON">

▣ Potential Cause

- Increase in resistance at the seat belt buckle pretensioner connector with main SRS harness.
- Airbag Control Unit (ACU) diagnostic function identifies out of specification condition with seat belt buckle pretensioner circuit

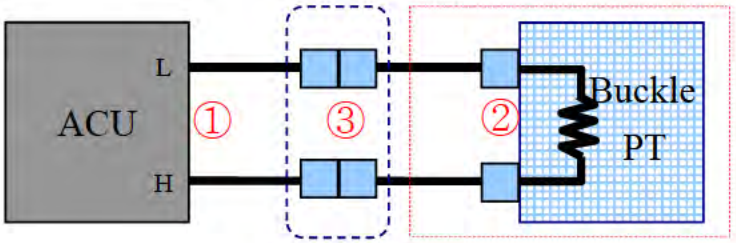
▣ Field unit and dealer return component investigation results

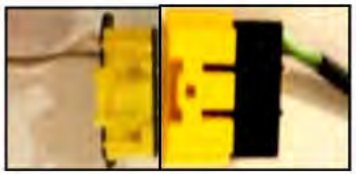
① ACU diagnosis – Buckle pretensioner resistance out of specification (6.1 ~ 11.5Ω)

② Analysis of removed seat belt buckle pretensioners reveals resistance within specification (1.8 ~ 2.5Ω)

③ Contacts in buckle to main SRS connector exhibiting excessive resistance

-Field investigation reveals circuit resistance returns to normal values after minor contact with connector housing.





<Connector under the seat>

<Buckle pretensioner>

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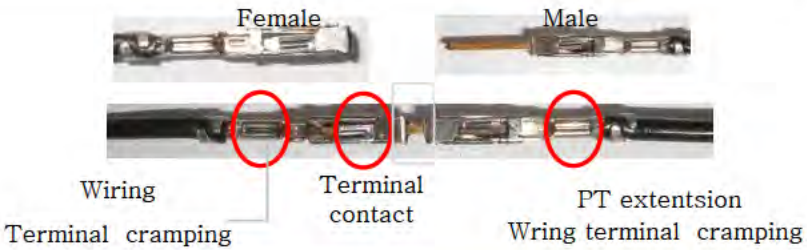
2. Field Investigation

▣ Results:

Total of 12 field vehicles: SRS indicator on 9 vehicles; not illuminate on 3 vehicles

- High resistance occurs only on manually adjusted seat
- High resistance occurs at connector located under the seat



NO	VIN	Production date	Odometer (miles)	Seat type		Results Driver resistance too high: B1701 Pass. Resistance too high : B1706	Comment
				Driver	Pass		
1	207114	06.07.29	93,230	Auto	Manual	• No DTC (B1706 erased)	• Cannot duplicate
2	246090	06.10.25	61,952	Auto	Manual	• No DTC (B1706 erased)	• Cannot duplicate
3	162315	06.04.17	37,145	Manual	Manual	• DTC B1706 active fault - connector(under seat) cause high resistance	• Touching the connector(under seat) made the fault disappear
4	013505	05.07.13	268,561	Auto	Manual	• DTC B1706 active fault - connector(under seat) cause high resistance	• Touching the connector(under seat) made the fault disappear • Checked resistance at each points
5	250134	07.01.26	98,248	Auto	Manual	• DTC B1706 active fault - connector(under seat) cause high resistance	• Touching the connector(under seat) made the fault disappear • Loose cable tie and band(under seat)
6	147419	06.03.25	138,539	Auto	Manual	• DTC B1706 active fault - connector(under seat) cause high resistance	• Touching the connector(under seat) made the fault disappear • Checked resistance at each points
7	097883	06.01.07	44,094	Auto	Manual	• DTC B1706 active fault - connector(under seat) cause high resistance	• Touching the connector(under seat) made the fault disappear
8	177163	06.05.11	134,462	Auto	Manual	• DTC B1706 active fault - connector(under seat) cause high resistance	• Touching the connector(under seat) made the fault disappear
9	121842	06.02.14	96,171	Manual	Manual	• DTC B1701 active fault - connector(under seat) cause high resistance	• Touching the connector(under seat) made the fault disappear

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2. Component Part Inspection Results

▣ Inspection Result (Checked the resistance of buckle PT, SPEC : 1.8~2.5Ω)

- Result of measuring resistance of buckle pretensioner on service parts (45 units): All within specification (2.1~2.3Ω)
- Result of measuring resistance of field return buckle pretensioner (6 units): All within specification (2.0~2.2Ω)

No.	VIN	P/D	Mile	Phenomenon	Result	Image
#1	293490	07.07.10	137,412	Field return B1701 (Driver Seat)	▶ No abnormality ·Measuled resistance:2.0 ~2.1Ω ※ SPEC : 1.8~2.5Ω	
#2	042094	06.02.25	-	Field return B1706 (Passenger Seat)	▶ No abnormality ·Measuled resistance:2.0 ~2.1Ω	
#3	013505	050713	268,561	Field return B1706 (Passenger Seat)	▶ No abnormality ·Measuled resistance:2.0 ~2.1Ω	
#4	207114	060729	93,230	Field return B1706 (Passenger Seat)	▶ No abnormality ·Measuled resistance:2.1 ~2.2Ω	
#5	246090	060814	61,952	Field return B1706 (Passenger Seat)	▶ No abnormality ·Measuled resistance:2.1 ~2.2Ω	
#6	162315	060417	37,145	Field return B1706 (Passenger Seat)	▶ No abnormality ·Measuled resistance:2.1 ~2.2Ω	

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3. Planned Analysis

	Inspection result	Date	Engineering Group
Field return Analysis	● Analysis of seatbelt buckle pretensioner extention wiring and SRS floor wiring - CT scan : Checking terminal pressed point Checking wiring disconnection behind the connector - SEM analysis of Surface terminal: Checking for terminal damage - Voltage variation: Evaluation of resistance in terminal pressed point └ compared before & After ※ Date of receive field return - buckle pretensioner: 4 Field return units secured, Floor wiring due 8/29/14	9/12 9/12 9/26	Design Team 2
Connector Evaluation	● Analysis of terminal contact points in connector - Complex environment vibration test : Checking a wear of terminal and voltage dip after vibration	9/26	Design Team 2
Verification of buckle pretensioner operation	● Verify operation of buckle pretensioner under high resistance conditions - Evaluate performance of buckle pretensioner under high resistance conditions and vibration to connector (5ohm, 10ohm, 15ohm, 20ohm, 25ohm,)	9/12	Safty Team
Field Fix	● After analysis of field return components and connector evaluation - Develop field countermeasure	TBD	QS QA 2 Team

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Attachment . #1 vehicle investigation_207114 (Dealer : Steven Creek)

Details	Results
Vehicle details	VIN [redacted] / 93,230mile / Production date : 06.07.29 / Driver seat auto, Passenger seat manual
DTC code	No code (B1706 erased)
Investigation result	• Wiring layout is normal • Can not duplicate faults

DTC	Driver under seat	Passenger under seat	ETC
			
			

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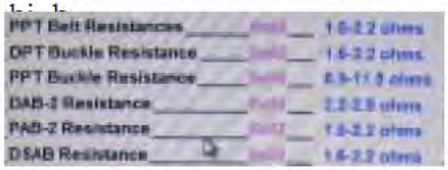
Attachment . #2 vehicle investigation_246090 (Dealer : Automall Circle)

구분	내용
Vehicle details	VIN [redacted] / 93,230mile / Production date :2006.07.29 / Driver seat auto, Passenger seat manual
DTC code	No code (B1706 erased)
Investigation result	• Wiring layout is normal • Can not duplicate faults

DTC	Driver under seat	Passenger under seat	ETC
			

Attachment . #3 vehicle investigation_162315 (Dealer : Naglee Road)

Details	Results
Vehicle details	VIN [redacted] / 37,145mile / Production date :06.4.17 / Driver and Passenger seats are manual
DTC code	B1706 Pass. Resistance too high
Investigation result	• Wiring layout is normal • Touching at connector(under seat) fault disappears , Can not duplicate faults

DTC	Driver under seat	Passenger under seat	ETC
 B1706 Pass. Resistance too  ACU internal data : 8.9~11.5Ω Real data: 8.9 Ω more			

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Attachment . #4 vehicle investigation_013505 (Dealer : Automall Circle)

Details	Results
Vehicle details	VIN [redacted] / 268,561mile / Production date :2005.07.13 / Driver seat auto, Passenger seat manual
DTC code	B1706 Pass. Resistance too high(history)
Investigation result	•Duplicate fault B1706 . Measured buckle PT resistance normal → connector(under seat) resistance high – Finding connector resistance high causes fault code B1706

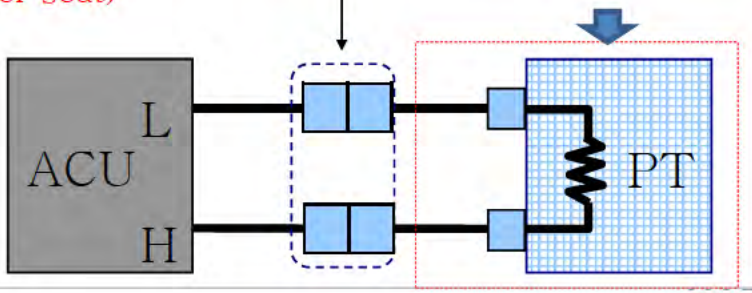
DTC	Driver under seat	Passenger under seat	ETC

B1706 Pass. Resistance too high

ACU internal data : 8.9~11.5Ω
Real data : 8.9 Ω over

Resistance normal
Real data : 2.4Ω

Connector resistance high
(under seat)



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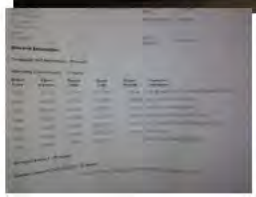
Attachment . #5 vehicle investigation_ 250134(Texas)

Details	Results
Vehicle details	VIN [redacted] / 98,248mile / Production date : 070126 / Driver·Passenger seat manual
DTC code	B1706 Pass. Resistance too high
Investigation result	• Repair background : 08.10.20 Pass. Pt repair(change part) / OCS sw updated • Loose Pass. Seat wiring / connector mounting clip • Touching at connector for measuring, resistance faults disappears

DTC	Driver under seat	Passenger under seat	ETC
B1706 Pass. Resistance too high	front Rear	front rear	



Attachment . #6 vehicle investigation _ 147419

Details	Results
Vehicle details	VIN [redacted] / 138,539mile / Production date:06.03.25/ Driver·Passenger seat manual
DTC code	B1706 Pass. Resistance too high
Investigation result	• Wiring layout is normal • Touching at connector(under seat) fault disappears , Can not duplicate faults

DTC	Driver under seat	Passenger under seat	ETC
 다  ACU internal data : 8.9~11.5Ω Real data : 8.9 Ω over			

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Attachment . #7 vehicle investigation _ 097883

Details	Results
Vehicle details	VIN [redacted] / 44,094mile / Production date : 06.01.07 / Driver seat auto(IMS), Passenger seat manual
DTC code	B1706 Pass. Resistance too high
Investigation result	• Repair background : none • Wiring layout and connector are normal • Touching at connector for measuring, resistance faults disappears

DTC

B1706 Pass. Resistance too

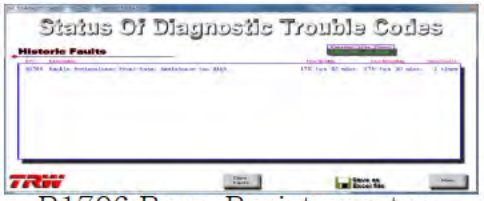
Driver under seat

Passenger under seat

ETC

Attachment . #8 vehicle investigation _ 177163

Details	Results
Vehicle details	VIN [redacted] / 134,462mile / prod 06.05.11
DTC code	B1706 Pass. Resistance too high
Investigation result	• Repair background : none •Wiring layout and connector are normal •Touching at connector for measuring, resistance faults disappears

DTC	Driver under seat	Passenger under seat	ETC
 B1706 Pass. Resistance too high 		Fron  Rea 	

Attachment . #9 vehicle investigation_ 121842 (Dealer : RIVER SIDE)

Details	Results
Vehicle details	VIN [redacted] / 96,171mile / Production date : 06.02.14 / Driver seat manual, Passenger seat manual
DTC code	Driver resistance too high: B1701 Pass. Resistance too high : B1706(history)
Investigation result	•Wiring layout is normal •Touching at connector(under seat) fault disappears , Can not duplicate faults

DTC	Driver under seat	Passenger under seat	ETC
DPT Buckle Resistance 0x04 2.8-3.7 ohms PPT Buckle Resistance 0x02 1.6-2.2 ohms After diappear faults, touching wiring at near connector(under seat) makes changing resistance [1.6~2.2Ω] ↔ [2.8~3.7Ω]			GDS (14.08.22) 

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ATTACHMENT K

Firing Current Capability

Hyundai Response to PE14-023

Response to Request 8

NF Airbag Control Unit (95910-0A000)
Firing Current Capability with Firing current Resistance / Supply power variations

9V (lower Limit of Normal Supply Power)			12V (nominal value of Normal Supply Power with IGN ON)		
Resistance(Ohms)	Firing Current		Resistance (Ohms)	Firing Current	
20		0.86Amp for 3.02msec	21		0.846Amp for 3.01msec
21		0.819Amp for 3.01msec	22		0.811Amp for 3.01msec
22		0.789Amp for 3.00msec	23		0.78Amp for 3.00msec

Supply voltage	9volt	12volt
Max Limit (ohm)	**21 Ohms (with 2.4% Margin in Current)**	**22 Ohms (with 1.4% Margin in Current)**

1) Total of 8 Frontal Restraints Deployed simultaneously

2) Required Firing current for Buckle PT: minimum 0.8Amp for minimum 2msec of duration

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ATTACHMENT M

SRSCM – EO

EO

Engineering Order list of NFA Airbag Control Unit

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ATTACHMENT M

SEAT BELT BUCKLE ASSEMBLY EO

Engineering Order list for NFA Seat belt buckle

NFA 88810-0A000 EO
Engineering Order LIST of NFA Seat Belt Buckle (88810-0A000)

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NFA 88810-0A000 EO
Engineering Order LIST of NFA Seat Belt Buckle (88810-0A000)

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SEAT BELT BUCKLE ASSEMBLY EO

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SEAT BELT BUCKLE ASSEMBLY EO

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SEAT BELT BUCKLE ASSEMBLY EO

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SEAT BELT BUCKLE ASSEMBLY EO

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