JOHNSON CONTROLS

Odelzhausen, 2 May 2007

Analysis conducted for W164 seat heaters failure parts

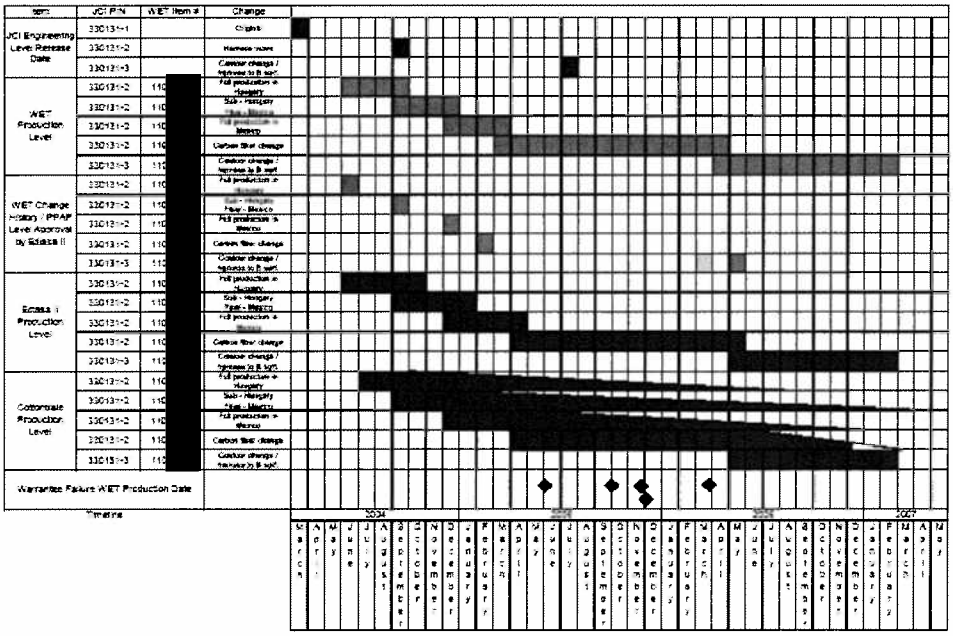
Concerned part is 1st row backrest (WET 110003589 / JCI 330131).

JOHNSON CONTROLS

1 List of failed parts

	Model	VIN	Heater Level	Repair	Production	km	Seat Type	RH / LH	Available at
1	W164	1641861A[redacted]	E	06/26/06	06/27/05	31,752	Leather Twin W/Lumbar	LH	
2	W164	1641751A[redacted]	E	10/10/06	11/15/05	22,010	Leather Twin	RH	WET Germany
3	W164	1641861A[redacted]	E	12/11/06	01/03/06	13,907	Leather Twin W/Lumbar	LH	WET Germany
4	W251	4JGCB65E86A[redacted]	E	1/4/07	07/01/05	22,009	Leather Twin W/Lumbar	LH	
5	W251	4JGCB65E96A[redacted]	E	1/5/07	10/27/05	46,088	Leather Twin W/Lumbar	LH	
6	W251	4JGCB65E56A[redacted]	E	1/18/07	12/9/05	27,244	Leather Twin W/Lumbar	LH	
7	W164	4JGBB86EX6A[redacted]	E	1/30/07	4/7/05	42,253	Leather Twin W/Lumbar	LH	
8	W164	4JGBB86E36A[redacted]	D	1/25/07	3/23/05	31,064	Leather Twin W/Lumbar	LH	WET Canada
9	W164	1641861A[redacted]	E	2/13/07	3/8/05	19,787	?	LH	
10	W164	1641861A[redacted]	E	2/22/07	7/29/05	22,330	Leather Twin W/Lumbar	LH	
11	W164	1641861A[redacted]	E	3/21/07	11/18/05	33,790	Leather Twin W/Lumbar	LH	
12	W251	2511651A[redacted]	E	3/9/07	11/8/05	29,878	Leather Twin W/Lumbar	LH	

Seat Heater Maturity History



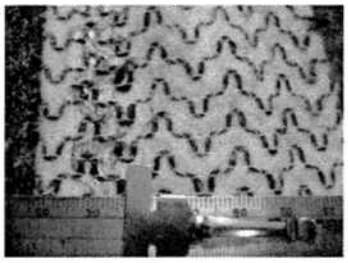
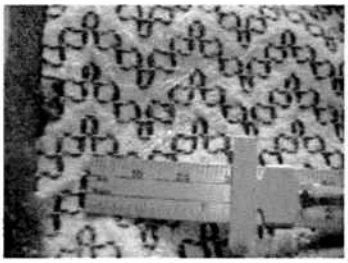
Cottondale use gradually diminishes based upon slow runners. All WET item "E" pulled from Cottondale Week 5 2007.

As of February 2007

2 General information about Carbotex©

2.1 Different electrode colors

The yellow thread indicates that this is the electrode WET 11004070B with wire WET 11003963A. The only supplier for this electrode is Leoni. The initial supplier PPAP was done to FTG, a former WET subsidiary, which has been integrated into the WET group (appendix 1)

WET index:	C & D	E	F (B0)
			
Carbon supplier:	Tenax	Toray	Toray

The discoloration of the silver electrode is only tarnishing. The tarnish appears after a while when the silver electrode is in contact with air. The color differences in the shown electrodes are caused by different transport or storage times of the parts.

By using a rubber the tarnish can be taken off. This explanation is proven by the WET test report N°2222e from Michael Weiss (appendix 2).

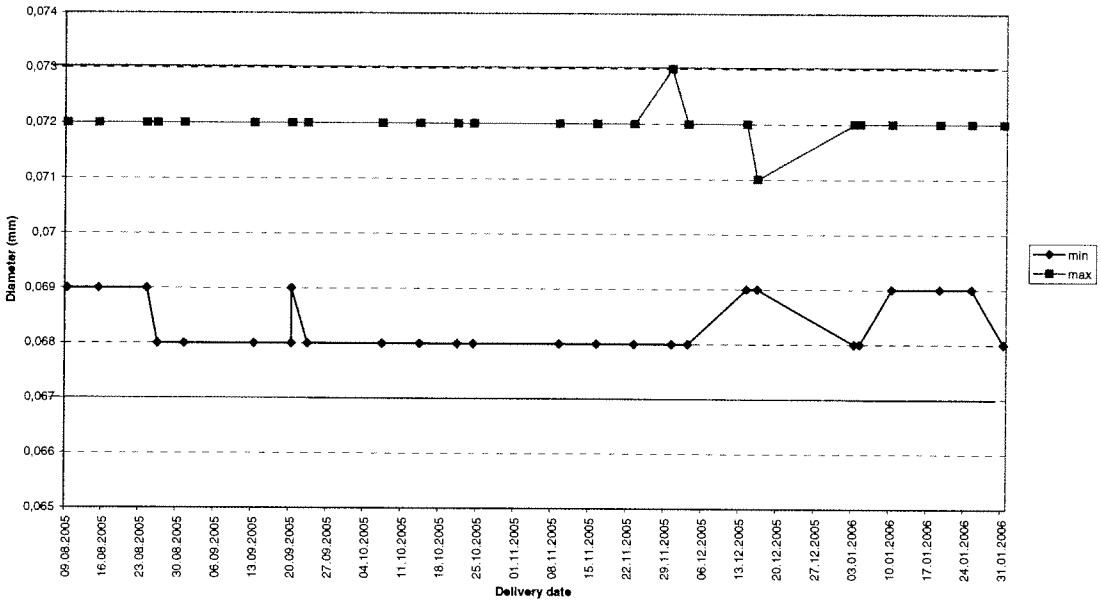
Corrosion on the above shown silver electrodes can be excluded, as the discoloration of the fleece is localized only around the broken area of the electrode, not on the rest of the pattern. These changes in the electrode color don't have consequences on the robustness of the heater and can be excluded as root cause of the broken electrode.

Regarding the delivered wire quality from supplier Leoni:

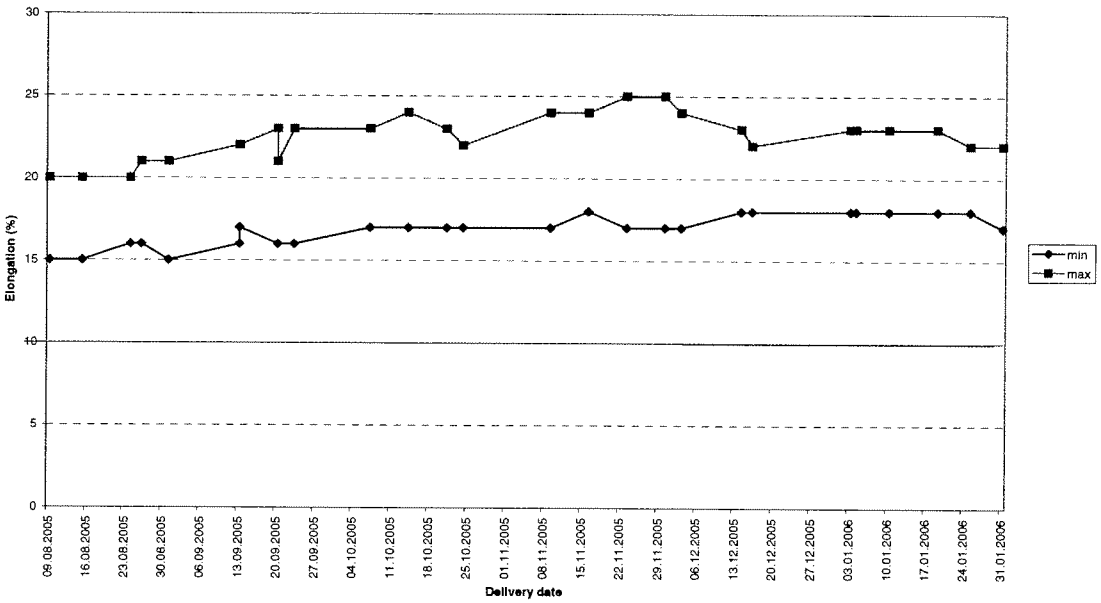
- WET has specified E-Cu58F21 (DIN 1787), but Leoni has always delivered a better quality OF-Cu (appendix 1). OF-Cu is known for its higher durability and therefore WET-specification was changed in late 2006.
- Leoni certificates from August 2005 to January 2006 prove that the delivered quality was inline with specification (appendix 3). Wires for failed parts were delivered during this period.

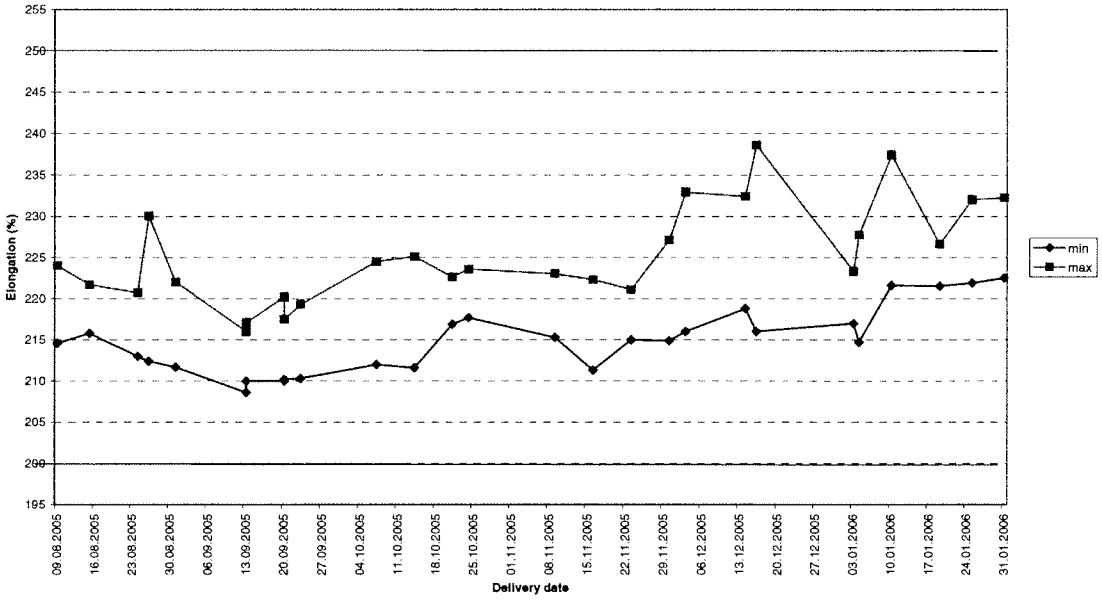
JOHNSON CONTROLS

Single wire diameter



Single wire elongation





- Relocation of Leoni production to China happened in late 2006 (appendix 4). Thus the failed parts were from German production.

2.2 Difference in electrode spacing

Electrodes for Carbotex consist of 7 electrodes wires which are knitted in a parallel sinus form. Each single electrode wire consists of 20 single strands which are drilled together to one electrode wire. The difference in the bus bar spacing is due to the knitting processes, as the electrode wires are able to move between the knitting points. The knitting points are controlled by stitch spacing as part of process control. The possible movement and the sinus form are the basis for the robustness of the electrodes and WET holds a patent on this. Electrode wires can be compressed later during handling or the assembly process and may so be in direct contact, but this has no negative influence on the quality.

These variances in the electrode spacing do not have consequences on the robustness of the heater and can be excluded as root cause of the broken electrode.

2.3 Knitting of carbon

Received carbon fibers, even from same supplier but different lots, will require slight adjustments in weave pattern to achieve required performance resistance. The change in weave pattern of carbon fibers is a normal process control measure in order to achieve constant required resistance within specific range and tolerance. WET has Cpk values higher 3 on this process.
During this knitting process the needle may touch the electrodes. This can cause minimal damages on the electrode. An internal test report shows, that these damages can absolutely be excluded as root cause for an eventual electrode breakage.

3 Information about W164 backrest seat-heater (WET 110003589 / JCI 330131)

3.1 History of Index Changes

W.E.T Number	JCI Number	Produced until	Production location	Changes at heater to previous version	Impact on heater	JCI approval & sign-off file
11003589_B	330131_02		full production in Hungary			21008225A_8
11003589_C	330131_02		subassembly in Hungary and final assembly in Mexico	No changes	None	Not necessary
11003589_D	330131_02		full production in NA (Mexico)	No changes	None	Not necessary
11003589_E	330131_02		full production in NA (Mexico)	is same as 11003589D (same heater resistance) but the type of carbon fiber was changed (supplied material)	None	Notified on 07JUL04 PPAP level 1 (appendix 5)
11003589_F	330131_03		full production in NA (Mexico)	Changes asked by JCI: 1.) New heater with shorter busbar (same as for Designs) 2.) New outline 3.) Harness exit on the B-surface		21008225B (appendix 6)

3.2 Labeling & Ship History

The release customer drawing shows a JCI release level 002 corresponding to WET release level B/C/D/E.

The failure parts show JCI level 001 but WET level E.

Part #2

part #3

This discordance is due to JCI plant Ediassa2 which did not update their system to JCI level 002. To avoid rejection of delivered parts, WET was asked to ship parts with JCI level 001.

With introduction of JCI level 003 corresponding to WET level F Ediassa2 has directly changed from JCI level 001 to 003. This is supported by investigations and notes from JCI Cottondale.

3.3 Change of carbon pattern / fiber supplier

Carbon fiber pattern was changed from level D to level E as WET changed supplier from TENAX to TORAY. WET has two approved carbon suppliers to allow flexibility for capacity and supply in a global market. The change of the carbon fiber supplier is not considered a significant contributing factor in this sort of failure mode or root cause and therefore not subject of new PV testing. This change was notified to JCI by PSW M05664 (appendix 05):

- WET mechanical specifications of both material are identical
- Both suppliers have supplier PPAP (TENAX appendix 7, TORAY appendix 8)
- Electrical specifications vary and therefore the pattern has to be adapted (see 2.4)
- Same TORAY carbon is also used for other Mercedes programs and other OEMs

4 Testing of complete seat

4.1 Initial testing

For application development WET only uses materials which have been tested and approved internally.

Prior to SOP WET has carried out the testing of the single heaters (not build-in). All tests were passed and accepted by JCI.

All complete seat validation tests were conducted by JCI Germany. Tests were performed according to DC specification and heaters passed all tests without any failures.

4.2 Testing of failed parts

Upon receipt of first warranty parts, found to be WET level E, JCI tried to reproduce occurred failures on a new trim and on a warranty trim where broken electrode was reconnected by soldering and retested on opposite bolster. According to JCI test report 0704422 (appendix 9), both heaters passed the tests and still met the specification.

In week 9 DC, JCI and WET tried to reproduce the failures in the WET test lab in Odelzhausen (Germany). Therefore a pressure peak profile of a driver-seat was realized on an M-Class car (appendix 10). This profile was the basis for a robot test of a backrest equipped with a level E, level F and a new CTXU heater. Instead of usually 10.000 cycles, representing around 150.000km, more than 40.000 cycles (corresponding to 600.00km) per backrest were performed and the heater were still working (appendix 11, 12, 13).

JOHNSON CONTROLS

5 Analysis of warranty parts

Two out of twelve warranty parts were analyzed in the WET test lab in Germany (appendix 14). As a summery it can be said that:

- Burning holes occur, when high current is running through carbon fibres because of completely broken electrodes (bypassing the damaged spot).
- The analysis shows broken electrodes. The failure area is in the similar position by comparison of both covers.
- On part #2:
  - attrition on the cover is visible in the region of the failure
  - 6 electrodes are broken on the same position
  - 1 electrode is broken 3cm higher
- On part #3:
  - a minimal fold is visible across to the failure position
  - all 7 electrodes are broken in one line

Further investigations were done externally.

5.1 Chemical analysis of broken wire

WET and JCI have conducted independently a chemical analysis of the broken electrode. It shows that the electrodes are conform to specification (appendix 15). WET report figures show:

- Silver layer thickness is 1,2µm (specification is 1,02µm)
- Diameter of single filament is approx. 80µm (specification is 70µm +- 3)
- No oxygen (specification allows some oxygen)

5.2 Fischerscope & SEM

A Fischerscope analysis (WET) and 2 SEM analysis (WET & JCI) of the broken electrode show that its consistence is still conform to specification (appendix 15 & 16)

- Silver layer thickness is 1,096 (specification is 1,02µm)
- Diameter of single wire is 68µm (specification is 70µm +-3)
- Silver surface is smooth (specification: without pulling grooves)

5.3 Tensile test of originally supplied wire

A tensile test of the originally supplied wires during august 05 and January 06 showed that they meet the new specification (tensile force wasn't specified before late 2006 – appendix 17)

- Tensile force is between 20,1 and 22,0N (specification is 20N +10-4)

6 Visit at manufacturing plants

Notification of the issue immediately produced a process review for any conditions outside of control for production of these parts at WET and/or JCI. These visits/audits were done by the Quality Directors Ms. Jeanine Berglund (WET) and Mr. Michel L. Cumbee (JCI).

6.1 WET Acuna

For contributions to bus bar breakage, the following areas were reviewed with no consequence:

- Packaging – a review of pack standards from revision level to revision level was completed with no change. Packaged parts on spot review in Acuna shift slightly during transportation with no adverse or unusual conditions
- Lamination – potential shift of electrode causing "suspect bus bar" during process revealed no out of control conditions during the manufacturing time period in question
- Change in lamination process – no changes during manufacturing time period. Regular production does allow for parameter changes due to environmental conditions but not outside of regular process parameters. A review of old documentation during the time period for process parameters and changes revealed no information.
- Incoming receiving inspection noted no out-of-control conditions for purchased components. A review of components and evaluation was included in section 5.3.

6.2 JCI Cottondale

Initial meetings at Cottondale March 13, 2007 included a process walk to review any areas considered to be contributing to electrode failure. A quick review of these areas produced no conclusions for the investigation:

cover to foam	inspect / steam and oven
back frame assembly	repairs and test
back close out	

A WET internal meeting produced the following results and conclusion:

- Problem Statement for this failure is broken electrode
- 5why analysis: 1Why: active bending of electrode (not found or evident in WET process)
  2Why: hidden crease or active expansion (not found or evident in WET process)
- An acute quality problem would be an out of control condition for all noted contributing conditions from Ishikawa as noted below (appendix 18 – CP Carbox):
  - Weave changes – no out of control condition noted visibly on failed parts or upon receiving inspection during manufacturing period. Further supported by section 5.
  - Resistance – no out of control condition noted on failed parts or upon receiving inspection during manufacturing period. Further supported be test results in previous package.
  - Position of electrode – no issue or out of control condition
  - Internal process review (noted above in section 6.1)
  - Chemical analysis – revealed no out of control condition (see test results from section 5.1)

7 Conclusion

WET, JCI and DC have analyzed and tested together the failed CTX parts. The occurred failures could not be reproduced on the heater (part N°WET1100358 9E / JCI 33001_002). They passed all tests according to DC specification which were carried out on a failed part where the breakage was soldered. Also a specifically developed ingress/egress test (WET, DC and JCI), which was carried out with more than 40.000 cycles, representing more than a car's live, was passed successfully.

Additionally WET, JCI and independent laboratories investigated on the used electrode material in the failed parts and could not find any deviations from the specification.

Parallel to this, visits/audits in the production plants were arranged by the quality directors. These visits did not show any problems or risks in the production process.

So WET and JCI conclude that the current design of the seat heaters with CTX meet all DC specifications for global product quality, production processes and used materials.

Nevertheless, the by DC requested change to the even more durable CTXU was handled in parallel to this investigations.

Authors:

Jens Schumacher (WET – Project Manager)

Jeanine Berglund (WET – Quality Director)

Jörg Plaum (JCI – Project Manager)

Guido Kunz (JCI – Engineering Manager)

Spezifikation / specification

FREI 6/05/02 GA

1.0 Bezeichnung / description

1.1 Name / name	Litze versilbert
1.2 Typ / type	E-Cu Litze 0,08 mm^2

2.0 Technische Daten / technical data

2.1 Konstruktion / design	20 x (0,07 +/-0,003)mm
2.2 Material / material	E-Cu58F21 (DIN 1787)
- Beschichtung / coating	versilbert / silver-coated min. 1.02µm (ASTM B 298)
2.3 Schlaglaenge / twist	7,4 mm

3.0 Technische Varianten / variations of material

3.1 Lieferform / form of delivery

W.E.T.-Nr. / W.E.T.-No	Leiterwiderstand / conductor-resistance (Ohm/m)	Gewicht / weight (g/m)	Spulenkoerper / reel (siehe / see 28020000A Blatt / sheet 3) Lauflaenge / length on reel (m)
11003963A	0,20 ... 0,25	0,69	max. 10.000

3.2 Bemerkungen / notes

Wichtige Pruefmerkmale: Leiterwiderstand, Leiterausfuehrung (Werkzeugnis nach DIN EN 10204/2.3, Jeder Lieferung ist ein Messprotokoll beizulegen); max. zulaessiger Einzeldrahtdurchm. = 0,073 mm Die Oberflaeche darf keine Ziehriefen enthalten. Farbe des Spulenkoerpers: blau

Critical items: Conductor-resistance, construction (certificate according to DIN EN 10204/2.3, a test certificate of the conductor-resistance has to be closed to every delivery) max. single-wire-diameter allowed is 0,073 mm. Grooving on the surface is not allowed. Colour of reel: blue.

4.0 Lagerbedingungen / storage conditions

4.1 Haltbarkeitsdauer / time of shelf life	6 Monate / months
4.2 Temperaturbereich / temperature range	15 ... 35°C
4.3 Relative Luftfeuchte / relative humidity	50 ... 75%

5.0 Mitgeltende Unterlagen / other applicable documents	keine / not-applicable
6.0 Lieferant / supplier	....

Index	Aenderung / Change	Datum / Date	Name / Name	Sepr / Chk
0	neu erstellt			
1	...	...	...	
2	...	...	...	
3	...	...	...	
4	...	...	...	
5	...	...	...	
6	...	...	...	
7	...	...	...	
8	...	...	...	
9	...	...	...	
10	...	...	...	

D / ▽ —

ISO 128 E

	Datum / Date	Name / Name	Unt. / Sign.
Erstelles	24.04.02	Fritz	
Gepr. / Check	07May02	Trennel	
Frei / Rel.	07May02	Grinner	
Datei / File	21007263A 00.dwg		

W.E.T. Automotive Systems AG

Benennung / Parts name: Litze versilbert / wire silver-coated 13.05.02 3

W.E.T.-Zchgs.nr. / W.E.T-Dwg. No.	21007263A
W.E.T.-Artikelnr. / W.E.T Part No.	...
Kde. / Customer	Kde-Nr. / Customer-No. ... ...

Maszstab / Scale: —

Blatt / Sh.-No.: 1

von / of: 1

Zchng-Erstellung durch CAD, Aenderung nur durch CAD / Design made by CAD, changes only admissible by CAD

1100 S 963 A

P.B. Nr: 2002/121

THE QUALITY CONNECTION
LEONI
Wire · Cable · Wiring Systems

Erstmusterprüfbericht

Berichtsergebnis

Ausstellungsdatum: 07.06.2002

x (3) **Meßbericht**	(4) **Werkstoffbericht**	(5) **Funktionsbericht**
Lieferant LEONI Draht Kötzting	(6) Bericht Nr. **070602**	(7) Zeichen St
Abnehmer (Besteller) FTG GmbH 95028 Hof	(8) Bericht Nr.	(9) Zeichen
Lieferanten-Nr.	Blatt 1 von 2	

Lieferant
LEONI Draht GmbH & Co KG
Windorferstrasse 1
93444 Kötzting

Abnehmer (Besteller)
FTG GmbH Fasertechnik
Schleizer Str. 56-58
95028 Hof

(10) Sachnummer (Zeichnungs-Nr.)	(11) Änderungsstand/Datum	(13) Sachnummer (Zeichnungs-Nr.)	(14) Änderungsstand/Datum
Muster		1100 3963 A	07/24-04-02
(12) Benennung		(15) Benennung	
CF-Cu Litze W 0,077 mm² 20x0.07 mm S 7,4 mm versilbert			
(16) Bestell-/Abruf-Nr.	(17) Bestell-/Abruf-Datum	(18) Abladestelle	
09E03001F720K1600	1198702-FTG		
(19) Lieferschein-Nr.	(20) Lieferschein-Datum	(21) Anzahl der Muster	
7065936	22.04.02		

„D" Teil (Dokumentationspflichtiges Teil)

[ ] (22) ja [x] (23) nein

Grund der Erstmusterprüfung

- [ ] (24) neuer Lieferant
- [x] (25) neues Teil
- [ ] (26) geänderte Spezifikationen
- [ ] (27) geänderte Fertigungsbedingungen
- [ ] (28) neuer Fertigungsort
- [ ] (29) längeres Aussetzen der Fertigung

Die für die Erstmusterprüfung zwischen den Abnehmer (Besteller) und Lieferant vereinbarten Spezifikationen sind in folgenden Unterlagen enthalten:

Laut Bestellung 1198702-FTG

Prüfergebnisse siehe Folgeblätter:
Dokumentationspflichtige Merkmale sind mit einem „D" gekennzeichnet. Die Ist-Werte sind in der Reihenfolge der Musternummerierung aufgeführt.
Nicht eingehaltene Spezifikationen sind durch Unterstreichen gekennzeichnet.

Bemerkungen

Bemerkungen

Bestätigung

Wir bestätigen.

1. daß die vorgestellten Erstmuster vollständig mit serienmäßigen Betriebsmitteln und unter serienmäßigen Bedingungen hergestellt worden sind.
2. die korrekte Durchführung der Erstmusterprüfung und ihre Darstellung in diesem Erstmusterbericht (Abweichungen davon sind in diesem Bericht besonders angegeben);
3. Daß eine Freigabe den Lieferanten nicht von der Verantwortung, nach der jeweils gültigen Zeichnung bzw. Lehre und vorgeschriebenen Funktionsvorschrift zu liefern, entbindet.

Thomas Stein 09941/40416
Name / Hausruf (bei Rückfragen)

07.06.2002 Stein
Datum verantwortliche Unterschriften

Entscheidung

	freigegeben	(30)	mit Auflage	(34)	abgelehnt neue Muster erforderlich	(38)
Maß		x				
Werkstoff		(31)		(35)		(39)
Funktion		(32)		(36)		(40)
Entscheidung		(33) x		(37)		(41)

Auflagen

24.06.02 R. Wabl
Datum verantwortliche Unterschriften

Verteiler: FTG, Vertrieb, QM

THE QUALITY CONNECTION

LEONI

Wire · Cable · Wiring Systems

Erstmusterprüfbericht

Prüfergebnis

(Berichtsergebnis siehe Blatt 1)

Ausstellungsdatum: 07.06.2002

x (3) **Meßbericht**		(4) **Werkstoffbericht**		(5) **Funktionsbericht**
Lieferant LEONI Draht Kötzting	(6) Bericht Nr. **070602**	(7) Zeichen St
Abnehmer FTG GmbH Hof	(8) Bericht Nr.	(9) Zeichen

Blatt 2 von 2

Lieferant LEONI Draht GmbH & Co KG Werk Kötzting	**Abnehmer** (Besteller)
(10/12) Sachnummer-/Benennung OF-Cu Litze W 0,077 mm² 20x0.07 mm S 7,4 mm versilbert	((13/15) Sachnummer-/Benennung

(42) Pos.	(43) Merkmal/Sollwert	(44) IST-Wert (Lieferant)	(45) IST-Wert (Abnehmer)
01	Einzeldraht Ø / 0.07 ± 0.003 mm	0.070 – 0.072 mm	
?	Einzeldrahtdehnung / min 10 %	17 – 20 %	
03	Schlaglänge / 7.4 mm S-Schlag	7.3 – 7.4 mm S-Schlag	
04	Widerstand / 200 – 250 Ω/km	213.4 – 219.3 Ω/km	
05	Schichtdicke Ag	1.01 µm	

(46) Bemerkung (Lieferant)

(47) Bemerkung (Abnehmer)

07.06.2002 Datum:	Klein verantwortliche Unterschriften	24-06-02 Datum:	R. Wabel verantwortliche Unterschriften

Versuchsbericht
Test Report

Anzahl der Merkmale	
Dokument mit besonderer Archivierung	

BERICHT-Nr. / Report-No.: 2222e

Grund für den Test / Reason for test:

- ☐ Design validation / DVP
- ☒ Grundlagenentwicklung / R & D
- ☐ Wettbewerbsanalyse / Bench mark
- ☐ externer Kundenauftrag / Customer requisition
- ☐ Konstruktionsänderung / Engineering change
- ☐ Reklamation / Reclamation
- ☐ Requalifikationstest / Requalification test
- ☐ anderer / other

Name: **Michael Weiß** **Datei / File:** **VB_radiergummi_eng.doc**

Datum / Date: **14/10/2003** **Gesamtseitenzahl / Total # of Pages:** **9**

Aufgabe / Task:

Investigation of corrosion or tarnishing of the silver electrode WET-No 11002408A/11002384A and 11004070B/11003963A.

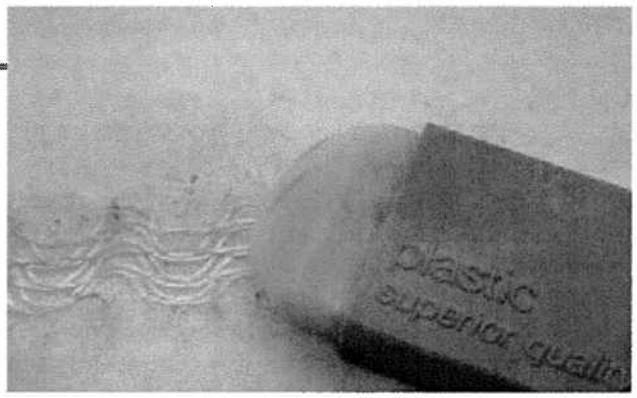
Suchbegriffe / Search mark: **ASH, carbon, corrosion, tarnishing**

Zusammenfassung - Ergebnisse / Summary - Results:

Shining silver after a weak rub out indicates a simple tarnishing.

If it is very hard to remove the tarnishing or if there remains a reddish shimmer after a weak rub out with the soft white side of the rubber, it indicates a critical corrosion.

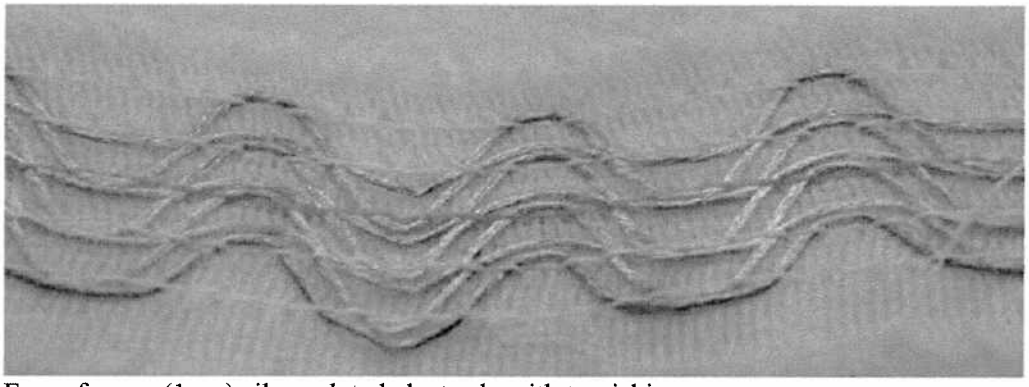
Inhalt / Contents:



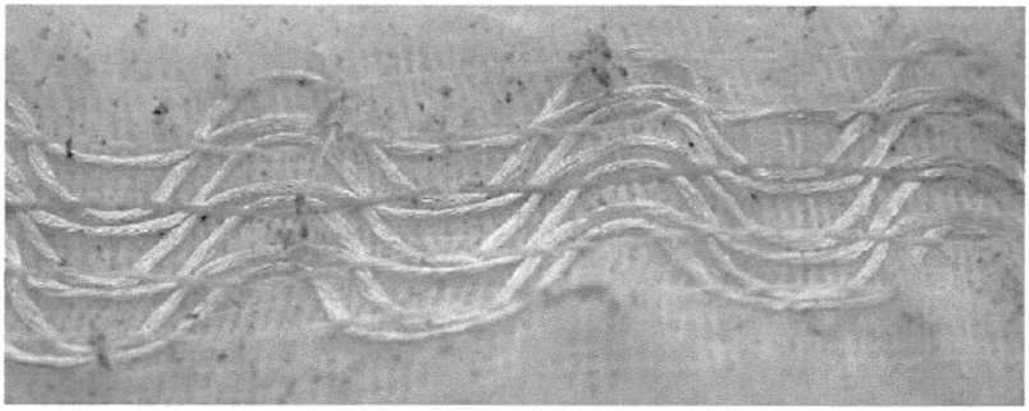
Verteiler / Copies:

	E/Sek. (Original)		Umlauf-Verteiler							
Komplett	X	X								
Deckblatt			X							

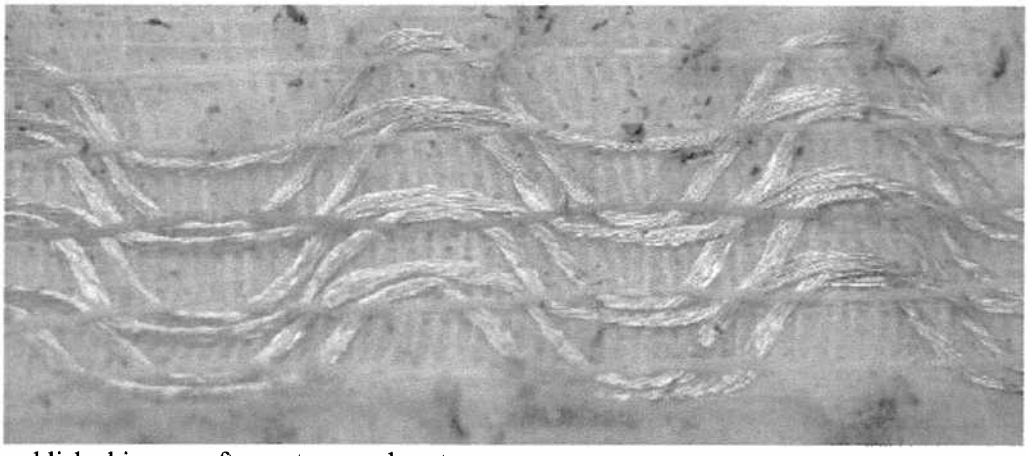
Free of pores (1µm) silver plated electrode (WET-No.: 11004070B/11003963A) - production FTG



Free of pores (1µm) silver plated electrode with tarnishing

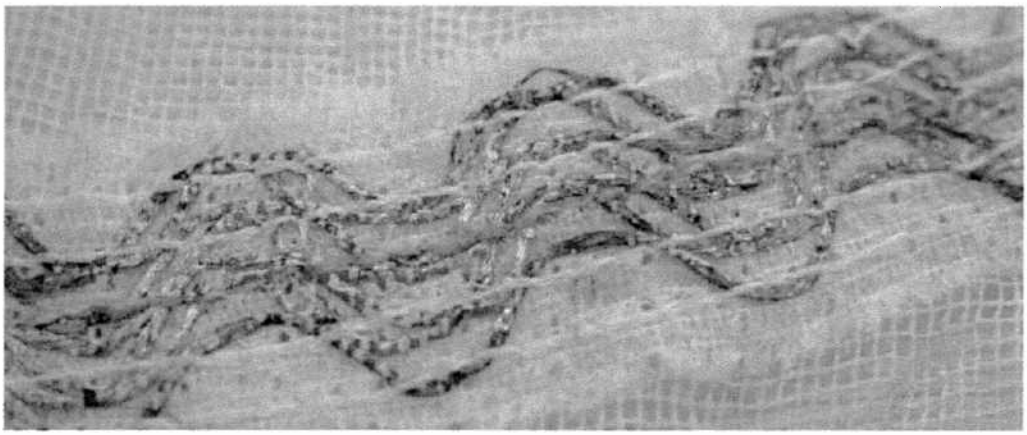


shining silver after a weak rub out indicates a simple tarnishing

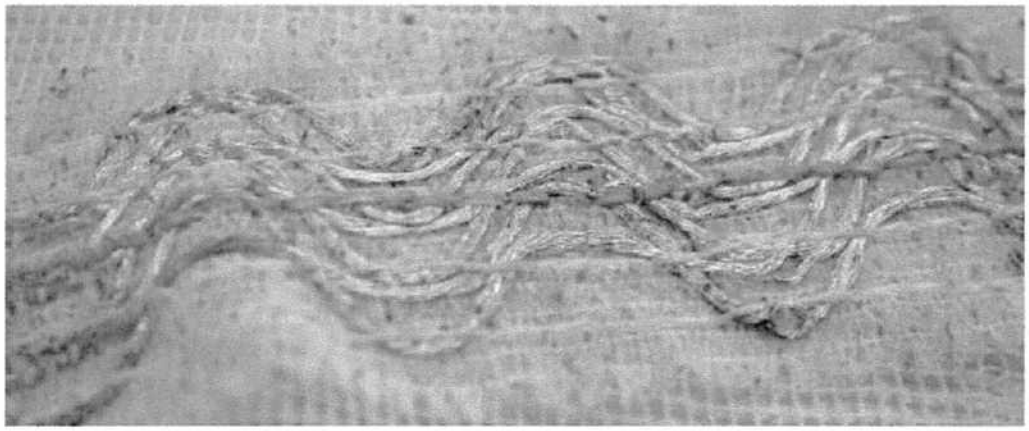


reddish shimmer after a strong rub out

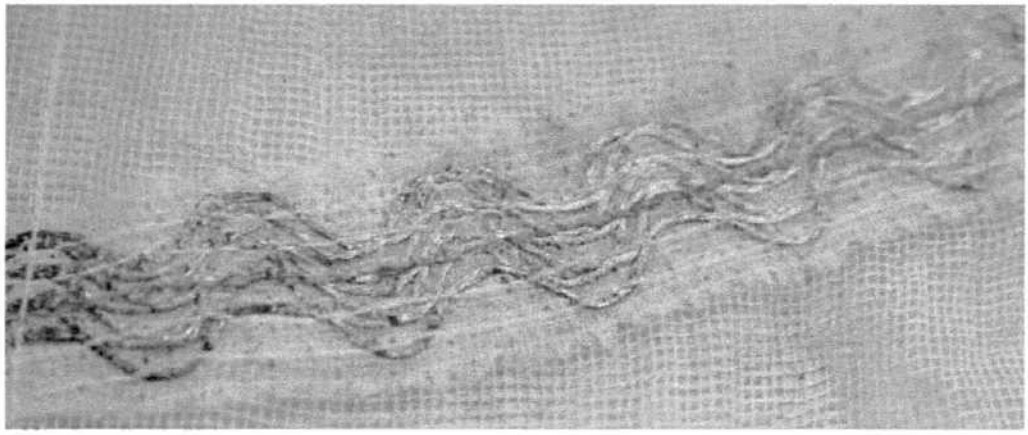
Optical (0,2µm) silver plated electrode (WET-No.: 11002408A/11002384A) after NOS-RUSH-TEST



Plus - electrode of W211-cushion from testreport 1632/1 page 24 - 28 after NOS-RUSH-TEST

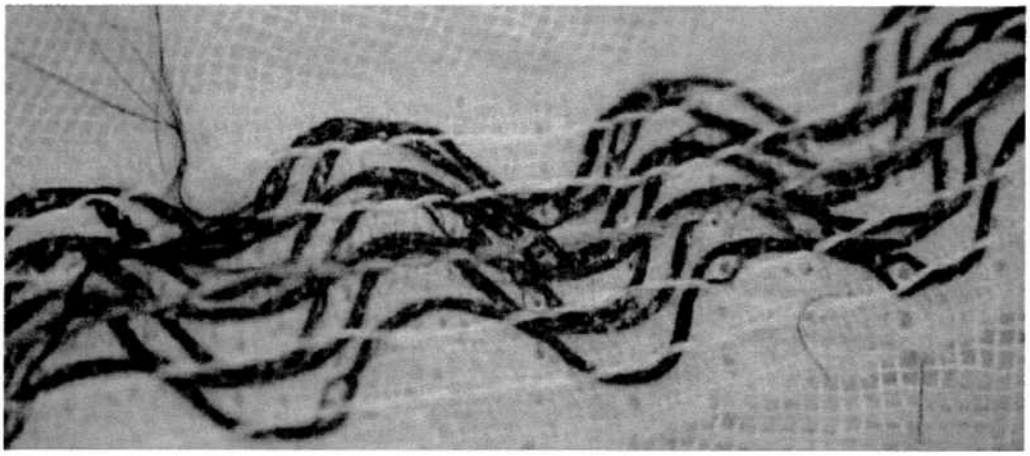


After a weak rub out with the soft white side of rubber remains a reddish shimmer. This indicates a corrosion.

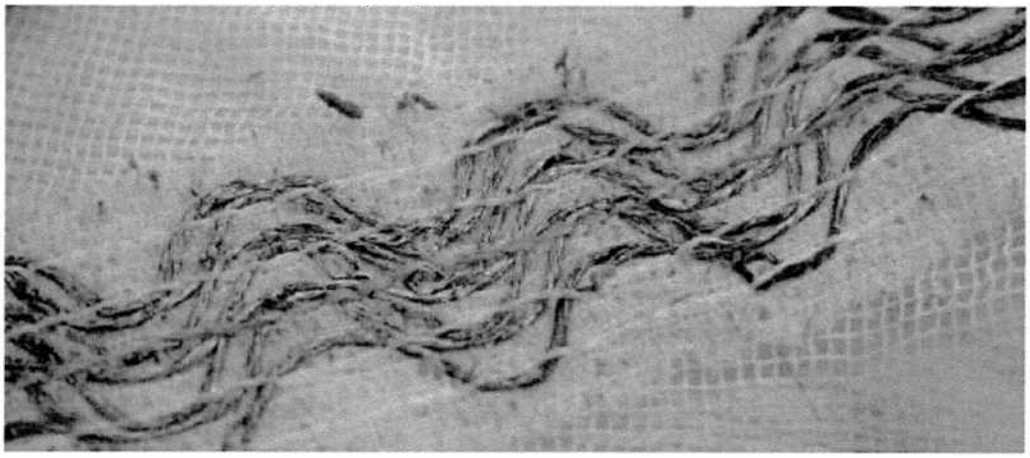


before: left untreated, after: right reddish shimmer after a weak rub out

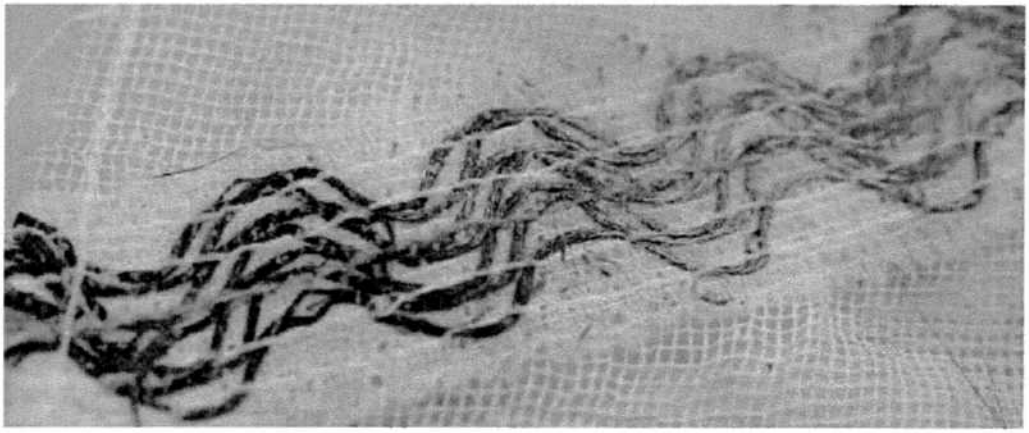
Optical (0,2µm) silver plated electrode (WET-No.: 11002408A/11002384A) after NOS-RUSH-TEST



Middle - electrode of W211 from testreport 1632/1 page 24 - 28 after NOS-RUSH-TEST

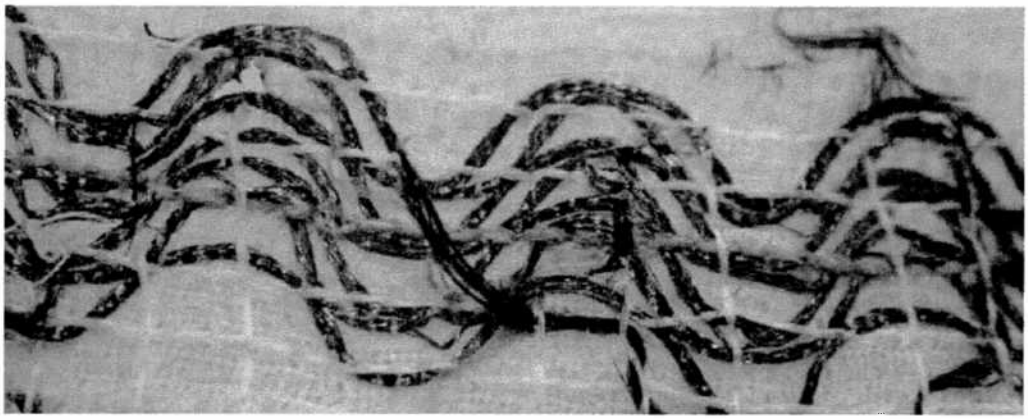


After a weak rub out with the soft white side of rubber remains a reddish shimmer. This indicates a corrosion.

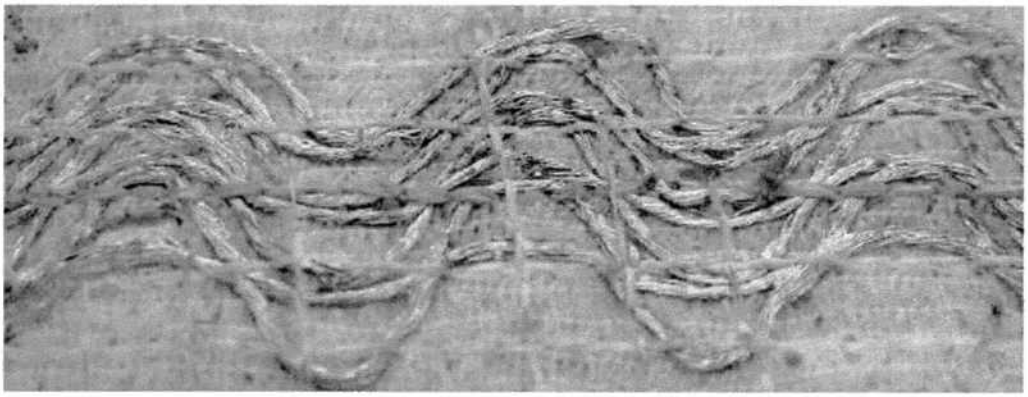


before: left untreated, after: right reddish shimmer after a weak rub out

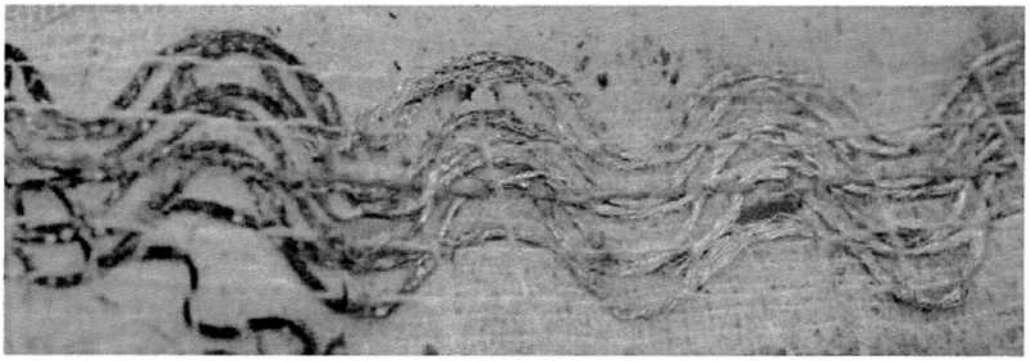
Optical (0,2µm) silver plated electrode (WET-No.: 11002408A/11002384A) after NOS-RUSH-TEST



Minus - electrode of W211 from testreport 1632/1 page 24 - 28 after NOS-RUSH-TEST



After a weak rub out with the soft white side of rubber remains a reddish shimmer. This indicates a corrosion.



before: left untreated, after: right reddish shimmer after a weak rub out

Appendix

-----Original Message-----
From: Knarr Werner
Sent: Friday, October 10, 2003 2:14 PM
To: Astarita Alison
Cc: Weiß Michael; Tremmel Peter; Lorenzen Günter; Freundel Werner
Subject: RE: Electrodes with poor silver coating

Dear Mrs Astarita,

this problem is , see the mail below , a simple tarnishing.
Our development department Mr.Weiss checked this point with an report.

The results is that this tarnishing have no influence of the quality of the product.

It is nessessary that you check the material with the test which is described in th email from Mr. Tremmel Tuesday, October 07, 2003 2:08 PM

When this coulour on the parts can be removed with an rubber than it is no problem.

I will send the report to you after receiving it.

If you have questions contact us.

Best regards and have a nice weekend.

Werner Knarr
Quality Manager
FTG Hof

Leading W.E.T. to become No. 1 in Quality

FTG Faser-Technik GmbH
Schleizerstr. 56-58
D-95028 Hof/Saale

Phone: +49.9281 83304 - 22
Fax: +49.9281 83304 - 44
mailto:knarrw@ftg-hof.de

FFFFFFF TTTTTTTTT GGGG
F T G G
F T G
FFFFFFF T G GGG
F T G G
F T G G
F T GGG

-----Original Message-----
From: Astarita Alison
Sent: Tuesday, October 07, 2003 10:51 AM
To: Knarr Werner
Cc: Ach Jürgen; Tremmel Peter; Fras Gorazd; Tabone Colin
Subject: Electrodes with poor silver coating
Importance: High

Dear Mr.Knarr,

We are again facing the problem with poor solver coating .
The biggest problem is that this problem is not found all through out the rolls.....so we cannot even carry out a sort out action.

As far as I am aware this problem should have been solved long time ago!!!

We need an immediate solution to the problem and in the meantime kindly advice how we should proceed with these parts.

Tahnsk in advance for your fast response

Best Reagrds

Alison Astarita
[Werner Knarr QM FTG Hof]

-----Original Message-----
From: Tremmel Peter
Sent: Tuesday, October 07, 2003 2:08 PM
To: Astarita Alison; Knarr Werner
Cc: Ach Jürgen; Fras Gorazd; Tabone Colin; Lorenzen Günter; Weiß Michael
Subject: RE: Electrodes with poor silver coating

Hello Alison,

the question is if we have a corrosion or a simple tarnishing of the silver electrodes.

Michael Weiss has developped a very simple test to decide this question.

If you are judder several times with a rubber (eraser) on the electrodes, and then the electrodes are shining, you have only a tarnish.
These parts can be mounted without any problems. There is no corrosion or lack of silver coating.

In case the electrodes are still discolored after judding, there is a suspect of corrosion or thinner coating.
In this case, these parts should be blocked.

regards

Peter Tremmel

-----Original Message-----
From: Knarr Werner
Sent: Friday, September 19, 2003 2:30 PM
To: Tremmel Peter; Rauh Hans-Georg; Fritsch Stefan; Lorenzen Günter
Cc: Freundel Werner; Potapow Michael; Grasse Volker; Bergmann Günther; Lapp Wolfgang; Weiß Michael
Subject: Problematik oxidierte Silberelektroden - Weiterer Punkt zu Besprechung am Montag, 22. September 2003 12:00-12:30.

Sehr geehrte Herren,

wenn wir schon bei dem oben eingeladenen Teilnehmerkreis zusammenkommen
hätte ich gerne noch einen Punkt auf der Agenda:

Anlaufen/ Oxidieren von Silberelektroden.

Wir möchten unsererseits nochmals auf die Problematik mit dem "Anlaufen" von Silberelektroden hinweisen.
Diesen Effekt haben wir bei beiden Silberlitzen normalversilbert sowie porendicht !!

Es tauchen immer mal wieder Teile im Prozess auf, bei denen die Elektroden im Fixierprozess/ Carbonprozess oder auch Nachfolgeprozessen anlaufen, das bedeutet:

es entsteht eine bräunliche Verfärbung der Elektroden.
Seitens WET Ungarn wurden solche Teile auch an uns reklamiert.
Siehe Beispiel Bild 1 Muster geht Herrn Tremmel parallel per Post zu .

Verfärbungen im Rohzustand vor Elektrodenwirken .siehe Bild 2
Bedingt durch Prozessunterbrechungen auf der Elektrodenmaschine mit den zwei Litzentypen könnnen bei FTG Zwischenlagerungszeiten von mehrerer Tagen oder Wochen auftreten.
Das Anlaufen geschieht nur in den äußeren Lagen.

Ich habe besagte Rolle an Leoni zur Analyse geschickt, mit der Vermutung daß die Schichtdicke nicht stimmte --> Ausssage dort war : Schichtdicke war entsprechend der Spezifikation - es handelt sich um ein Oxidiereren des Silbers.
Diese Verfärbungen können jeweils weggewischt werden .Dies habe ich ausprobiert.

Bitte dieses Thema nochmals durchdiskutieren.

Ist dies ein kritischer Punkt für unserere Sitzheizungen im Gebrauch ?????

Bitte auch mail von Herrn Weiss unten beachten . Er bereits Muster erhalten.

letzter Satz ....
dann ist es schon sehr bedenklich für unsere Heizelemente.

Bitte beachten Sie, daß wie oben schon erwähnt, dieser Effekt auch bei der porendichten Version auftritt.

Ich bitte Sie dieses Thema nochmals miteinander anzustossen bzw. weiter zu diskutieren.

Ich halte mich für die Besprechung am Montag telefonisch bereit.

Werner Knarr
Quality Manager
FTG Hof

Leading W.E.T. to become No. 1 in Quality

FTG Faser-Technik GmbH
Schleizerstr. 56-58
D-95028 Hof/Saale

Phone: +49.9281 83304 - 22
Fax: +49.9281 83304 - 44
mailto:knarrw@ftg-hof.de

FFFFFFF TTTTTTTTT GGGG
F T G G
F T G
FFFFFFF T G GGG
F T G G
F T G G
F T GGG

-----Original Message-----
From: Weiß Michael
Sent: Monday, September 08, 2003 5:21 PM
To: Tremmel Peter; Lapp Wolfgang
Cc: Lorenzen Günter; Knarr Werner
Subject: RE: Farbiges Anlaufen von optisch versilberten Elektroden

Sehr geehrte Herren,

Kupfer diffundiert durch die Poren in der optischen Silberschicht und auch durch die sehr dünne Silberschicht (0,2µm) schnell an die Oberfläche. An der Oberfläche bildet das Kupfer Oxyde, die die Silberoberfläche zudecken. Dieser Mechanismus läuft ohne Feuchtigkeit und auch bei nicht eingeschalteter Sitzheizung ab. (Beschrieben in VB 2141) Also sollten sich alle optisch versilberten Litzen mit der Zeit verfärben. Dieses ist auch in VB 1818 beschrieben, wobei "mit der Zeit" noch genauer eingegrenzt werden muß.

Abhängig von der Umgebungstemperatur und der Silberschichtdicke kann die Oxidation schneller oder langsamer gehen. Wenn es allerdings bei Raumtemperatur nur 4 Wochen dauert, dann ist es schon sehr bedenklich für unsere Heizelemente.

Michael Weiß

-----Original Message-----
From: Tremmel Peter
Sent: Monday, September 08, 2003 10:21 AM
To: Lapp Wolfgang; Weiß Michael
Cc: Lorenzen Günter; Knarr Werner
Subject: RE: Farbiges Anlaufen von optisch versilberten Elektroden

Hallo,

wir hatten solche Fälle von Verfärbungen schon in der Vergangenheit. Bisher sind uns keine Probleme bekannt. Richtig genau wissen wir allerdings nicht, ob nicht doch ein Risiko besteht.

Ich würde vorschlagen, beim Wirken von Elektroden solche leicht verfärbte Rollen immer mit blanken zum mischen. D.h. von 7 Elektroden sollten max. 4 verfärbt sein. Wir haben dann immer noch mindestens 3 blanke Litzen, die eventuelle Probleme mit den anderen 4 kompensieren.

Vor ca. 1 Jahr haben wir genauso gehandelt, als wir diese verfärbten Litzen auf schon gewirkten Elektroden entdeckt haben.

Gruß

Peter Tremmel

-----Original Message-----
From: Lapp Wolfgang
Sent: Friday, September 05, 2003 12:52 PM
To: Weiß Michael; Tremmel Peter
Cc: Lorenzen Günter; Knarr Werner
Subject: Farbiges Anlaufen von optisch versilberten Elektroden

Hallo zusammen,

Von der FTG kommt der Hinweis das nach ca.4 Wochen Lagerung an Luft die Aussenwindungen bei einer optisch versilberten Spule schon sichtbar oxidieren. siehe Fotos)

Die Spule ist derzeit zur Sicherheit von FTG zur Untersuchung zu Leoni geschickt worden.

Ich glaube das diese Verfärbung für optisch versilberte Litzen durchaus normal ist, nur sieht man es im Normalfall nicht, denn es passiert in der Heizung. (Hier gab es auch schon Hinweise aus Ungarn an die FTG)

Wir bitten um Info, wenn dieser Zustand seitens der Entwicklung als kritisch eingestuft wird. Falls erforderlich können natürlich auch Muster zur Verfügung gestellt werden.

Selbstverständlich ist es möglich diese Windungen bei der FTG zu entfernen, falls notwendig.

Vielen Dank im voraus.

Wolfgang Lapp

Delivery date	Delivery number	Quantity supplied (kg)	Single wire diameter (m)		Single wire elongation (%)		Plating thickness (µm)		Strand diameter (mm)		Lay length (mm)		DC-Resistance (Ω/km)		Certificate date	Name
			min	max	min	max	min	max	min	max	min	max	min	max		
	Set Point		0,067	0,073	10		nom 1,1		nom 0,36		nom 7,4		200	250		
09.08.2005	80037041	2163,15	0,069	0,072	15	20	without pores		0,357	0,365	7,2	7,5	215	224	10.08.2005	Stein
15.08.2005	80036968	1784,25	0,069	0,072	15	20	without pores		0,357	0,365	7,2	7,5	216	222	09.08.2005	Stein
24.08.2005	80037484	1816,60	0,069	0,072	16	20	without pores		0,358	0,367	7,3	7,5	213	221	24.08.2005	Saller
26.08.2005	80037503	2187,35	0,068	0,072	16	21	without pores		0,356	0,366	7,3	7,5	212	230	26.08.2005	Saller
31.08.2005	80037747	1468,90	0,068	0,072	15	21	without pores		0,356	0,366	7,3	7,5	212	222	31.08.2005	Saller
13.09.2005	80038240	1669,55	0,068	0,072	16	22	without pores		0,354	0,365	7,3	7,6	209	216	13.09.2005	Saller
13.09.2005	80038267	1460,70	0,068	0,072	17	22	without pores		0,353	0,365	7,3	7,6	210	217	13.09.2005	Saller
20.09.2005	80038490	1111,20	0,068	0,072	16	23	without pores		0,354	0,366	7,4	7,6	210	220	20.09.2005	Saller
20.09.2005	80038535	555,45	0,069	0,072	16	21	without pores		0,356	0,363	7,4	7,5	210	218	20.09.2005	Saller
23.09.2005	80038654	1651,15	0,068	0,072	16	23	without pores		0,354	0,365	7,3	7,5	210	219	23.09.2005	Saller
07.10.2005	80039144	2147,05	0,068	0,072	17	23	without pores		0,352	0,366	7,4	7,6	212	225	07.10.2005	Saller
14.10.2005	80039401	2676,20	0,068	0,072	17	24	without pores		0,352	0,364	7,4	7,5	212	225	14.10.2005	Saller
21.10.2005	80039773	1704,90	0,068	0,072	17	23	without pores		0,354	0,362	7,4	7,5	217	223	21.10.2005	Saller
24.10.2005	80039811	705,80	0,068	0,072	17	22	without pores		0,353	0,364	7,4	7,6	218	224	24.10.2005	Saller
09.11.2005	80040340	2155,15	0,068	0,072	17	24	without pores		0,356	0,364	7,4	7,6	215	223	09.11.2005	Saller
16.11.2005	80040614	2158,15	0,068	0,072	18	24	without pores		0,355	0,364	7,4	7,6	211	222	16.11.2005	Saller
23.11.2005	80040847	2159,90	0,068	0,072	17	25	without pores		0,357	0,365	7,4	7,6	215	221	23.11.2005	Saller
30.11.2005	80041104	1794,07	0,068	0,073	17	25	without pores		0,357	0,365	7,4	7,6	215	227	01.12.2005	Saller
03.12.2005	80041384	2118,20	0,068	0,072	17	24	without pores		0,355	0,364	7,4	7,6	216	233	06.12.2005	Saller
14.12.2005	80041677	2090,90	0,069	0,072	18	23	without pores		0,357	0,365	7,3	7,5	219	232	14.12.2005	Saller
16.12.2005	80041822	896,60	0,069	0,071	18	22	without pores		0,358	0,364	7,4	7,5	216	239	16.12.2005	Saller
03.01.2006	80040171	2146,90	0,068	0,072	18	23	without pores		0,354	0,364	7,4	7,6	217	223	03.11.2005	Saller
04.01.2006	80042065	2092,45	0,068	0,072	18	23	without pores		0,354	0,363	7,4	7,5	215	228	04.01.2006	Saller
10.01.2006	80042328	2099,70	0,069	0,072	18	23	without pores		0,355	0,365	7,4	7,5	222	237	10.01.2006	Saller
19.01.2006	80042702	2100,20	0,069	0,072	18	23	without pores		0,355	0,365	7,4	7,5	222	227	19.01.2006	Saller
25.01.2006	80042897	2103,77	0,069	0,072	18	22	without pores		0,356	0,363	7,4	7,5	222	232	25.01.2006	Saller
31.01.2006	80043170	1531,80	0,068	0,072	17	22	without pores		0,355	0,365	7,3	7,5	223	232	31.01.2006	Saller

THE QUALITY CONNECTION

LEONI

Wire · Cable · Wiring Systems

LEONI Draht GmbH - Postfach 346 - D-93440 Kötzting

W.E.T. Audtmotive System (China) L

Jinyuan Road

Langfang Development Zone

065001 Heibei

CHINA

Inspection certificate EN 10204/ 3.1

We herewith confirm that the goods supplied are in conformity with the agreements of order.

Delivery No	Delivery Dat	Order No	Your part No
80036968	15.08.2005	533702/311/107301	11003963A
Part No	**Material**	**Product**	
108737E	Cu-OF1	OF-Cu Litze 0.077mm² 20x0.07 mm versilbert	
Order No	**Quantity supplied**	**Reels**	**Condition**
10018786	1784,250 kg	280	K1600

Test report

Feature		Set point	Measured value	
Single wire diameter	mm	0.067 - 0.073	0,069	0,072
Single wire elongation	%	min 10	15	20
Plating thicknes	µm	nom 1.1		Test auf Porenfreiheit i.O.
Strand diameter	mm	nom 0.36	0,357	0,365
Strand elongation	%			
Lay length	mm	nom 7.4 S	7,2	7,5
DC-Resistance	Ohm/km	200 - 250	215,8	221,7
Tensile strength	N/mm²			

Date: 09.08.2005 Name: Stein

Regards

Qualitymanagement

THE QUALITY CONNECTION

LEONI

Wire · Cable · Wiring Systems

LEONI Draht GmbH - Postfach 346 - D-93440 Kötzting

W.E.T. Audtmotive System (China) L

Jinyuan Road

Langfang Development Zone

065001 Heibei

CHINA

Inspection certificate EN 10204/ 3.1

We herewith confirm that the goods supplied are in conformity with the agreements of order.

Delivery No	Delivery Dat	Order No	Your part No
80037041	09.08.2005	533702/311/107301	11003963A
Part No	**Material**	**Product**	
108737E	Cu-OF1	OF-Cu Litze 0.077mm² 20x0.07 mm versilbert	
Order No	**Quantity supplied**	**Reels**	**Condition**
10020958	2163,150 kg	336	K1600

Test report

Feature		Set point	Measured value		
Single wire diametermm		0.067 - 0.073	0,069	0,072	
Single wire elongation %		min 10	15	20	
Plating thicknes	µm	nom 1.1			Test auf Porenfreiheit i.O.
Strand diameter	mm	nom 0.36	0,357	0,365	
Strand elongation	%				
Lay length	mm	nom 7.4 S	7,2	7,5	
DC-Resistance Ohm/km		200 - 250	214,6	224	
Tensile strengthN/mm²					

Date: 10.08.2005 Name: Stein

Regards

Qualitymanagement

THE QUALITY CONNECTION

LEONI

Wire · Cable · Wiring Systems

LEONI Draht GmbH - Postfach 346 - D-93440 Kötzting

FTG GmbH

Faser-Technik

Schleizer Straße 56-58

D 95028 Hof

Abnahmeprüfzeugnis EN 10204/ 3.1

Inspection certificate / Certificate de reception

Wir bestätigen hiermit, daß die gelieferte Ware den Vereinbarungen der Bestellung entspricht.
We herewith confirm that the goods supplied are in conformity with the agreements of order.
Nous certifions que les marchandises livrées correspondent aux conditions de la commande.

Lieferung Nr (Delivery No / Livraison No)	Lieferung Dat (Delivery Dat / Livraison Dat)	Ihre Bestellung (Y / Order No / V / Commande No)	Ihre Teile Nr (Your part No / V/ No d'article)
80038654	23.09.2005	115/701412	11003963A

Teile Nr (Part No / No d'article)	Werkstoff (Material / Materiel)	Produkt (Product / Désignation)
108737E	Cu-OF1	OF-Cu Litze 0.077mm² 20x0.07 mm versilbert

Auftrag Nr (Order No / Commande No)	Liefermenge (Quantity supplied / Quantité livrée)	Anzahl	Aufmachung (Condition / Conditionnement)
10022369	1651,150 kg	252	K1600

Prüfprotokoll Test report / Relevé de controle

Merkmal Feature		Sollwert Set point	Messwerte Measured values		
Draht Durchmesser (Single wire diameter)	mm	0.067 - 0.073	0,068	0,072	
Draht Dehnung (Single wire elongation)	%	min 10	16	23	
Schichtdicke (Plating thicknes)	µm	nom 1.1			Test auf Porenfreiheit i.O.
Litze Durchmesser (Strand diameter)	mm	nom 0.36	0,354	0,365	
Litze Dehnung (Strand elongation)	%				
Schlaglänge (Lay length)	mm	nom 7.4 S	7,3	7,5	
Widerstand (DC-Resistance)	Ohm/km	200 - 250	210,3	219,3	
Zugfestigkeit (Tensile Strength)	N/mm²				

Datum: 23.09.2005 (Date) Name: Saller (Name)

Mit freundlichen Grüssen

With kind regards
Sincéres salutations

Qualitätsmanagement

THE QUALITY CONNECTION

LEONI

Wire · Cable · Wiring Systems

LEONI Draht GmbH - Postfach 346 - D-93440 Kötzting

W.E.T. Audtmotive System (China) L

Jinyuan Road

Langfang Development Zone

065001 Heibei

CHINA

Inspection certificate EN 10204/ 3.1

We herewith confirm that the goods supplied are in conformity with the agreements of order.

Delivery No	Delivery Dat	Order No	Your part No
80037484	24.08.2005	533702/311/107301	11003963A
Part No	**Material**	**Product**	
108737E	Cu-OF1	OF-Cu Litze 0.077mm² 20x0.07 mm versilbert	
Order No	**Quantity supplied**	**Reels**	**Condition**
10020958	1816,600 kg	280	K1600

Test report

Feature		Set point	Measured value		
Single wire diametermm		0.067 - 0.073	0,069	0,072	
Single wire elongation %		min 10	16	20	
Plating thicknes	µm	nom 1.1			Test auf Porenfreiheit i.O.
Strand diameter	mm	nom 0.36	0,358	0,367	
Strand elongation	%				
Lay length	mm	nom 7.4 S	7,3	7,5	
DC-Resistance Ohm/km		200 - 250	213	220,7	
Tensile strengthN/mm²					

Date: 24.08.2005 Name: Saller

Regards

Qualitymanagement

THE QUALITY CONNECTION

LEONI

Wire · Cable · Wiring Systems

LEONI Draht GmbH - Postfach 346 - D-93440 Kötzting

W.E.T. Audtmotive System (China) L

Jinyuan Road

Langfang Development Zone

065001 Heibei

CHINA

Inspection certificate EN 10204/ 3.1

We herewith confirm that the goods supplied are in conformity with the agreements of order.

Delivery No	Delivery Dat	Order No	Your part No
80037503	26.08.2005	533702/311/107301	11003963A
Part No	**Material**	**Product**	
108737E	Cu-OF1	OF-Cu Litze 0.077mm² 20x0.07 mm versilbert	
Order No	**Quantity supplied**	**Reels**	**Condition**
10020958	2187,350 kg	336	K1600

Test report

Feature		Set point	Measured value		
Single wire diameter	mm	0.067 - 0.073	0,068	0,072	
Single wire elongation	%	min 10	16	21	
Plating thicknes	µm	nom 1.1			Test auf Porenfreiheit i.O.
Strand diameter	mm	nom 0.36	0,356	0,366	
Strand elongation	%				
Lay length	mm	nom 7.4 S	7,3	7,5	
DC-Resistance	Ohm/km	200 - 250	212,4	230	
Tensile strength	N/mm²				

Date: 26.08.2005 Name: Saller

Regards

Qualitymanagement

THE QUALITY CONNECTION

LEONI

Wire · Cable · Wiring Systems

LEONI Draht GmbH - Postfach 346 - D-93440 Kötzting

W.E.T. Audtmotive System (China) L

Jinyuan Road

Langfang Development Zone

065001 Heibei

CHINA

Inspection certificate EN 10204/ 3.1

We herewith confirm that the goods supplied are in conformity with the agreements of order.

Delivery No	Delivery Dat	Order No	Your part No
80040340	09.11.2005	533702/311/109385	11003963A
Part No	**Material**	**Product**	
108737E	Cu-OF1	OF-Cu Litze 0.077mm² 20x0.07 mm versilbert	
Order No	**Quantity supplied**	**Reels**	**Condition**
10020958	2155,150 kg	336	K1600

Test report

Feature		Set point	Measured value		
Single wire diametermm		0.067 - 0.073	0,068	0,072	
Single wire elongation %		min 10	17	24	
Plating thicknes	µm	nom 1.1			Test auf Porenfreiheit i.O.
Strand diameter	mm	nom 0.36	0,356	0,364	
Strand elongation	%				
Lay length	mm	nom 7.4 S	7,4	7,6	
DC-Resistance Ohm/km		200 - 250	215,3	223	
Tensile strengthN/mm²					

Date: 09.11.2005 Name: Saller

Regards

Qualitymanagement

THE QUALITY CONNECTION

LEONI

Wire · Cable · Wiring Systems

LEONI Draht GmbH - Postfach 346 - D-93440 Kötzting

W.E.T. Audtmotive System (China) L

Jinyuan Road

Langfang Development Zone

065001 Heibei

CHINA

Inspection certificate EN 10204/ 3.1

We herewith confirm that the goods supplied are in conformity with the agreements of order.

Delivery No	Delivery Dat	Order No	Your part No
80037747	31.08.2005	533702/311/107301	11003963A
Part No	**Material**	**Product**	
108737E	Cu-OF1	OF-Cu Litze 0.077mm² 20x0.07 mm versilbert	
Order No	**Quantity supplied**	**Reels**	**Condition**
10020958	1468,900 kg	224	K1600

Test report

Feature		Set point	Measured value		
Single wire diameter	mm	0.067 - 0.073	0,068	0,072	
Single wire elongation	%	min 10	15	21	
Plating thicknes	µm	nom 1.1			Test auf Porenfreiheit i.O.
Strand diameter	mm	nom 0.36	0,356	0,366	
Strand elongation	%				
Lay length	mm	nom 7.4 S	7,3	7,5	
DC-Resistance	Ohm/km	200 - 250	211,7	222	
Tensile strength	N/mm²				

Date: 31.08.2005 Name: Saller

Regards

Qualitymanagement

THE QUALITY CONNECTION

LEONI

Wire · Cable · Wiring Systems

LEONI Draht GmbH - Postfach 346 - D-93440 Kötzting

W.E.T. Audtmotive System (China) L

Jinyuan Road

Langfang Development Zone

065001 Heibei

CHINA

Inspection certificate EN 10204/ 3.1

We herewith confirm that the goods supplied are in conformity with the agreements of order.

Delivery No	Delivery Dat	Order No	Your part No
80038240	13.09.2005	533702/311/107301	11003963A
Part No	**Material**	**Product**	
108737E	Cu-OF1	OF-Cu Litze 0.077mm² 20x0.07 mm versilbert	
Order No	**Quantity supplied**	**Reels**	**Condition**
10020958	1669,550 kg	252	K1600

Test report

Feature		Set point	Measured value		
Single wire diameter	mm	0.067 - 0.073	0,068	0,072	
Single wire elongation	%	min 10	16	22	
Plating thicknes	µm	nom 1.1			Test auf Porenfreiheit i.O.
Strand diameter	mm	nom 0.36	0,354	0,365	
Strand elongation	%				
Lay length	mm	nom 7.4 S	7,3	7,6	
DC-Resistance	Ohm/km	200 - 250	208,6	216	
Tensile strength	N/mm²				

Date: 13.09.2005 Name: Saller

Regards

Qualitymanagement

THE QUALITY CONNECTION

LEONI

Wire · Cable · Wiring Systems

LEONI Draht GmbH - Postfach 346 - D-93440 Kötzting

W.E.T. Audtmotive System (China) L

Jinyuan Road

Langfang Development Zone

065001 Heibei

CHINA

Inspection certificate EN 10204/ 3.1

We herewith confirm that the goods supplied are in conformity with the agreements of order.

Delivery No	Delivery Dat	Order No	Your part No
80038267	13.09.2005	533702/311/107301	11003963A
Part No	**Material**	**Product**	
108737E	Cu-OF1	OF-Cu Litze 0.077mm² 20x0.07 mm versilbert	
Order No	**Quantity supplied**	**Reels**	**Condition**
10020958	1460,700 kg	222	K1600

Test report

Feature	Set point	Measured value		
Single wire diametermm	0.067 - 0.073	0,068	0,072	
Single wire elongation %	min 10	17	22	
Plating thicknes µm	nom 1.1			Test auf Porenfreiheit i.O.
Strand diameter mm	nom 0.36	0,353	0,365	
Strand elongation %				
Lay length mm	nom 7.4 S	7,3	7,6	
DC-Resistance Ohm/km	200 - 250	210	217,1	
Tensile strengthN/mm²				

Date: 13.09.2005 Name: Saller

Regards

Qualitymanagement

LEONI Draht GmbH
Windorfer Straße 1
D-93444 Kötzting
Telefon +49 (0)9941-404-0
Telefax +49 (0)9941-404-40
E-mail draht@leoni.com
www.leoni.com

Gesellschaft mit beschränkter Haftung
Sitz und Registergericht Nürnberg HRB 16712
Ust-ID-Nr.: DE 813981316
Steuer-Nr.: 241/115/90083

Geschäftsführer:
Markus Thoma
Dr. Klaus Probst

THE QUALITY CONNECTION

LEONI

Wire · Cable · Wiring Systems

LEONI Draht GmbH - Postfach 346 - D-93440 Kötzting

W.E.T. Audtmotive System (China) L

Jinyuan Road

Langfang Development Zone

065001 Heibei

CHINA

Inspection certificate EN 10204/ 3.1

We herewith confirm that the goods supplied are in conformity with the agreements of order.

Delivery No	Delivery Dat	Order No	Your part No
80038490	20.09.2005	533702/311/107301	11003963A
Part No	**Material**	**Product**	
108737E	Cu-OF1	OF-Cu Litze 0.077mm² 20x0.07 mm versilbert	
Order No	**Quantity supplied**	**Reels**	**Condition**
10020958	1111,200 kg	168	K1600

Test report

Feature		Set point	Measured value		
Single wire diameter	mm	0.067 - 0.073	0,068	0,072	
Single wire elongation	%	min 10	16	23	
Plating thicknes	µm	nom 1.1			Test auf Porenfreiheit i.O.
Strand diameter	mm	nom 0.36	0,354	0,366	
Strand elongation	%				
Lay length	mm	nom 7.4 S	7,4	7,6	
DC-Resistance	Ohm/km	200 - 250	210	220,2	
Tensile strength	N/mm²				

Date: 20.09.2005 Name: Saller

Regards

Qualitymanagement

THE QUALITY CONNECTION

LEONI

Wire · Cable · Wiring Systems

LEONI Draht GmbH - Postfach 346 - D-93440 Kötzting

FTG GmbH

Faser-Technik

Schleizer Straße 56-58

D 95028 Hof

Abnahmeprüfzeugnis EN 10204/ 3.1

Inspection certificate / Certificate de reception

Wir bestätigen hiermit, daß die gelieferte Ware den Vereinbarungen der Bestellung entspricht.
We herewith confirm that the goods supplied are in conformity with the agreements of order.
Nous certifions que les marchandises livrées correspondent aux conditions de la commande.

Lieferung Nr Delivery No / Livraison No	Lieferung Dat Delivery Dat / Livraison Dat	Ihre Bestellung Y / Order No / V / Commande No	Ihre Teile Nr Your part No / V/ No d'article
80038535	20.09.2005	115/701412	11003963A

Teile Nr Part No / No d'article	Werkstoff Material / Materiel	Produkt Product / Désignation
108737E	Cu-OF1	OF-Cu Litze 0.077mm² 20x0.07 mm versilbert

Auftrag Nr Order No / Commande No	Liefermenge Quantity supplied / Quantité livrée	Anzahl	Aufmachung	Condition / Conditionnement
10022369	555,450 kg	84	K1600	

Prüfprotokoll Test report / Relevé de controle

Merkmal Feature		Sollwert Set point	Messwerte Measured values		
Draht Durchmesser Single wire diameter	mm	0.067 - 0.073	0,069	0,072	
Draht Dehnung Single wire elongation	%	min 10	16	21	
Schichtdicke Plating thickness	µm	nom 1.1			Test auf Porenfreiheit i.O.
Litze Durchmesser Strand diameter	mm	nom 0.36	0,356	0,363	
Litze Dehnung Strand elongation	%				
Schlaglänge Lay length	mm	nom 7.4 S	7,4	7,5	
Widerstand DC-Resistance	Ohm/km	200 - 250	210,2	217,5	
Zugfestigkeit Tensile Strength	N/mm²				

Datum: 20.09.2005 (Date)

Name: Saller (Name)

Mit freundlichen Grüssen

With kind regards
Sincéres salutations

Qualitätsmanagement

THE QUALITY CONNECTION

LEONI

Wire · Cable · Wiring Systems

LEONI Draht GmbH - Postfach 346 - D-93440 Kötzting

FTG GmbH

Faser-Technik

Schleizer Straße 56-58

D 95028 Hof

Abnahmeprüfzeugnis EN 10204/ 3.1

Inspection certificate / Certificate de reception

Wir bestätigen hiermit, daß die gelieferte Ware den Vereinbarungen der Bestellung entspricht.

We herewith confirm that the goods supplied are in conformity with the agreements of order.

Nous certifions que les marchandises livrées correspondent aux conditions de la commande.

Lieferung Nr Delivery No / Livraison No	Lieferung Dat Delivery Dat / Livraison Dat	Ihre Bestellung Y / Order No / V / Commande No	Ihre Teile Nr Your part No / V/ No d'article
80039773	21.10.2005	533702/311	11003963A

Teile Nr Part No / No d'article	Werkstoff Material / Materiel	Produkt Product / Désignation
108737E	Cu-OF1	OF-Cu Litze 0.077mm² 20x0.07 mm versilbert

Auftrag Nr Order No / Commande No	Liefermenge Quantity supplied / Quantité livrée	Anzahl	Aufmachung Condition / Conditionnement
10022369	1704,900 kg	267	K1600

Prüfprotokoll Test report / Relevé de controle

Merkmal Feature		Sollwert Set point	Messwerte Measured values		
Draht Durchmesser Single wire diameter	mm	0.067 - 0.073	0,068	0,072	
Draht Dehnung Single wire elongation	%	min 10	17	23	
Schichtdicke Plating thickness	µm	nom 1.1			Test auf Porenfreiheit i.O.
Litze Durchmesser Strand diameter	mm	nom 0.36	0,354	0,362	
Litze Dehnung Strand elongation	%				
Schlaglänge Lay length	mm	nom 7.4 S	7,4	7,5	
Widerstand DC-Resistance	Ohm/km	200 - 250	216,9	222,6	
Zugfestigkeit Tensile Strength	N/mm²				

Datum: 21.10.2005 (Date)

Name: Saller (Name)

Mit freundlichen Grüssen

With kind regards

Sincéres salutations

Qualitätsmanagement

THE QUALITY CONNECTION

LEONI

Wire · Cable · Wiring Systems

LEONI Draht GmbH - Postfach 346 - D-93440 Kötzting

FTG GmbH

Faser-Technik

Schleizer Straße 56-58

D 95028 Hof

Abnahmeprüfzeugnis EN 10204/ 3.1

Inspection certificate / Certificate de reception

Wir bestätigen hiermit, daß die gelieferte Ware den Vereinbarungen der Bestellung entspricht.

We herewith confirm that the goods supplied are in conformity with the agreements of order.

Nous certifions que les marchandises livrées correspondent aux conditions de la commande.

Lieferung Nr Delivery No / Livraison No	Lieferung Dat Delivery Dat / Livraison Dat	Ihre Bestellung Y / Order No / V / Commande No	Ihre Teile Nr Your part No / V/ No d'article
80039144	07.10.2005	115/701412	11003963A

Teile Nr Part No / No d'article	Werkstoff Material / Materiel	Produkt Product / Désignation
108737E	Cu-OF1	OF-Cu Litze 0.077mm² 20x0.07 mm versilbert

Auftrag Nr Order No / Commande No	Liefermenge Quantity supplied / Quantité livrée	Anzahl	Aufmachung Condition / Conditionnement
10022369	2147,050 kg	336	K1600

Prüfprotokoll Test report / Relevé de controle

Merkmal Feature		Sollwert Set point	Messwerte Measured values		
Draht Durchmesser Single wire diameter	mm	0.067 - 0.073	0,068	0,072	
Draht Dehnung Single wire elongation	%	min 10	17	23	
Schichtdicke Plating thicknes	µm	nom 1.1			Test auf Porenfreiheit i.O.
Litze Durchmesser Strand diameter	mm	nom 0.36	0,352	0,366	
Litze Dehnung Strand elongation	%				
Schlaglänge Lay length	mm	nom 7.4 S	7,4	7,6	
Widerstand DC-Resistance	Ohm/km	200 - 250	212	224,5	
Zugfestigkeit Tensile Strength	N/mm²				

Datum: 07.10.2005 (Date)

Name: Saller (Name)

Mit freundlichen Grüssen

With kind regards

Sincéres salutations

Qualitätsmanagement

LEONI Draht GmbH
Windorfer Straße 1
D-93444 Kötzting
Telefon +49 (0)9941-404-0
Telefax +49 (0)9941-404-40
E-mail draht@leoni.com
www.leoni.com

Gesellschaft mit beschränkter Haftung
Sitz und Registergericht Nürnberg HRB 16712
Ust-ID-Nr.: DE 813981316
Steuer-Nr.: 241/115/90063

Geschäftsführer:
Markus Thoma
Dr. Klaus Probst

THE QUALITY CONNECTION

LEONI

Wire · Cable · Wiring Systems

LEONI Draht GmbH - Postfach 346 - D-93440 Kötzting

FTG GmbH

Faser-Technik

Schleizer Straße 56-58

D 95028 Hof

Abnahmeprüfzeugnis EN 10204/ 3.1

Inspection certificate / Certificate de reception

Wir bestätigen hiermit, daß die gelieferte Ware den Vereinbarungen der Bestellung entspricht.

We herewith confirm that the goods supplied are in conformity with the agreements of order.

Nous certifions que les marchandises livrées correspondent aux conditions de la commande.

Lieferung Nr (Delivery No / Livraison No)	Lieferung Dat (Delivery Dat / Livraison Dat)	Ihre Bestellung (Y / Order No / V / Commande No)	Ihre Teile Nr (Your part No / V/ No d'article)
80039401	14.10.2005	115/701412	11003963A

Teile Nr (Part No / No d'article)	Werkstoff (Material / Materiel)	Produkt (Product / Désignation)
108737E	Cu-OF1	OF-Cu Litze 0.077mm² 20x0.07 mm versilbert

Auftrag Nr (Order No / Commande No)	Liefermenge (Quantity supplied / Quantité livrée)	Anzahl	Aufmachung (Condition / Conditionnement)
10022369	2676,200 kg	420	K1600

Prüfprotokoll Test report / Relevé de controle

Merkmal Feature		Sollwert Set point	Messwerte Measured values		
Draht Durchmesser (Single wire diameter)	mm	0.067 - 0.073	0,068	0,072	
Draht Dehnung (Single wire elongation)	%	min 10	17	24	
Schichtdicke (Plating thickness)	µm	nom 1.1			Test auf Porenfreiheit i.O.
Litze Durchmesser (Strand diameter)	mm	nom 0.36	0,352	0,364	
Litze Dehnung (Strand elongation)	%				
Schlaglänge (Lay length)	mm	nom 7.4 S	7,4	7,5	
Widerstand (DC-Resistance)	Ohm/km	200 - 250	211,6	225,1	
Zugfestigkeit (Tensile Strength)	N/mm²				

Datum: 14.10.2005 (Date)

Name: Saller (Name)

Mit freundlichen Grüssen

With kind regards

Sincéres salutations

Qualitätsmanagement

LEONI Draht GmbH
Windorfer Straße 1
D-93444 Kötzting
Telefon +49 (0)9941-404-0
Telefax +49 (0)9941-404-40
E-mail draht@leoni.com
www.leoni.com

Gesellschaft mit beschränkter Haftung
Sitz und Registergericht Nürnberg HRB 16712
Ust-ID-Nr.: DE 813981316
Steuer-Nr.: 241/115/90083

Geschäftsführer:
Markus Thoma
Dr. Klaus Probst

THE QUALITY CONNECTION

LEONI

Wire · Cable · Wiring Systems

LEONI Draht GmbH - Postfach 346 - D-93440 Kötzting

W.E.T. Audtmotive System (China) L

Jinyuan Road

Langfang Development Zone

065001 Heibei

CHINA

Inspection certificate EN 10204/ 3.1

We herewith confirm that the goods supplied are in conformity with the agreements of order.

Delivery No	Delivery Dat	Order No	Your part No
80039811	24.10.2005	533702/311/109385	11003963A
Part No	**Material**	**Product**	
108737E	Cu-OF1	OF-Cu Litze 0.077mm² 20x0.07 mm versilbert	
Order No	**Quantity supplied**	**Reels**	**Condition**
10020958	705,800 kg	112	K1600

Test report

Feature		Set point	Measured value		
Single wire diameter	mm	0.067 - 0.073	0,068	0,072	
Single wire elongation	%	min 10	17	22	
Plating thicknes	µm	nom 1.1			Test auf Porenfreiheit i.O.
Strand diameter	mm	nom 0.36	0,353	0,364	
Strand elongation	%				
Lay length	mm	nom 7.4 S	7,4	7,6	
DC-Resistance	Ohm/km	200 - 250	217,7	223,6	
Tensile strength	N/mm²				

Date: 24.10.2005 Name: Saller

Regards

Qualitymanagement

THE QUALITY CONNECTION

LEONI

Wire · Cable · Wiring Systems

LEONI Draht GmbH - Postfach 346 - D-93440 Kötzting

W.E.T. Audtmotive System (China) L

Jinyuan Road

Langfang Development Zone

065001 Heibei

CHINA

Inspection certificate EN 10204/ 3.1

We herewith confirm that the goods supplied are in conformity with the agreements of order.

Delivery No	Delivery Dat	Order No	Your part No
80040171	03.11.2005	533702/311/109385	11003963A
Part No	**Material**	**Product**	
108737E	Cu-OF1	OF-Cu Litze 0.077mm² 20x0.07 mm versilbert	
Order No	**Quantity supplied**	**Reels**	**Condition**
10020958	2146,900 kg	336	K1600

Test report

Feature		Set point	Measured value		
Single wire diameter	mm	0.067 - 0.073	0,068	0,072	
Single wire elongation	%	min 10	18	23	
Plating thicknes	µm	nom 1.1			Test auf Porenfreiheit i.O.
Strand diameter	mm	nom 0.36	0,354	0,364	
Strand elongation	%				
Lay length	mm	nom 7.4 S	7,4	7,6	
DC-Resistance	Ohm/km	200 - 250	217	223,3	
Tensile strength	N/mm²				

Date: 03.11.2005 Name: Saller

Regards

Qualitymanagement

THE QUALITY CONNECTION

LEONI

Wire · Cable · Wiring Systems

LEONI Draht GmbH - Postfach 346 - D-93440 Kötzting

W.E.T. Automotive System (China) L

Jinyuan Road

Langfang Development Zone

065001 Heibei

CHINA

Inspection certificate EN 10204/ 3.1

We herewith confirm that the goods supplied are in conformity with the agreements of order.

Delivery No	Delivery Dat	Order No	Your part No
80040614	16.11.2005	533702/311/109385	11003963A
Part No	**Material**	**Product**	
108737E	Cu-OF1	OF-Cu Litze 0.077mm² 20x0.07 mm versilbert	
Order No	**Quantity supplied**	**Reels**	**Condition**
10020958	2158,150 kg	336	K1600

Test report

Feature		Set point	Measured value	
Single wire diametermm		0.067 - 0.073	0,068	0,072
Single wire elongation	%	min 10	18	24
Plating thicknes	µm	nom 1.1		Test auf Porenfreiheit i.O.
Strand diameter	mm	nom 0.36	0,355	0,364
Strand elongation	%			
Lay length	mm	nom 7.4 S	7,4	7,6
DC-Resistance	Ohm/km	200 - 250	211,3	222,3
Tensile strengthN/mm²				

Date: 16.11.2005 Name: Saller

Regards

Qualitymanagement

THE QUALITY CONNECTION

LEONI

Wire · Cable · Wiring Systems

LEONI Draht GmbH - Postfach 346 - D-93440 Kötzting

W.E.T. Automotive System (China) L

Jinyuan Road

Langfang Development Zone

065001 Heibei

CHINA

Inspection certificate EN 10204/ 3.1

We herewith confirm that the goods supplied are in conformity with the agreements of order.

Delivery No	Delivery Dat	Order No	Your part No
80040847	23.11.2005	533702/311/109385	11003963A
Part No	**Material**	**Product**	
108737E	Cu-OF1	OF-Cu Litze 0.077mm² 20x0.07 mm versilbert	
Order No	**Quantity supplied**	**Reels**	**Condition**
10020958	2159,900 kg	336	K1600

Test report

Feature		Set point	Measured value		
Single wire diameter	mm	0.067 - 0.073	0,068	0,073	
Single wire elongation	%	min 10	17	25	
Plating thicknes	µm	nom 1.1			Test auf Porenfreiheit i.O.
Strand diameter	mm	nom 0.36	0,357	0,365	
Strand elongation	%				
Lay length	mm	nom 7.4 S	7,4	7,6	
DC-Resistance	Ohm/km	200 - 250	215	221,1	
Tensile strength	N/mm²				

Date: 23.11.2005 Name: Saller

Regards

Qualitymanagement

THE QUALITY CONNECTION

LEONI

Wire · Cable · Wiring Systems

LEONI Draht GmbH - Postfach 346 - D-93440 Kötzting

W.E.T. Automotive System (China) L

Jinyuan Road

Langfang Development Zone

065001 Heibei

CHINA

Inspection certificate EN 10204/ 3.1

We herewith confirm that the goods supplied are in conformity with the agreements of order.

Delivery No	Delivery Dat	Order No	Your part No
80041384	06.12.2005	533702/311/109385	11003963A
Part No	**Material**	**Product**	
108737E	Cu-OF1	OF-Cu Litze 0.077mm² 20x0.07 mm versilbert	
Order No	**Quantity supplied**	**Reels**	**Condition**
10020958	2118,200 kg	336	K1600

Test report

Feature	Set point	Measured value		
Single wire diametermm	0.067 - 0.073	0,068	0,072	
Single wire elongation %	min 10	17	24	
Plating thicknes µm	nom 1.1			Test auf Porenfreiheit i.O.
Strand diameter mm	nom 0.36	0,355	0,364	
Strand elongation %				
Lay length mm	nom 7.4 S	7,4	7,6	
DC-Resistance Ohm/km	200 - 250	216	232,9	
Tensile strengthN/mm²				

Date: 06.12.2005 Name: Salier

Regards

Qualitymanagement

THE QUALITY CONNECTION

LEONI

Wire · Cable · Wiring Systems

LEONI Draht GmbH - Postfach 346 - D-93440 Kötzting

W.E.T. Automotive System (China) L

Jinyuan Road

Langfang Development Zone

065001 Heibei

CHINA

Abnahmeprüfzeugnis EN 10204/ 3.1

Inspection certificate / Certificate de reception

Wir bestätigen hiermit, daß die gelieferte Ware den Vereinbarungen der Bestellung entspricht.

We herewith confirm that the goods supplied are in conformity with the agreements of order.

Nous certifions que les marchandises livrées correspondent aux conditions de la commande.

Lieferung Nr Delivery No / Livraison No	Lieferung Dat Delivery Dat / Livraison Dat	Ihre Bestellung Y / Order No / V / Commande No	Ihre Teile Nr Your part No / V/ No d'article
80041104	30.11.2005	533702/311/109385	11003963A

Teile Nr Part No / No d'article	Werkstoff Material / Materiel	Produkt Product / Désignation
108737E	Cu-OF1	OF-Cu Litze 0.077mm² 20x0.07 mm versilbert

Auftrag Nr Order No / Commande No	Liefermenge Quantity supplied / Quantité livrée	Anzahl	Aufmachung Condition / Conditionnement
10020958	1794,070 kg	280	K1600

Prüfprotokoll Test report / Relevé de controle

Merkmal Feature		Sollwert Set point	Messwerte Measured values		
Draht Durchmesser Single wire diameter	mm	0.067 - 0.073	0,068	0,073	
Draht Dehnung Single wire elongation	%	min 10	17	25	
Schichtdicke Plating thickness	µm	nom 1.1			Test auf Porenfreiheit i.O.
Litze Durchmesser Strand diameter	mm	nom 0.36	0,357	0,365	
Litze Dehnung Strand elongation	%				
Schlaglänge Lay length	mm	nom 7.4 S	7,4	7,6	
Widerstand DC-Resistance	Ohm/km	200 - 250	214,9	227,1	
Zugfestigkeit Tensile Strength	N/mm²				

Datum: 01.12.2005 (Date)

Name: Seebauer (Name)

Mit freundlichen Grüssen

With kind regards

Sincéres salutations

Qualitätsmanagement

LEONI Draht GmbH
Windorfer Straße 1
D-93444 Kötzting
Telefon +49 (0)9941-404-0
Telefax +49 (0)9941-404-40
E-mail draht@leoni.com
www.leoni.com

Gesellschaft mit beschränkter Haftung
Sitz und Registergericht Nürnberg HRB 16712
Ust-ID-Nr.: DE 813981316
Seuer-Nr.: 241/115/90083

Geschäftsführer:
Markus Thoma
Dr. Klaus Probst

THE QUALITY CONNECTION

LEONI

Wire · Cable · Wiring Systems

LEONI Draht GmbH - Postfach 346 - D-93440 Kötzting

W.E.T. Automotive System (China) L

Jinyuan Road

Langfang Development Zone

065001 Heibei

CHINA

Inspection certificate EN 10204/ 3.1

We herewith confirm that the goods supplied are in conformity with the agreements of order.

Delivery No	Delivery Dat	Order No	Your part No
80041677	14.12.2005	533702/311/109385	11003963A
Part No	**Material**	**Product**	
108737E	Cu-OF1	OF-Cu Litze 0.077mm² 20x0.07 mm versilbert	
Order No	**Quantity supplied**	**Reels**	**Condition**
10020958	2090,900 kg	336	K1600

Test report

Feature		Set point	Measured value		
Single wire diameter	mm	0.067 - 0.073	0,069	0,072	
Single wire elongation	%	min 10	18	23	
Plating thicknes	µm	nom 1.1			Test auf Porenfreiheit i.O.
Strand diameter	mm	nom 0.36	0,357	0,365	
Strand elongation	%				
Lay length	mm	nom 7.4 S	7,3	7,5	
DC-Resistance	Ohm/km	200 - 250	218,8	232,4	
Tensile strength	N/mm²				

Date: 14.12.2005 Name: Saller

Regards

Qualitymanagement

THE QUALITY CONNECTION

LEONI

Wire · Cable · Wiring Systems

LEONI Draht GmbH - Postfach 346 - D-93440 Kötzting

W.E.T. Automotive System (China) L

Jinyuan Road

Langfang Development Zone

065001 Heibei

CHINA

Inspection certificate EN 10204/ 3.1

We herewith confirm that the goods supplied are in conformity with the agreements of order.

Delivery No	Delivery Dat	Order No	Your part No
80041822	16.12.2005	533702/311/109385	11003963A
Part No	**Material**	**Product**	
108737E	Cu-OF1	OF-Cu Litze 0.077mm² 20x0.07 mm versilbert	
Order No	**Quantity supplied**	**Reels**	**Condition**
10020958	896,600 kg	142	K1600

Test report

Feature		Set point	Measured value		
Single wire diameter	mm	0.067 - 0.073	0,069	0,071	
Single wire elongation	%	min 10	18	22	
Plating thicknes	µm	nom 1.1			Test auf Porenfreiheit i.O.
Strand diameter	mm	nom 0.36	0,358	0,364	
Strand elongation	%				
Lay length	mm	nom 7.4 S	7,4	7,5	
DC-Resistance	Ohm/km	200 - 250	216	238,6	
Tensile strength	N/mm²				

Date: 16.12.2005 Name: Saller

Regards

Qualitymanagement

THE QUALITY CONNECTION

LEONI

Wire · Cable · Wiring Systems

LEONI Draht GmbH - Postfach 346 - D-93440 Kötzting

W.E.T. Automotive System (China) L

Jinyuan Road

Langfang Development Zone

065001 Heibei

CHINA

Abnahmeprüfzeugnis EN 10204/ 3.1

Inspection certificate / Certificate de reception

Wir bestätigen hiermit, daß die gelieferte Ware den Vereinbarungen der Bestellung entspricht.

We herewith confirm that the goods supplied are in conformity with the agreements of order.

Nous certifions que les marchandises livrées correspondent aux conditions de la commande.

Lieferung Nr Delivery No / Livraison No	Lieferung Dat Delivery Dat / Livraison Dat	Ihre Bestellung Y / Order No / V / Commande No	Ihre Teile Nr Your part No / V/ No d'article
80042065	04.01.2006	533702/311/110541	11003963A

Teile Nr Part No / No d'article	Werkstoff Material / Material	Produkt Product / Désignation
108737E	Cu-OF1	OF-Cu Litze 0.077mm² 20x0.07 mm versilbert

Auftrag Nr Order No / Commande No	Liefermenge Quantity supplied / Quantité livrée	Anzahl	Aufmachung Condition / Conditionnement
10024416	2092,450 kg	336	K1600

Prüfprotokoll Test report / Relevé de controle

Merkmal Feature		Sollwert Set point	Messwerte Measured values		
Draht Durchmesser Single wire diameter	mm	0.067 - 0.073	0,068	0,072	
Draht Dehnung Single wire elongation	%	min 10	18	23	
Schichtdicke Plating thicknes	µm	nom 1.1			Test auf Porenfreiheit i.O.
Litze Durchmesser Strand diameter	mm	nom 0.36	0,354	0,363	
Litze Dehnung Strand elongation	%				
Schlaglänge Lay length	mm	nom 7.4 S	7,4	7,5	
Widerstand DC-Resistance	Ohm/km	200 - 250	214,7	227,7	
Zugfestigkeit Tensile Strength	N/mm²				

Datum: 04.01.2006 (Date) Name: Saller (Name)

Mit freundlichen Grüssen

With kind regards

Sincéres salutations

Qualitätsmanagement

THE QUALITY CONNECTION

LEONI

Wire · Cable · Wiring Systems

LEONI Draht GmbH - Postfach 346 - D-93440 Kötzting

W.E.T. Automotive System (China) L

Jinyuan Road

Langfang Development Zone

065001 Heibei

CHINA

Inspection certificate EN 10204/ 3.1

We herewith confirm that the goods supplied are in conformity with the agreements of order.

Delivery No	Delivery Dat	Order No	Your part No
80042328	10.01.2006	533702/311/110541	11003963A
Part No	**Material**	**Product**	
108737E	Cu-OF1	OF-Cu Litze 0.077mm² 20x0.07 mm versilbert	
Order No	**Quantity supplied**	**Reels**	**Condition**
10024416	2099,700 kg	336	K1600

Test report

Feature		Set point	Measured value		
Single wire diameter	mm	0.067 - 0.073	0,069	0,072	
Single wire elongation	%	min 10	18	23	
Plating thicknes	µm	nom 1.1			Test auf Porenfreiheit i.O.
Strand diameter	mm	nom 0.36	0,355	0,365	
Strand elongation	%				
Lay length	mm	nom 7.4 S	7,4	7,5	
DC-Resistance	Ohm/km	200 - 250	221,6	237,4	
Tensile strength	N/mm²				

Date: 10.01.2006 Name: Saller

Regards

Qualitymanagement

THE QUALITY CONNECTION

LEONI

Wire - Cable - Wiring Systems

LEONI Draht GmbH - Postfach 346 - D-93440 Kötzting

W.E.T. Automotive System (China) L

Jinyuan Road

Langfang Development Zone

065001 Heibei

CHINA

Inspection certificate EN 10204/ 3.1

We herewith confirm that the goods supplied are in conformity with the agreements of order.

Delivery No	Delivery Dat	Order No	Your part No
80042702	19.01.2006	533702/311/111188	11003963A
Part No	**Material**	**Product**	
108737E	Cu-OF1	OF-Cu Litze 0.077mm² 20x0.07 mm versilbert	
Order No	**Quantity supplied**	**Reels**	**Condition**
10024416	2100,200 kg	336	K1600

Test report

Feature		Set point	Measured value		
Single wire diameter	mm	0.067 - 0.073	0,069	0,072	
Single wire elongation	%	min 10	18	23	
Plating thicknes	µm	nom 1.1			Test auf Porenfreiheit i.O.
Strand diameter	mm	nom 0.36	0,355	0,365	
Strand elongation	%				
Lay length	mm	nom 7.4 S	7,4	7,5	
DC-Resistance	Ohm/km	200 - 250	221,5	226,6	
Tensile strength	N/mm²				

Date: 19.01.2006 Name: Seebauer

Regards

Qualitymanagement

THE QUALITY CONNECTION

LEONI

Wire · Cable · Wiring Systems

LEONI Draht GmbH - Postfach 346 - D-93440 Kötzting

W.E.T. Automotive System (China) L

Jinyuan Road

Langfang Development Zone

065001 Heibei

CHINA

Inspection certificate EN 10204/ 3.1

We herewith confirm that the goods supplied are in conformity with the agreements of order.

Delivery No	Delivery Dat	Order No	Your part No
80042897	25.01.2006	533702/311/111188	11003963A
Part No	**Material**	**Product**	
108737E	Cu-OF1	OF-Cu Litze 0.077mm² 20x0.07 mm versilbert	
Order No	**Quantity supplied**	**Reels**	**Condition**
10024416	2103,770 kg	336	K1600

Test report

Feature		Set point	Measured value		
Single wire diameter	mm	0.067 - 0.073	0,069	0,072	
Single wire elongation	%	min 10	18	22	
Plating thicknes	µm	nom 1.1			Test auf Porenfreiheit i.O.
Strand diameter	mm	nom 0.36	0,356	0,363	
Strand elongation	%				
Lay length	mm	nom 7.4 S	7,4	7,5	
DC-Resistance	Ohm/km	200 - 250	221,9	232	
Tensile strength	N/mm²				

Date: 25.01.2006 Name: Saller

Regards

Qualitymanagement

THE QUALITY CONNECTION

LEONI

Wire · Cable · Wiring Systems

LEONI Draht GmbH - Postfach 346 - D-93440 Kötzting

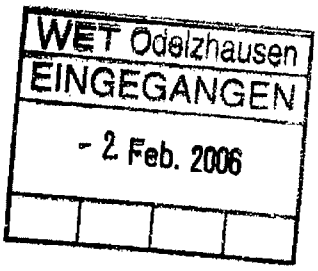
W.E.T. Automotive System (China) L

Jinyuan Road

Langfang Development Zone

065001 Heibei

CHINA



Inspection certificate EN 10204/ 3.1

We herewith confirm that the goods supplied are in conformity with the agreements of order.

Delivery No	Delivery Dat	Order No	Your part No
80043170	31.01.2006	533702/311/111188	11003963A
Part No	**Material**	**Product**	
108737E	Cu-OF1	OF-Cu Litze 0.077mm² 20x0.07 mm versilbert	
Order No	**Quantity supplied**	**Reels**	**Condition**
10024416	1531,800 kg	242	K1600

Test report

Feature		Set point	Measured value		
Single wire diameter	mm	0.067 - 0.073	0,068	0,072	
Single wire elongation	%	min 10	17	22	
Plating thicknes	µm	nom 1.1			Test auf Porenfreiheit i.O.
Strand diameter	mm	nom 0.36	0,355	0,365	
Weight	g/m				
Strand elongation	%				
Lay length	mm	nom 7.4 S	7,3	7,5	
DC-Resistance	Ohm/km	200 - 250	222,5	232,2	
Tensile strength	N/mm²				

Date: 31.01.2006 Name: Saller

Regards

Qualitymanagement

LEONI Draht GmbH
Windorfer Straße 1
D-93444 Bad Kötzting
Telefon +49 (0)9941-404-0
Telefax +49 (0)9941-404-40
E-mail draht@leoni.com
www.leoni.com

Gesellschaft mit beschränkter Haftung
Sitz und Registergericht Nürnberg HRB 16712
Ust-ID-Nr.: DE 813981316
Steuer-Nr.: 241/115/90083

Geschäftsführer:
Markus Thoma
Dr. Klaus Probst

Part Submission Warrant

Part Name OF-Cu Sliver Plated copper wire Type 20×0.07mm 11003963A
Safety and/or
Government Regulation ☐ Yes ☒ No Engineering Drawing Change Level ~~N/A~~ 21007263A rev 3 Dated ~~N/A~~
Additional Engineering Changes N/A Dated
Shown on Drawing No. N/A Purchase Order No. N/A Weight(kg)2kg
Checking Aid No. N/A Engineering Change Level N/A Dated N/A

SUPPLIER MANUFACTURING INFORMATION

LEONI Wire (Changzhou) Co., Ltd.
Supplier Name Supplier Code
No. 209 Huashan Middle Rd., Xinbei District, Changzhou Jiangsu, China
Street Address
Changzhou 213022, Jiangsu P.R. China
City/State/Zip

SUBMISSION INFORMATION

☒ Dimensional ☒ Materials/Functional ☐ Appearance

Customer Name/Division Schunk General Carbon (Panyu) Co., Ltd.
Buyer/Buyer Code
Application

Note: Does this part contains any restricted or reportable substances ☐ Yes ☒ No
Are plastic parts identified with appropriate ISO marking codes ☐ Yes ☒ No

REASON FOR SUBMISSION

☒ Initial Submission
☐ Engineering Change(s)
☐ Tooling: Transfer, Replacement, Returbishment or additional
☐ Correction of Discrepancy
☐ Tooling Inactive > than 1 year
☐ Change to Optional Construction or Material
☐ Sub-Supplier or Material Source Change
☐ Change in Part Processing
☐ Parts Produced at Additional Location
☒ Other – please specify

REQUESTED SUBMISSION LEVEL (Check one)

☐ Level 1 – Warrant only (and for designated appearance items, an Appearance Approval Report) submitted to customer.
☐ Level 2 – Warrant with product samples and limited supporting data submitted to customer.
☒ Level 3 – Warrant with product samples and complete supporting data submitted to customer.
☐ Level 4 – Warrant and other requirements as defined by customer.
☐ Level 5 – Warrant with product samples and complete supporting data reviewed at supplier's manufacturing location.

SUBMISSION RESULTS

The results for ☒dimensional measurements ☒materials and functional tests and ☐appearance criteria ☐statistical process package. These results meet all drawing and specification requirements: ☒ Yes ☐ No (If "No" - Explanation Required)
Mold / Cavity / Production Process

DECLARATION

I hereby affirm that the samples represented by this warrant are representative of our parts, have been made to the applicable Production Part Approval Process Manual 3rd Edition Requirements. I further warrant these samples were produced at the production rate of (#1) /8 hours. I have noted any deviations from this declaration below.

EXPLANATION/COMMENTS: #1:no part production

Print Name Connie Feng Title Quality Manager Phone No. +86 519 5103456 ext.130
Supplier Authorized Signature Connie. Feng Date 20.02.06

FOR CUSTOMER USE ONLY (IF APPLICABLE)

Part Warrant Disposition: ☒ Approved ☐ Rejected ☐ Other **Part Functional Approval:** ☐ Approved ☐ Waived

Customer Name: Jürgen Kraekel FE2 Customer signature V. Jürgen Date 03.11.06
Tel: +49/8134/933-528
Juergen.Kraekel@wet-group.com

W.E.T. Automotive Systems AG
Rudolf-Diesel-Str.12, 85235 Odelzhausen

Re-sampling for optimized characteristic of elongation o.k.

Die Freigabe erfolgt vorbehaltlich der Richtigkeit und Vollständigkeit der vorgelegten Bemusterungsunterlagen. Diese stellt keine Befreiung des Lieferanten bzgl. der Serien- und Systemtauglichkeit des Produktes im Rahmen der getroffenen Verträge dar.

DAIMLERCHRYSLER

Production Part Approval - Material Test Results

SUPPLIER	PART NUMBER
LEONI Changzhou	0601-20007 SA 1100396 3A
NAME OF INSPECTION FACILITY	PART NAME
LEONI Changzhou	OF-Cu Sliver Plated Copper wire

Type of Test	MATERIAL SPEC NO/DATE/SPECIFICATION		SUPPLIER TEST RESULTS	OK	NOT OK
	Base material: Cu-OF1 (EN 13602)		Cu-OF1 (See to supplier test report)	X	
	Surface: Sliver		Sliver (See to supplier test report)	X	
	Reel:plastic K160E		K1600	X	

SIGNATURE Genghong	Title Quality Supervisor	DATE 10.08.06

Genghong 8.10

10. 3.11.06

DAIMLERCHRYSLER

Production Part Approval - Dimensional Results

SUPPLIER	PART NUMBER
LEONI Changzhou	0601-20007 SA 1103963 A
NAME OF INSPECTION FACILITY	PART NAME
LEONI Changzhou	Sliver Plated Copper wire 20x0,07mm OF-Cu

Type of Test	MATERIAL SPEC NO/DATE/SPECIFICATION		SUPPLIER TEST RESULTS	OK	NOT OK
	Sliver Plated Copper wire 20x0,07mm OF-Cu				
	Lay length: (pitch) 7,4mm (+/– 10%)		7,8mm	X	
	Amount of wires 20		20	X	
	Diameter single wire 0,07mm (+/– 0.003)		0,068 - 0,073 mm	X	
	Cross section: 0.08mm²		0.08mm²	X	
	Thickness Min: 1.02 µ m		1.15-1.25	X	
	DC-resistance: 200-250 Ohm/km		224.55-226.46	X	
	Tensile force 20(+10/-4 N)		20-90-20.99	X	
	Elongation Min 15%		19-21	X	

SIGNATURE Genghong Title QS DATE 10.08.06

8.10

3.11.06

Part Submission Warrant

number of characteristics

document with special archives

PSW Nº M05664

Part Name **FSBK Basis/Multikontur** Part Number **330131_001 W.E.T11003589E**

Safety and/or Government Regulation ☒ Yes ☐ No Engineering Drawing Change Level **001** Dated **15-Jul-2004**

Additional Engineering Changes **N/A** Dated **N/A**

Shown on Drawing No. **21008225A** Purchase Order No. **N/A** Weight **0.4800** kg

Checking Aid No. **N/A** Engineering Change Level **N/A** Dated **N/A**

SUPPLIER MANUFACTURING INFORMATION

W.E.T. Sistemas Automotrices S.A. . de C.V.
Supplier Name Supplier Code

Carr. Presa la Amistad Km 7.5 Parque Industrial La Paz
Street Address

Cd. Acuña Coah., Mexico 26220
City/State/Zip

SUBMISSION INFORMATION

☐ Dimensional ☐ Materials/Functional ☐ Appearance

Customer Name/Division **Ediasa II**

Buyer/Buyer Code

Application **Mercedes 164/251**

Note: Does this part contain any restricted or reportable substances. ☒ Yes ☐ No

Are plastic parts identified with appropriate ISO marking codes. ☒ Yes ☐ No

REASON FOR SUBMISSION

☐ Initial Submission
☐ Engineering Change(s)
☐ Tooling: Transfer, Replacement, Refurbishment, or additional
☐ Correction of Discrepancy
☐ Tooling Inactive > than 1 year
☒ Change to Optional Construction or Material
☐ Sub- Supplier Material Source Change
☐ Change in Part Processing
☐ Parts Produced at Additional Location
☐ Other – please specify

REQUESTED SUBMISSION LEVEL (Check one)

☒ Level 1 - Warrant only (and for destinated appearance items, an Appearance Approval Report) submitted to customer.
☐ Level 2 - Warrant with product samples and limited supporting data submitted to customer.
☐ Level 3 - Warrant with product samples and complete supporting data submitted to customer.
☐ Level 4 - Warrant and other requirements as defined by customer.
☐ Level 5 - Warrant with product samples and complete supporting data reviewed at supplier's manufacturing location.

SUBMISSION RESULTS

The result for ☐ dimensional measurements ☐ material and functional tests ☐ appearance criteria ☒ statistical process package

These results meet all drawing and specification requirements ☒ Yes ☐ No (if „No" - Explanation Required)

Mold / Cavity / Production Process

Declaration

I hereby affirm that the samples represented by this warrant are representative of our parts, have been made to the applicable Production Part Approval Process Manual 3rd Edition Requirements. I further warrant these samples were produced at the production rate of **320/** 8 hours. I have noted any deviations from this declaration below.

EXPLANATION/COMMENTS: **Carbotex Change. IMDS# 14341439/2**

Print Name **Samuel Rodriguez** Title **Quality Manager** Phone No. **(830) 774 3512** FAX No. **(830) 768 3110**

Supplier Authorized Signature Quality Engineering Supervisor PA Date Feb04-2005

FOR CUSTOMER USE ONLY (IF APPLICABLE)

Part Warrant Disposition: ☐ Approved ☐ Rejected ☐ Other

Part Functional Approval: ☐ Approved ☐ Waived

Customer Name Customer Signature Date

July 1999 **CFG-1001**

The original copy of this document shall remain at the suppliers location while the part is active (see Glossary).

Optional: customer tracking number: #

Part Submission Warrant

number of characteristics

document with special archives

PSW Nº M05665

Part Name **FSBK Sport Seat** Part Number **330147_001 W.E.T11004732E**

Safety and/or Government Regulation ☒ Yes ☐ No Engineering Drawing Change Level **001** Dated **15-Jul-2004**

Additional Engineering Changes **N/A** Dated **N/A**

Shown on Drawing No. **21008588A** Purchase Order No. **N/A** Weight **0.5000** kg

Checking Aid No. **N/A** Engineering Change Level **N/A** Dated **N/A**

SUPPLIER MANUFACTURING INFORMATION

W.E.T. Sistemas Automotrices S.A. . de C.V.
Supplier Name Supplier Code

Carr. Presa la Amistad Km 7.5 Parque Industrial La Paz
Street Address

Cd. Acuña Coah., Mexico 26220
City/State/Zip

SUBMISSION INFORMATION

☐ Dimensional ☐ Materials/Functional ☐ Appearance

Customer Name/Division **Ediasa II**

Buyer/Buyer Code

Application **Mercedes 164/251**

Note: Does this part contain any restricted or reportable substances. ☒ Yes ☐ No

Are plastic parts identified with appropriate ISO marking codes. ☒ Yes ☐ No

REASON FOR SUBMISSION

☐ Initial Submission
☐ Engineering Change(s)
☐ Tooling: Transfer, Replacement, Refurbishment, or additional
☐ Correction of Discrepancy
☐ Tooling Inactive > than 1 year
☒ Change to Optional Construction or Material
☐ Sub- Supplier Material Source Change
☐ Change in Part Processing
☐ Parts Produced at Additional Location
☐ Other – please specify

REQUESTED SUBMISSION LEVEL (Check one)

☒ Level 1 - Warrant only (and for destinated appearance items, an Appearance Approval Report) submitted to customer.
☐ Level 2 - Warrant with product samples and limited supporting data submitted to customer.
☐ Level 3 - Warrant with product samples and complete supporting data submitted to customer.
☐ Level 4 - Warrant and other requirements as defined by customer.
☐ Level 5 - Warrant with product samples and complete supporting data reviewed at supplier's manufacturing location.

SUBMISSION RESULTS

The result for ☐ dimensional measurements ☐ material and functional tests ☐ appearance criteria ☐ statistical process package

These results meet all drawing and specification requirements ☒ Yes ☐ No (If „No" - Explanation Required)

Mold / Cavity / Production Process

Declaration

I hereby affirm that the samples represented by this warrant are representative of our parts, have been made to the applicable Production Part Approval Process Manual 3rd Edition Requirements. I further warrant these samples were produced at the production rate of **320/** 8 hours. I have noted any deviations from this declaration below.

EXPLANATION/COMMENTS: **Carbotex Change. IMDS# 14463702/2**

Print Name **Samuel Rodriguez** Title **Quality Manager** Phone No. **(830) 774 3512** FAX No. **(830) 768 3110**

Supplier Authorized Signature Quality Engineering Supervisor Date 12-10-2005

FOR CUSTOMER USE ONLY (IF APPLICABLE)

Part Warrant Disposition: ☐ Approved ☐ Rejected ☐ Other

Part Functional Approval: ☐ Approved ☐ Waived

Customer Name Customer Signature Date

Part Submission Warrant

number of characteristics

document with special archives

PSW Nº M05666

Part Name **FSBK Basis/Multikontur** Part Number **365988_001 W.E.T11005771E**

Safety and/or Government Regulation ☒ Yes ☐ No Engineering Drawing Change Level **001** Dated **15-Jul-2004**

Additional Engineering Changes **N/A** Dated **N/A**

Shown on Drawing No. **21010606A** Purchase Order No. **N/A** Weight **0.5000** kg

Checking Aid No. **N/A** Engineering Change Level **N/A** Dated **N/A**

SUPPLIER MANUFACTURING INFORMATION

W.E.T. Sistemas Automotrices S.A. . de C.V.
Supplier Name Supplier Code

Carr. Presa la Amistad Km 7.5 Parque Industrial La Paz
Street Address

Cd. Acuña Coah., Mexico 26220
City/State/Zip

SUBMISSION INFORMATION

☐ Dimensional ☐ Materials/Functional ☐ Appearance

Customer Name/Division **Ediasa II**

Buyer/Buyer Code

Application **Mercedes 164/251**

Note: Does this part contain any restricted or reportable substances. ☒ Yes ☐ No

Are plastic parts identified with appropriate ISO marking codes. ☒ Yes ☐ No

REASON FOR SUBMISSION

☐ Initial Submission
☐ Engineering Change(s)
☐ Tooling: Transfer, Replacement, Refurbishment, or additional
☐ Correction of Discrepancy
☐ Tooling Inactive > than 1 year
☒ Change to Optional Construction or Material
☐ Sub- Supplier Material Source Change
☐ Change in Part Processing
☐ Parts Produced at Additional Location
☐ Other – please specify

REQUESTED SUBMISSION LEVEL (Check one)

☒ Level 1 - Warrant only (and for destinated appearance items, an Appearance Approval Report) submitted to customer.
☐ Level 2 - Warrant with product samples and limited supporting data submitted to customer.
☐ Level 3 - Warrant with product samples and complete supporting data submitted to customer.
☐ Level 4 - Warrant and other requirements as defined by customer.
☐ Level 5 - Warrant with product samples and complete supporting data reviewed at supplier's manufacturing location.

SUBMISSION RESULTS

The result for ☐ dimensional measurements ☐ material and functional tests ☐ appearance criteria ☐ statistical process package

These results meet all drawing and specification requirements ☒ Yes ☐ No (If „No" - Explanation Required)

Mold / Cavity / Production Process

Declaration

I hereby affirm that the samples represented by this warrant are representative of our parts, have been made to the applicable Production Part Approval Process Manual 3rd Edition Requirements. I further warrant these samples were produced at the production rate of **320/** 8 hours. I have noted any deviations from this declaration below.

EXPLANATION/COMMENTS: **Carbotex Change. IMDS# 14462115/2**

Print Name **Samuel Rodriguez** Title **Quality Manager** Phone No. **(830) 774 3512** FAX No. **(830) 768 3110**

Supplier Authorized Signature Quality Engineering Supervisor Date

FOR CUSTOMER USE ONLY (IF APPLICABLE)

Part Warrant Disposition: ☐ Approved ☐ Rejected ☐ Other

Part Functional Approval: ☐ Approved ☐ Waived

Customer Name Customer Signature Date

The original copy of this document shall remain at the suppliers location while the part is active (see Glossary).

Optional: customer tracking number: #

copy: FB05005-00E / Version 6 Filename: M05666 11005771E

Part Submission Warrant

number of characteristics

document with special archives

PSW Nº M05664

Part Name **FSBK Basis/Multikontur** Part Number **330131_02 W.E.T11003589E**

Safety and/or Government Regulation ☒ Yes ☐ No Engineering Drawing Change Level **02** Dated **15-Jul-2004**

Additional Engineering Changes **N/A** Dated **N/A**

Shown on Drawing No. **21008225A** Purchase Order No. **N/A** Weight **0.4800** kg

Checking Aid No. **N/A** Engineering Change Level **N/A** Dated **N/A**

SUPPLIER MANUFACTURING INFORMATION

W.E.T. Sistemas Automotrices S.A. . de C.V.
Supplier Name Supplier Code

Carr. Presa la Amistad Km 7.5 Parque Industrial La Paz
Street Address

Cd. Acuña Coah., Mexico 26220
City/State/Zip

SUBMISSION INFORMATION

☐ Dimensional ☐ Materials/Functional ☐ Appearance

Customer Name/Division **Edlasa II**

Buyer/Buyer Code

Application **Mercedes 164/251**

Note: Does this part contain any restricted or reportable substances. ☒ Yes ☐ No

Are plastic parts identified with appropriate ISO marking codes. ☒ Yes ☐ No

REASON FOR SUBMISSION

☐ Initial Submission
☐ Engineering Change(s)
☐ Tooling: Transfer, Replacement, Refurbishment, or additional
☐ Correction of Discrepancy
☐ Tooling Inactive > than 1 year
☒ Change to Optional Construction or Material
☐ Sub- Supplier Material Source Change
☐ Change in Part Processing
☐ Parts Produced at Additional Location
☐ Other - please specify

REQUESTED SUBMISSION LEVEL (Check one)

☒ Level 1 - Warrant only (and for destinated appearance items, an Appearance Approval Report) submitted to customer.
☐ Level 2 - Warrant with product samples and limited supporting data submitted to customer.
☐ Level 3 - Warrant with product samples and complete supporting data submitted to customer.
☐ Level 4 - Warrant and other requirements as defined by customer.
☐ Level 5 - Warrant with product samples and complete supporting data reviewed at supplier's manufacturing location.

SUBMISSION RESULTS

The result for ☐ dimensional measurements ☐ material and functional tests ☐ appearance criteria ☒ statistical process package

These results meet all drawing and specification requirements ☒ Yes ☐ No (If „No" - Explanation Required)

Mold / Cavity / Production Process

Declaration

I hereby affirm that the samples represented by this warrant are representative of our parts, have been made to the applicable Production Part Approval Process Manual 3rd Edition Requirements. I further warrant these samples were produced at the production rate of **320/** 8 hours. I have noted any deviations from this declaration below.

EXPLANATION/COMMENTS: **Carbotex Change. IMDS# 14341439/2**

Print Name **Samuel Rodriguez** Title **Quality Manager** Phone No. **(830) 774 3512** FAX No. **(830) 768 3110**

Supplier Authorized Signature Quality Engineering Supervisor P.A. Date Feb 09-2005

FOR CUSTOMER USE ONLY (IF APPLICABLE)

Part Warrant Disposition: ☐ Approved ☐ Rejected ☐ Other

Part Functional Approval: ☐ Approved ☐ Waived

Customer Name Customer Signature Date

July 1999 **CFG-1001**

The original copy of this document shall remain at the suppliers location while the part is active (see Glossary).

Optional: customer tracking number: #

Part Submission Warrant

number of characteristics

document with special archives

PSW Nº M05665

Part Name **FSBK Sport Seat** Part Number **330147_02 W.E.T11004732E**

Safety and/or Government Regulation ☒ Yes ☐ No Engineering Drawing Change Level **02** Dated **15-Jul-2004**

Additional Engineering Changes **N/A** Dated **N/A**

Shown on Drawing No. **21008588A** Purchase Order No. **N/A** Weight **0.5000** kg

Checking Aid No. **N/A** Engineering Change Level **N/A** Dated **N/A**

SUPPLIER MANUFACTURING INFORMATION

W.E.T. Sistemas Automotrices S.A. . de C.V.
Supplier Name Supplier Code

Carr. Presa la Amistad Km 7.5 Parque Industrial La Paz
Street Address

Cd. Acuña Coah., Mexico 26220
City/State/Zip

SUBMISSION INFORMATION

☐ Dimensional ☐ Materials/Functional ☐ Appearance

Customer Name/Division **Ediasa II**

Buyer/Buyer Code

Application **Mercedes 164/251**

Note: Does this part contain any restricted or reportable substances. ☒ Yes ☐ No

Are plastic parts identified with appropriate ISO marking codes. ☒ Yes ☐ No

REASON FOR SUBMISSION

☐ Initial Submission
☐ Engineering Change(s)
☐ Tooling: Transfer, Replacement, Refurbishment, or additional
☐ Correction of Discrepancy
☐ Tooling Inactive > than 1 year
☒ Change to Optional Construction or Material
☐ Sub- Supplier Material Source Change
☐ Change in Part Processing
☐ Parts Produced at Additional Location
☐ Other – please specify

REQUESTED SUBMISSION LEVEL (Check one)

☒ Level 1 - Warrant only (and for destinated appearance items, an Appearance Approval Report) submitted to customer.
☐ Level 2 - Warrant with product samples and limited supporting data submitted to customer.
☐ Level 3 - Warrant with product samples and complete supporting data submitted to customer.
☐ Level 4 - Warrant and other requirements as defined by customer.
☐ Level 5 - Warrant with product samples and complete supporting data reviewed at supplier's manufacturing location.

SUBMISSION RESULTS

The result for ☐ dimensional measurements ☐ material and functional tests ☐ appearance criteria ☐ statistical process package

These results meet all drawing and specification requirements ☒ Yes ☐ No (If „No" - Explanation Required)

Mold / Cavity / Production Process

Declaration

I hereby affirm that the samples represented by this warrant are representative of our parts, have been made to the applicable Production Part Approval Process Manual 3rd Edition Requirements. I further warrant these samples were produced at the production rate of **320/** 8 hours. I have noted any deviations from this declaration below.

EXPLANATION/COMMENTS: **Carbotex Change. IMDS# 14463702/2**

Print Name **Samuel Rodriguez** Title **Quality Manager** Phone No. **(830) 774 3512** FAX No. **(830) 768 3110**

Supplier Authorized Signature Quality Engineering Supervisor PA Date Feb09-2005

FOR CUSTOMER USE ONLY (IF APPLICABLE)

Part Warrant Disposition: ☐ Approved ☐ Rejected ☐ Other

Part Functional Approval: ☐ Approved ☐ Waived

Customer Name Customer Signature Date

July 1999 **CFG-1001**

The original copy of this document shall remain at the suppliers location while the part is active (see Glossary).

Optional: customer tracking number: #

Part Submission Warrant

number of characteristics

document with special archives

PSW Nº M05666

Part Name **FSBK Basis/Multikontur** Part Number **365988_02 W.E.T11005771E**

Safety and/or Government Regulation ☒ Yes ☐ No Engineering Drawing Change Level **02** Dated **15-Jul-2004**

Additional Engineering Changes **N/A** Dated **N/A**

Shown on Drawing No. **21010606A** Purchase Order No. **N/A** Weight **0.5000** kg

Checking Aid No. **N/A** Engineering Change Level **N/A** Dated **N/A**

SUPPLIER MANUFACTURING INFORMATION

W.E.T. Sistemas Automotrices S.A. de C.V.
Supplier Name Supplier Code

Carr. Presa la Amistad Km 7.5 Parque Industrial La Paz
Street Address

Cd. Acuña Coah., Mexico 26220
City/State/Zip

SUBMISSION INFORMATION

☐ Dimensional ☐ Materials/Functional ☐ Appearance

Customer Name/Division **Edlasa II**

Buyer/Buyer Code

Application **Mercedes 164/251**

Note: Does this part contain any restricted or reportable substances. ☒ Yes ☐ No

Are plastic parts identified with appropriate ISO marking codes. ☒ Yes ☐ No

REASON FOR SUBMISSION

☐ Initial Submission
☐ Engineering Change(s)
☐ Tooling: Transfer, Replacement, Refurbishment, or additional
☐ Correction of Discrepancy
☐ Tooling Inactive > than 1 year
☒ Change to Optional Construction or Material
☐ Sub- Supplier Material Source Change
☐ Change in Part Processing
☐ Parts Produced at Additional Location
☐ Other – please specify

REQUESTED SUBMISSION LEVEL (Check one)

☒ Level 1 - Warrant only (and for destinated appearance items, an Appearance Approval Report) submitted to customer.
☐ Level 2 - Warrant with product samples and limited supporting data submitted to customer.
☐ Level 3 - Warrant with product samples and complete supporting data submitted to customer.
☐ Level 4 - Warrant and other requirements as defined by customer.
☐ Level 5 - Warrant with product samples and complete supporting data reviewed at supplier's manufacturing location.

SUBMISSION RESULTS

The result for ☐ dimensional measurements ☐ material and functional tests ☐ appearance criteria ☐ statistical process package

These results meet all drawing and specification requirements ☒ Yes ☐ No (If „No" - Explanation Required)

Mold / Cavity / Production Process

Declaration

I hereby affirm that the samples represented by this warrant are representative of our parts, have been made to the applicable Production Part Approval Process Manual 3rd Edition Requirements. I further warrant these samples were produced at the production rate of **320/** 8 hours. I have noted any deviations from this declaration below.

EXPLANATION/COMMENTS: **Carbotex Change. IMDS# 14462115/2**

Print Name **Samuel Rodriguez** Title **Quality Manager** Phone No. **(830) 774 3512** FAX No. **(830) 768 3110**

Supplier Authorized Signature Quality Engineering Supervisor Date Feb 04 2005

FOR CUSTOMER USE ONLY (IF APPLICABLE)

Part Warrant Disposition: ☐ Approved ☐ Rejected ☐ Other

Part Functional Approval: ☐ Approved ☐ Waived

Customer Name Customer Signature Date

July 1999 **CFG-1001**

The original copy of this document shall remain at the suppliers location while the part is active (see Glossary).

Optional: customer tracking number: #

	Test Report Form Sheet	Doc.-No./ Version: 80-0000158/ 002 Date: 26-Nov-04 Scope: North America

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8

PHONE: (519) 735-1818
FAX: (519) 735-5224

Flammability Test

Test Reference # 06301

Requested by:	Vesna Mitanovski	**Address:**	W.E.T. Automotive Systems Ltd. 9475 Twin Oaks Drive Windsor, Ont, N8N 5B8
Sample(s) in Lab:	April 11, 2006		
Date of Test:	April 27, 2006	**Key Words:**	Mercedes Flammability
Date of Report:	April 27, 2006		

Specification:	**Section:**	**Date:**
FMVSS 302		Sept. 24, 1998

Remarks/Deviation(s): Specimens' structure obtained from submitted flammability sample information sheets.

Purpose: To determine burning rate.

Pass/Fail Criteria: Please refer to the FMVSS 302 Specification.

Samples:

Set # 1:
Six flammability specimens representing 2005 Mercedes BR 164/125 FSBK RH/LH Basis, W.E.T. part number 11003589F and 2005 Mercedes BR 164/125 FSBK LH/RH Sport, W.E.T. part number 11004732F (cut from W.E.T. part number 11003589F), comprised of the following components: Grey Fleece (11005584A), Spun Fab – adhesive thermo (12000276A/12003047A), CTX (11009897C), Foam – Lam Mat (11002691A), sample #: 06301/1-6.

Set # 2:
Six flammability specimens representing 2005 Mercedes BR 164/125 FSBK RH/LH Nappa, W.E.T. part number 11005771F and Mercedes W164 FSBK Designo, W.E.T. part number 11009016B (cut from W.E.T. part number 11005771F), comprised of the following components: Grey Fleece (1102727A), Spun Fab – adhesive thermo (12000276A/12003047A), CTX (11009897C), Foam – Lam Mat (11002691A), sample #: 06301/7-12.

Procedure: Please refer to the FMVSS 302 Specification.

Equipment:

Test Chamber (#92)	Calibration due date: November 30, 2006
Flammability Chamber (#17)	Calibration due date: November 14, 2006
Stop Watch (#103)	Calibration due date: October 13, 2006
Steel Ruler (#112)	Calibration due date: October 14, 2006
Digital Thermo-Hygrometer (#124)	Calibration due date: July 27, 2006

Name & Title	Bozena Kasprowicz (Lab Technician)	Steve Braido (Test Lab Manager)

Signed and Controlled Document is Electronic Version Only!

Results: Materials identified in this report **met** requirements of the FMVSS 302 specification.
The maximum burn rate was:
Set # 1: 35.7 mm/min.
Set # 2: 39.2 mm/min.

For the results please refer to the attached tables.

FMVSS 302 Reporting Codes

*A - Does not ignite.
*B - Self-extinguishing (material does not burn to timing zone).
*C - Self-extinguishing/no burn rate (ignites but does not burn more than 50mm (2 in.)into timing zone).
*D - Self-extinguishing/with burn rate.
*E - Burns entire length with calculated burn rate.

Table 1: Burn Rates for Set # 1

Sample #	FMVSS 302 Reporting Code*	Burn Distance	Burn Time	Calculated Burn Rate	
		[mm]	[sec]	[mm/min]	[in/min]
06301/1	E	254	442	34.5	1.4
06301/2	E	254	448	34.0	1.3
06301/3	E	254	449	33.9	1.3
06301/4	E	254	469	32.5	1.3
06301/5	E	254	427	35.7	1.4
06301/6	E	254	473	32.2	1.3
			Specified Maximum :	102.0	4.0

Table 2: Burn Rates for Set # 2

Sample #	FMVSS 302 Reporting Code*	Burn Distance	Burn Time	Calculated Burn Rate	
		[mm]	[sec]	[mm/min]	[in/min]
06301/7	E	254	422	36.1	1.4
06301/8	E	254	432	35.3	1.4
06301/9	E	254	393	38.8	1.5
06301/10	E	254	410	37.2	1.5
06301/11	E	254	389	39.2	1.5
06301/12	E	254	399	38.2	1.5
			Specified Maximum :	102.0	4.0

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8
Phone (519) 735-1818
Fax (519) 735-5224

Test Report No.: 07077_1a(Flammability11007181E,CTX)

Name:	Bozena Kasprowicz	**Requested by:**	Monica Mihalceanu
Date of report:	August 28, 2006		

Purpose (incl. remarks & deviations):

Flammability Test - to verify if composition fulfils requirements of the 40-0000717 specification, section 1.1

Note:
Specimens' structure obtained from submitted flammability sample information sheet.
Frames without supporting wires were used for testing.

Sample(s) (& sample received date):

Six specimens representing Mercedes W164 Serial Production heater elements, W.E.T. part number 11007176E, 11007177E, 11007180E, 11007181E (cut from 11007181E), comprised of the following components: Grey Fleece (11002727A), Spunfab (19401213A), CTX (11009108A / Subassembly 12003856A), Foam – Lamination Material (11003000A / Subassembly 12003267B) sample # 07077_1a/1-6.

Sample(s) in Lab: August 14, 2006

Specification (section if applicable / version / release date):

40-0000717 / 002 / Section 1.1 Flammability / December 03, 2003

Summary - Results:

Material identified in this report **met** requirements of the 40-0000717 specification, section 1.1 Flammability.
All tested samples burned entire length with maximum calculated burn rate of 44.3 mm/min.

For the more details refer to the attached table and images.

_____ Steve Braido
Date approved by (Test Lab Manager)

The test results apply only to the tested parts.

Equipment used (incl. calibration information):

Test Chamber (#35)	Calibration due date: June 30, 2007
Flammability Chamber (#17)	Calibration due date: November 14, 2006
Stop Watch (#103)	Calibration due date: October 13, 2006
Steel Ruler (#110)	Calibration due date: October 14, 2006
Digital Thermo-Hygrometer (#123)	Calibration due date: July 05, 2007

Estimated measurement uncertainty was calculated to be ± 0.14 mm/min.

Procedure (incl. supporting data, graphs, images, pass/fail criteria, date of test)

Test Procedure:

All specimens were preconditioned for a minimum 24 hours at 21°C and 50% relative humidity (specimens' structure obtained from submitted flammability sample information sheet).
The specimens were placed horizontally between the two U-shaped metal frames in a specified draft free flammability chamber.
A specimen that softens and bends at the flaming end so as to cause erratic burning is kept horizontally by supports consisting of thin, heat resistant wires; spanning the width of the U-shaped frame under the specimen at 25 mm intervals (Frames without supporting wires were used for testing).
The Bunsen natural gas burner having a flame height of 38 mm is placed 19 mm below the center of the exposed end of the specimen for 15 seconds.
If ignition and flame propagation occur, timing commences when the flame passes the first set of pins in the metal frame and is stopped when the flame reaches the last set of pins at the opposite end of the metal frame.
The test was performed at room temperature of 21°± 2°C and 50%±5% relative humidity.
Burn rate is calculated as follows:

$$B = \frac{60 \times D}{T}$$

Where: B - burn rate in mm per minute
D - distance the flame travels in mm
T - time in seconds for the flame to travel D

Pass/Fail Criteria:

Parts in production and existing structures: Burning rate must be less than 100 mm/min.

FMVSS 302 Reporting Codes:

*A - Does not ignite.
*B - Self-extinguishing (material does not burn to timing zone).
*C - Self-extinguishing/no burn rate (ignites but does not burn more than 50mm (2 in.)into timing zone).
*D - Self-extinguishing/with burn rate.
*E - Burns entire length with calculated burn rate.

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8
Phone (519) 735-1818
Fax (519) 735-5224

Date of Test:

August 25, 2006

Table 1: Burn Rates and Confidence

Sample #	FMVSS 302 Reporting Code*	Burn Distance	Burn Time	Calculated Burn Rate			
				Based on FMVSS requirement		For Confidence Level calculation based on **ALL** samples	
		[mm]	[sec]	[mm/min]	[in/min]	[mm/min]	[in/min]
07077_1a/1	E	254	403	37.8	1.5	37.8	1.5
07077_1a/2	E	254	381	40.0	1.6	40.0	1.6
07077_1a/3	E	254	344	44.3	1.7	44.3	1.7
07077_1a/4	E	254	379	40.2	1.6	40.2	1.6
07077_1a/5	E	254	409	37.3	1.5	37.3	1.5
07077_1a/6	E	254	351	43.4	1.7	43.4	1.7
			Maximum:	44.3	1.7	44.3	1.7
			Minimum:			37.3	1.5
			Number of samples with calculated burn rate:			6	6
			Average:			40.5	1.6
			Standard deviation:			2.9	0.1
			Assumed confidence level:			0.95	0.95
			Confidence interval for the mean:			2.3	0.1

Image # 1: Sample # 07077_1a/1 pre test – side facings occupant compartment air space

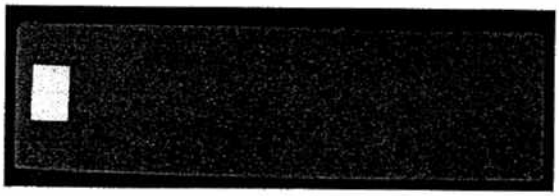


Image # 2: Sample # 07077_1a/1 pre test – side facings away from occupant compartment air space

Image # 3: Sample # 07077_1a/1 post test – side facings occupant compartment air space

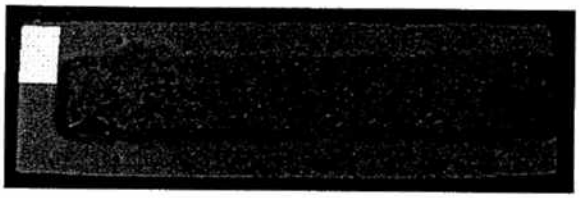


Image # 4: Sample # 07077_1a/1 post test – side facings away from occupant compartment air space

Form # and rev : 80-0000314-7-Windsor

Filename: 07077_1a%2811007181E%20CTX%2 9[1].doc Printed on: 2007-02-24

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8
Phone (519) 735-1818
Fax (519) 735-5224

Test Report No.: 07077_1b(Flammability 11007181E RW)

Name:	Bozena Kasprowicz	**Requested by:**	Monica Mihalceanu
Date of report:	August 29, 2006		

Purpose (incl. remarks & deviations):

Flammability Test - to verify if composition fulfils requirements of the 40-0000717 specification, section 1.1

Note:
Specimens' structure obtained from submitted flammability sample information sheet.
Frames without supporting wires were used for testing.

Sample(s) (& sample received date):

Six specimens representing Mercedes W164 Serial Production heater elements, W.E.T. part number 11007176E, 11007177E, 11007180E, 11007181E (cut from 11007181E), comprised of the following components: Grey Fleece (11002727A), Spunfab (19401213A), Resistance Wire (18020033A), Foam – Lamination Material (11003000A / Subassembly 12003267B), sample # 07077_1b/1-6.

Sample(s) in Lab: August 14, 2006

Specification (section if applicable / version / release date):

40-0000717 / 002 / Section 1.1 Flammability / December 03, 2003

Summary - Results:

Material identified in this report **met** requirements of the 40-0000717 specification, section 1.1 Flammability.
All tested samples burned entire length with maximum calculated burn rate of 48.2 mm/min.

For the more details refer to the attached table and images.

Date

Steve Braido
approved by (Test Lab Manager)

The test results apply only to the tested parts.

Form # and rev : 80-0000314-7-Windsor

Filename:
07077_1b%2811007181E%20RW%2 9[1].doc Printed on: 2007-02-24

Equipment used (incl. calibration information):

Test Chamber (#35)	Calibration due date: June 30, 2007
Flammability Chamber (#17)	Calibration due date: November 14, 2006
Stop Watch (#103)	Calibration due date: October 13, 2006
Steel Ruler (#110)	Calibration due date: October 14, 2006
Digital Thermo-Hygrometer (#123)	Calibration due date: July 05, 2007

Estimated measurement uncertainty was calculated to be ± 0.14 mm/min.

Procedure (incl. supporting data, graphs, images, pass/fail criteria, date of test)

Test Procedure:

All specimens were preconditioned for a minimum 24 hours at 21°C and 50% relative humidity (specimens' structure obtained from submitted flammability sample information sheet).
The specimens were placed horizontally between the two U-shaped metal frames in a specified draft free flammability chamber.
A specimen that softens and bends at the flaming end so as to cause erratic burning is kept horizontally by supports consisting of thin, heat resistant wires; spanning the width of the U-shaped frame under the specimen at 25 mm intervals (Frames without supporting wires were used for testing).
The Bunsen natural gas burner having a flame height of 38 mm is placed 19 mm below the center of the exposed end of the specimen for 15 seconds.
If ignition and flame propagation occur, timing commences when the flame passes the first set of pins in the metal frame and is stopped when the flame reaches the last set of pins at the opposite end of the metal frame.
The test was performed at room temperature of 21°± 2°C and 50%±5% relative humidity.
Burn rate is calculated as follows:

$$B = \frac{60 \times D}{T}$$

Where: B - burn rate in mm per minute
D - distance the flame travels in mm
T - time in seconds for the flame to travel D

Pass/Fail Criteria:

Parts in production and existing structures: Burning rate must be less than 100 mm/min.

FMVSS 302 Reporting Codes:

*A - Does not Ignite.
*B - Self-extinguishing (material does not burn to timing zone).
*C - Self-extinguishing/no burn rate (ignites but does not burn more than 50mm (2 in.)into timing zone).
*D - Self-extinguishing/with burn rate.
*E - Burns entire length with calculated burn rate.

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8
Phone (519) 735-1818
Fax (519) 735-5224

Date of Test:

August 25, 2006

Table 1: Burn Rates and Confidence

Sample #	FMVSS 302 Reporting Code*	Burn Distance	Burn Time	Calculated Burn Rate			
				Based on FMVSS requirement		For Confidence Level calculation based on **ALL** samples	
		[mm]	[sec]	[mm/min]	[in/min]	[mm/min]	[in/min]
07077_1b/1	E	254	344	44.3	1.7	44.3	1.7
07077_1b/2	E	254	322	47.3	1.9	47.3	1.9
07077_1b/3	E	254	364	41.9	1.6	41.9	1.6
07077_1b/4	E	254	316	48.2	1.9	48.2	1.9
07077_1b/5	E	254	335	45.5	1.8	45.5	1.8
07077_1b/6	E	254	329	46.3	1.8	46.3	1.8
			Maximum:	48.2	1.9	48.2	1.9
			Minimum:			41.9	1.6
			Number of samples with calculated burn rate:			6	6
			Average:			45.6	1.8
			Standard deviation:			2.3	0.1
			Assumed confidence level:			0.95	0.95
			Confidence interval for the mean:			1.8	0.1

Image # 1: Sample # 07077_1b/1 pre test – side facings occupant compartment air space

Image # 2: Sample # 07077_1b/1 pre test – side facings away from occupant compartment air space

Image # 3: Sample # 07077_1b/1 post test – side facings occupant compartment air space

Image # 4: Sample # 07077_1b/1 post test – side facings away from occupant compartment air space

Form # and rev : 80-0000314-7-Windsor

Filename: 07077_1b%2811007181E%20RW%29[1].doc Printed on: 2007-02-24

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8
Phone (519) 735-1818
Fax (519) 735-5224

Test Report No.: 07077_1c(Flammability 11007174E CTX)

Name:	Bozena Kasprowicz	**Requested by:**	Monica Mihalceanu
Date of report:	August 29, 2006		

Purpose (incl. remarks & deviations):

Flammability Test - to verify if composition fulfils requirements of the 40-0000717 specification, section 1.1

Note:
Specimens' structure obtained from submitted flammability sample information sheet.
Frames without supporting wires were used for testing.

Sample(s) (& sample received date):

Six specimens representing Mercedes W164 Serial Production heater elements, W.E.T. part number 11006098F, 11007174E, 11007177E, 11007178E (cut from 11007174E), comprised of the following components: Grey Fleece (11005584A), Spunfab (19401213A), CTX (11009108A / Subassembly 12003856A), Foam – Lamination Material (11003000A / Subassembly 12003267B), sample # 07077_1c/1-6.

Sample(s) in Lab: August 14, 2006

Specification (section if applicable / version / release date):

40-0000717 / 002 / Section 1.1 Flammability / December 03, 2003

Summary - Results:

Material identified in this report **met** requirements of the 40-0000717 specification, section 1.1 Flammability.
All tested samples burned entire length with maximum calculated burn rate of 44.6 mm/min.

For the more details refer to the attached table and images.

Date

Steve Braido
approved by (Test Lab Manager)

The test results apply only to the tested parts.

Equipment used (incl. calibration information):

Test Chamber (#35)	Calibration due date: June 30, 2007
Flammability Chamber (#17)	Calibration due date: November 14, 2006
Stop Watch (#103)	Calibration due date: October 13, 2006
Steel Ruler (#110)	Calibration due date: October 14, 2006
Digital Thermo-Hygrometer (#123)	Calibration due date: July 05, 2007

Estimated measurement uncertainty was calculated to be ± 0.14 mm/min.

Procedure (incl. supporting data, graphs, images, pass/fail criteria, date of test)

Test Procedure:

All specimens were preconditioned for a minimum 24 hours at 21°C and 50% relative humidity (specimens' structure obtained from submitted flammability sample information sheet).
The specimens were placed horizontally between the two U-shaped metal frames in a specified draft free flammability chamber.
A specimen that softens and bends at the flaming end so as to cause erratic burning is kept horizontally by supports consisting of thin, heat resistant wires; spanning the width of the U-shaped frame under the specimen at 25 mm intervals (Frames without supporting wires were used for testing).
The Bunsen natural gas burner having a flame height of 38 mm is placed 19 mm below the center of the exposed end of the specimen for 15 seconds.
If ignition and flame propagation occur, timing commences when the flame passes the first set of pins in the metal frame and is stopped when the flame reaches the last set of pins at the opposite end of the metal frame.
The test was performed at room temperature of 21°± 2°C and 50%±5% relative humidity.
Burn rate is calculated as follows:

$$B = \frac{60 \times D}{T}$$

Where: B - burn rate in mm per minute
D - distance the flame travels in mm
T - time in seconds for the flame to travel D

Pass/Fail Criteria:

Parts in production and existing structures: Burning rate must be less than 100 mm/min.

FMVSS 302 Reporting Codes:

*A - Does not ignite.
*B - Self-extinguishing (material does not burn to timing zone).
*C - Self-extinguishing/no burn rate (ignites but does not burn more than 50mm (2 in.)into timing zone).
*D - Self-extinguishing/with burn rate.
*E - Burns entire length with calculated burn rate.

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8
Phone (519) 735-1818
Fax (519) 735-5224

Date of Test:

August 25, 2006

Table 1: Burn Rates and Confidence

Sample #	FMVSS 302 Reporting Code*	Burn Distance	Burn Time	Calculated Burn Rate			
				Based on FMVSS requirement		For Confidence Level calculation based on **ALL** samples	
		[mm]	[sec]	[mm/min]	[in/min]	[mm/min]	[in/min]
07077_1c/1	E	254	346	44.0	1.7	44.0	1.7
07077_1c/2	E	254	342	44.6	1.8	44.6	1.8
07077_1c/3	E	254	358	42.6	1.7	42.6	1.7
07077_1c/4	E	254	377	40.4	1.6	40.4	1.6
07077_1c/5	E	254	358	42.6	1.7	42.6	1.7
07077_1c/6	E	254	365	41.8	1.6	41.8	1.6
			Maximum:	44.6	1.8	44.6	1.8
			Minimum:			40.4	1.6
			Number of samples with calculated burn rate:			6	6
			Average:			42.7	1.7
			Standard deviation:			1.5	0.1
			Assumed confidence level:			0.95	0.95
			Confidence interval for the mean:			1.2	0.0

Image # 1: Sample # 07077_1c/1 pre test – side facings occupant compartment air space

Image # 2: Sample # 07077_1c/1 pre test – side facings away from occupant compartment air space

Image # 3: Sample # 07077_1c/1 post test – side facings occupant compartment air space

Image # 4: Sample # 07077_1c/1 post test – side facings away from occupant compartment air space

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8
Phone (519) 735-1818
Fax (519) 735-5224

Test Report No.: 07077_1d(Flammability 11007174E RW)

Name:	Bozena Kasprowicz	**Requested by:**	Monica Mihalceanu
Date of report:	August 29, 2006		

Purpose (incl. remarks & deviations):

Flammability Test - to verify if composition fulfils requirements of the 40-0000717 specification, section 1.1

Note:
Specimens' structure obtained from submitted flammability sample information sheet.
Frames without supporting wires were used for testing.

Sample(s) (& sample received date):

Six specimens representing Mercedes W164 Serial Production heater elements, W.E.T. part number 11006098F, 11007174E, 11007177E, 11007178E (cut from 11007174E), comprised of the following components: Grey Fleece (11005584A), Spunfab (19401213A), Resistance Wire (18020033A), Foam – Lamination Material (11003000A / Subassembly 12003267B), sample # 07077_1d/1-6.

Sample(s) in Lab: August 14, 2006

Specification (section if applicable / version / release date):

40-0000717 / 002 / Section 1.1 Flammability / December 03, 2003

Summary - Results:

Material identified in this report **met** requirements of the 40-0000717 specification, section 1.1 Flammability.
All tested samples burned entire length with maximum calculated burn rate of 52.2 mm/min.

For the more details refer to the attached table and images.

_____ Steve Braido
Date approved by (Test Lab Manager)

The test results apply only to the tested parts.

Equipment used (incl. calibration information):

Test Chamber (#35)	Calibration due date: June 30, 2007
Flammability Chamber (#17)	Calibration due date: November 14, 2006
Stop Watch (#103)	Calibration due date: October 13, 2006
Steel Ruler (#110)	Calibration due date: October 14, 2006
Digital Thermo-Hygrometer (#123)	Calibration due date: July 05, 2007

Estimated measurement uncertainty was calculated to be ± 0.14 mm/min.

Procedure (incl. supporting data, graphs, images, pass/fail criteria, date of test)

Test Procedure:

All specimens were preconditioned for a minimum 24 hours at 21°C and 50% relative humidity (specimens' structure obtained from submitted flammability sample information sheet).
The specimens were placed horizontally between the two U-shaped metal frames in a specified draft free flammability chamber.
A specimen that softens and bends at the flaming end so as to cause erratic burning is kept horizontally by supports consisting of thin, heat resistant wires; spanning the width of the U-shaped frame under the specimen at 25 mm intervals (Frames without supporting wires were used for testing).
The Bunsen natural gas burner having a flame height of 38 mm is placed 19 mm below the center of the exposed end of the specimen for 15 seconds.
If ignition and flame propagation occur, timing commences when the flame passes the first set of pins in the metal frame and is stopped when the flame reaches the last set of pins at the opposite end of the metal frame.
The test was performed at room temperature of 21°± 2°C and 50%±5% relative humidity.
Burn rate is calculated as follows:

$$B = \frac{60 \times D}{T}$$

Where: B - burn rate in mm per minute
D - distance the flame travels in mm
T - time in seconds for the flame to travel D

Pass/Fail Criteria:

Parts in production and existing structures: Burning rate must be less than 100 mm/min.

FMVSS 302 Reporting Codes:

*A - Does not ignite.
*B - Self-extinguishing (material does not burn to timing zone).
*C - Self-extinguishing/no burn rate (Ignites but does not burn more than 50mm (2 in.)into timing zone).
*D - Self-extinguishing/with burn rate.
*E - Burns entire length with calculated burn rate.

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8
Phone (519) 735-1818
Fax (519) 735-5224

Date of Test:

August 28, 2006

Table 1: Burn Rates and Confidence

Sample #	FMVSS 302 Reporting Code*	Burn Distance	Burn Time	Calculated Burn Rate			
				Based on FMVSS requirement		For Confidence Level calculation based on **ALL** samples	
		[mm]	[sec]	[mm/min]	[in/min]	[mm/min]	[in/min]
07077_1d/1	E	254	322	47.3	1.9	47.3	1.9
07077_1d/2	E	254	329	46.3	1.8	46.3	1.8
07077_1d/3	E	254	338	45.1	1.8	45.1	1.8
07077_1d/4	E	254	313	48.7	1.9	48.7	1.9
07077_1d/5	E	254	327	46.6	1.8	46.6	1.8
07077_1d/6	E	254	292	52.2	2.1	52.2	2.1
			Maximum:	52.2	2.1	52.2	2.1
			Minimum:			45.1	1.8
			Number of samples with calculated burn rate:			6	6
			Average:			47.7	1.9
			Standard deviation:			2.5	0.1
			Assumed confidence level:			0.95	0.95
			Confidence interval for the mean:			2.0	0.1

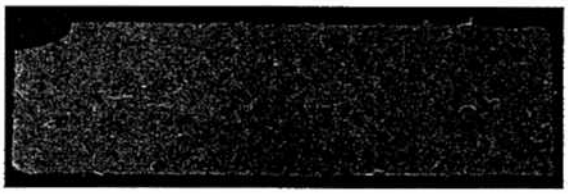


Image # 1: Sample # 07077_1d/1 pre test – side facings occupant compartment air space

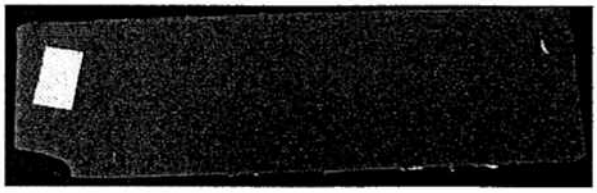


Image # 2: Sample # 07077_1d/1 pre test – side facings away from occupant compartment air space

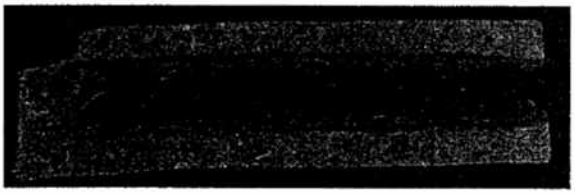


Image # 3: Sample # 07077_1d/1 post test – side facings occupant compartment air space

Image # 4: Sample # 07077_1d/1 post test – side facings away from occupant compartment air space

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8
Phone (519) 735-1818
Fax (519) 735-5224

Test Report No.: 07077_2(Resistance)

Name:	Andrew Dixon	**Requested by:**	Vince Libbrecht
Date of report:	August 19, 2006		

Purpose (incl. remarks & deviations):
Purpose: Design Validation

Sample(s) (& sample received date):

- Twelve **Mercedes W164 / BR 251** (Serial Production) FS CH LH Basis Leather heater elements, W.E.T. P/N 11007174E, sample # 07077/4 - 15.
- Three **Mercedes W164 / BR251** (Serial Production) FS BK RH/LH Basis heater elements, W.E.T. P/N 11003589F, sample # 07077/1 - 12.
- Three **Mercedes W164 / BR251** (Serial Production) FS CH LH Multikontur heater elements, W.E.T. P/N 11007181E, sample # 07077/4 - 15.
- Three **Mercedes W164 / BR251** (Serial Production) FS BK LH/RH Basis Nappa heater elements, W.E.T. P/N 11005771F, sample # 070771/1 - 12.

Specification (section if applicable / version / release date):
W.E.T 40-0000717Rev002 section 1.3 (Resistance Measurement) Release date: December 3, 2003.

Summary - Results:

All samples met the requirements of the specification. Samples were required to have a resistance within ±10% of the design resistance.

RESISTANCE MEASUREMENT			
PART NUMBER	11005771F		
SAMPLE	CURRENT [AMPS]	CALCULATED RESISTANCE [Ω]	PASS/FAIL 2.70±10%
07077/1	5.13	2.63	PASS
07077/2	5.17	2.61	PASS
07077/3	5.16	2.62	PASS
07077/4	5.16	2.62	PASS
07077/5	5.18	2.61	PASS
07077/6	5.15	2.62	PASS
07077/7	5.17	2.61	PASS
07077/8	5.17	2.61	PASS
07077/9	5.16	2.62	PASS
07077/10	5.08	2.66	PASS
07077/11	5.17	2.61	PASS
07077/12	5.15	2.62	PASS

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8
Phone (519) 735-1818
Fax (519) 735-5224

PART NUMBER	11007174E		
SAMPLE	CURRENT [AMPS]	CALCULATED RESISTANCE [Ω]	PASS/FAIL 3.16±10%
07077/4	4.34	3.11	PASS
07077/5	4.32	3.13	PASS
07077/6	4.29	3.15	PASS
07077/7	4.36	3.10	PASS
07077/8	4.29	3.15	PASS
07077/9	4.31	3.13	PASS
07077/10	4.31	3.13	PASS
07077/11	4.32	3.13	PASS
07077/12	4.31	3.13	PASS
07077/13	4.28	3.15	PASS
07077/14	4.33	3.12	PASS
07077/15	4.29	3.15	PASS

PART NUMBER	11007181E		
SAMPLE	CURRENT [AMPS]	CALCULATED RESISTANCE [Ω]	PASS/FAIL 3.16±10%
07077/4	4.37	3.09	PASS
07077/5	4.33	3.12	PASS
07077/6	4.33	3.12	PASS
07077/7	4.29	3.15	PASS
07077/8	4.37	3.09	PASS
07077/9	4.33	3.12	PASS
07077/10	4.33	3.12	PASS
07077/11	4.35	3.10	PASS
07077/12	4.34	3.11	PASS
07077/13	4.35	3.10	PASS
07077/14	4.38	3.08	PASS
07077/15	4.36	3.10	PASS

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8
Phone (519) 735-1818
Fax (519) 735-5224

PART NUMBER	11003589F		
SAMPLE	CURRENT [AMPS]	CALCULATED RESISTANCE [Ω]	PASS/FAIL 2.70+10%
07077/1	5.06	2.67	PASS
07077/2	5.13	2.63	PASS
07077/3	5.1	2.65	PASS
07077/4	5.1	2.65	PASS
07077/5	5.15	2.62	PASS
07077/6	5.12	2.64	PASS
07077/7	5.15	2.62	PASS
07077/8	5.16	2.62	PASS
07077/9	5.12	2.64	PASS
07077/10	5.11	2.64	PASS
07077/11	5.11	2.64	PASS
07077/12	5.15	2.62	PASS

Date

Steve Braido
approved by

The test results apply only to the tested parts.

Equipment used (incl. calibration information):

Stop Watch (#168)	Calibration due date: July 6, 2007
W.E.T. Data Acquisition Station (#44)	Calibration due date: November 7, 2006
DC Power Supply (#106)	Calibration due date: October 13, 2006

Procedure (incl. supporting data, graphs, images, pass/fail criteria, date of test)

Procedure:

Energize heater with 13.5Vdc

Record current draw of heater

Calculate resistance of heater elements.

Pass/Fail Criteria:

Samples must be within +10% of the design resistance.

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8
Phone (519) 735-1818
Fax (519) 735-5224

Test Report No.: 07077_4 (Set Point Temperature, Heaters)

Name:	Andrew Dixon	**Requested by:**	Vince Libbrecht
Date of report:	August 24, 2006		

Purpose (incl. remarks & deviations):
Purpose: Design Validation
All samples were tested using a voltage of 3.9 Vdc (low setting), 100 minutes 7.8Vdc (medium setting), for 15minutes and 13.0Vdc (high setting), for 5 minutes, as specified by requestor.
1 Extra thermocouple was used on the cushion samples over the bolster area.
The test was performed with cushion and back heater elements set in position as a unit.

Sample(s) (& sample received date):

- Three **Mercedes W164 / BR 251** (Serial Production) FS CH LH Basis Leather heater elements, W.E.T. P/N 11007174E, sample # 07077/13, 14, and 15.
- Three **Mercedes W164 / BR251** (Serial Production) FS BK RH/LH Basis heater elements, W.E.T. P/N 11003589F, sample # 07077/3, 5, and 9.
- Three **Mercedes W164 / BR251** (Serial Production) FS CH LH Multikontur heater elements, W.E.T. P/N 11007181E, sample # 07077/9, 10, and 11.
- Three **Mercedes W164 / BR251** (Serial Production) FS BK LH/RH Basis Nappa heater elements, W.E.T. P/N 11005771F, sample # 07077/6, 7, and 8.

Specification (section if applicable / version / release date):
W.E.T 40-0000717Rev002 section 1.4 (Set Point Temperature, Heaters) Release date: December 3, 2003.

Summary - Results:

All samples met the requirements of the specification.
Samples were required to not exceed 70°C.

Date

Steve Braldo
approved by

The test results apply only to the tested parts.

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8
Phone (519) 735-1818
Fax (519) 735-5224

Equipment used (incl. calibration information):

Stop Watch (#168)	Calibration due date: July 6, 2007
W.E.T. Data Acquisition Station (#44)	Calibration due date: November 7, 2006
DC Power Supply (#106)	Calibration due date: October 13, 2006

Procedure (incl. supporting data, graphs, images, pass/fail criteria, date of test)

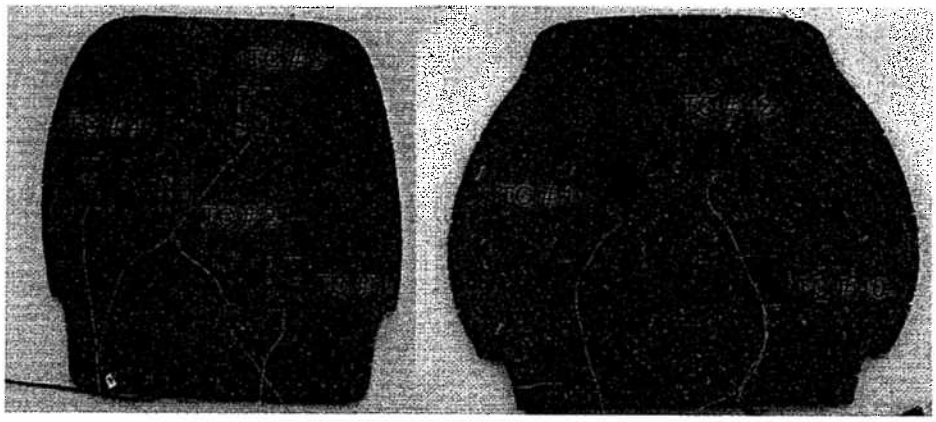
Procedure:

1. Place 3 thermocouples on each heater element.
2. Place heaters between two foams
3. Energize sample with 3.9Vdc for 100 minutes, 7.8Vdc for 15 minutes and 13.0Vdc for 5 minutes.
4. Record current draw and thermocouple temperatures throughout the test.

Pass/Fail Criteria:

Samples must not exceed 70°C.

Image 1 and 2



Images 1 and 2: Shows thermocouple placement on the samples.

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8
Phone (519) 735-1818
Fax (519) 735-5224
Image 3

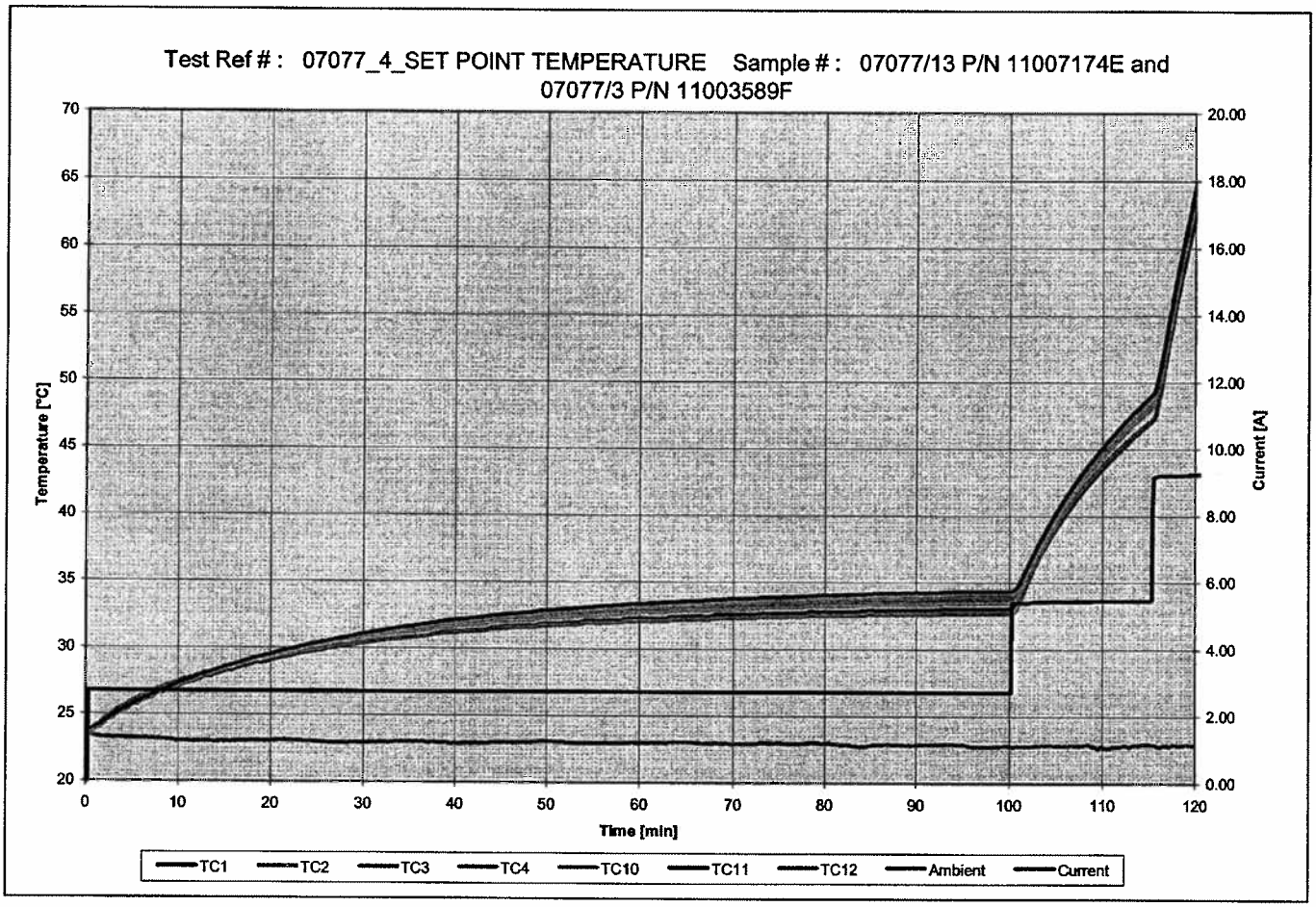


Image 3: Shows individual thermocouple temperatures and current draw for samples 07077/13 P/N 11007174E and 07077/3 P/N 11003589F.

Table 1

MAXIMUM THERMOCOUPLE TEMPERATURES			
LOCATION	TC #	MAXIMUM TEMPERATURE	PASS/FAIL CRITERIA <70°C
CUSHION	1	62.47	PASS
CUSHION	2	64.05	PASS
CUSHION	3	63.93	PASS
BOLSTER	4	63.25	PASS
BACK	10	63.92	PASS
BACK	11	64.43	PASS
BACK	12	64.43	PASS

Table 1: Shows maximum thermocouple temperature for samples 07077/13 P/N 11007174E and 07077/3 P/N 11003589F.

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8
Phone (519) 735-1818
Fax (519) 735-5224

Image 4

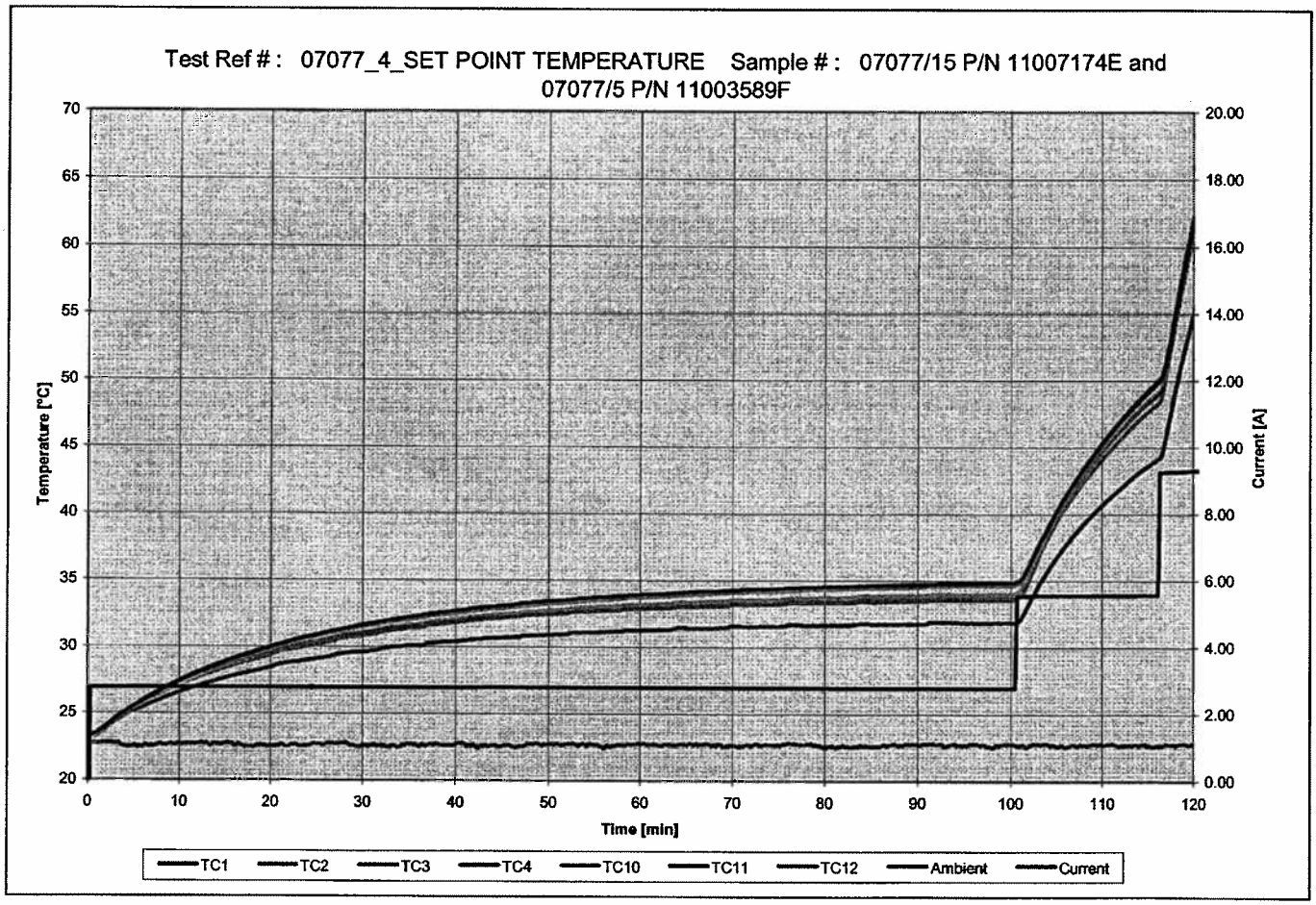


Image 4: Shows individual thermocouple temperatures and current draw for samples 07077/15 P/N 11007174E and 07077/5 P/N 11002589F.

Table 2

MAXIMUM THERMOCOUPLE TEMPERATURES			
LOCATION	TC #	MAXIMUM TEMPERATURE	PASS/FAIL CRITERIA <70°C
CUSHION	1	54.98	PASS
CUSHION	2	60.89	PASS
CUSHION	3	62.24	PASS
BOLSTER	4	61.60	PASS
BACK	10	62.03	PASS
BACK	11	61.92	PASS
BACK	12	61.87	PASS

Table 1: Shows maximum thermocouple temperature for samples 07077/15 P/N 11007174E and 07077/5 P/N 11003589F.

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8
Phone (519) 735-1818
Fax (519) 735-5224

Image 5

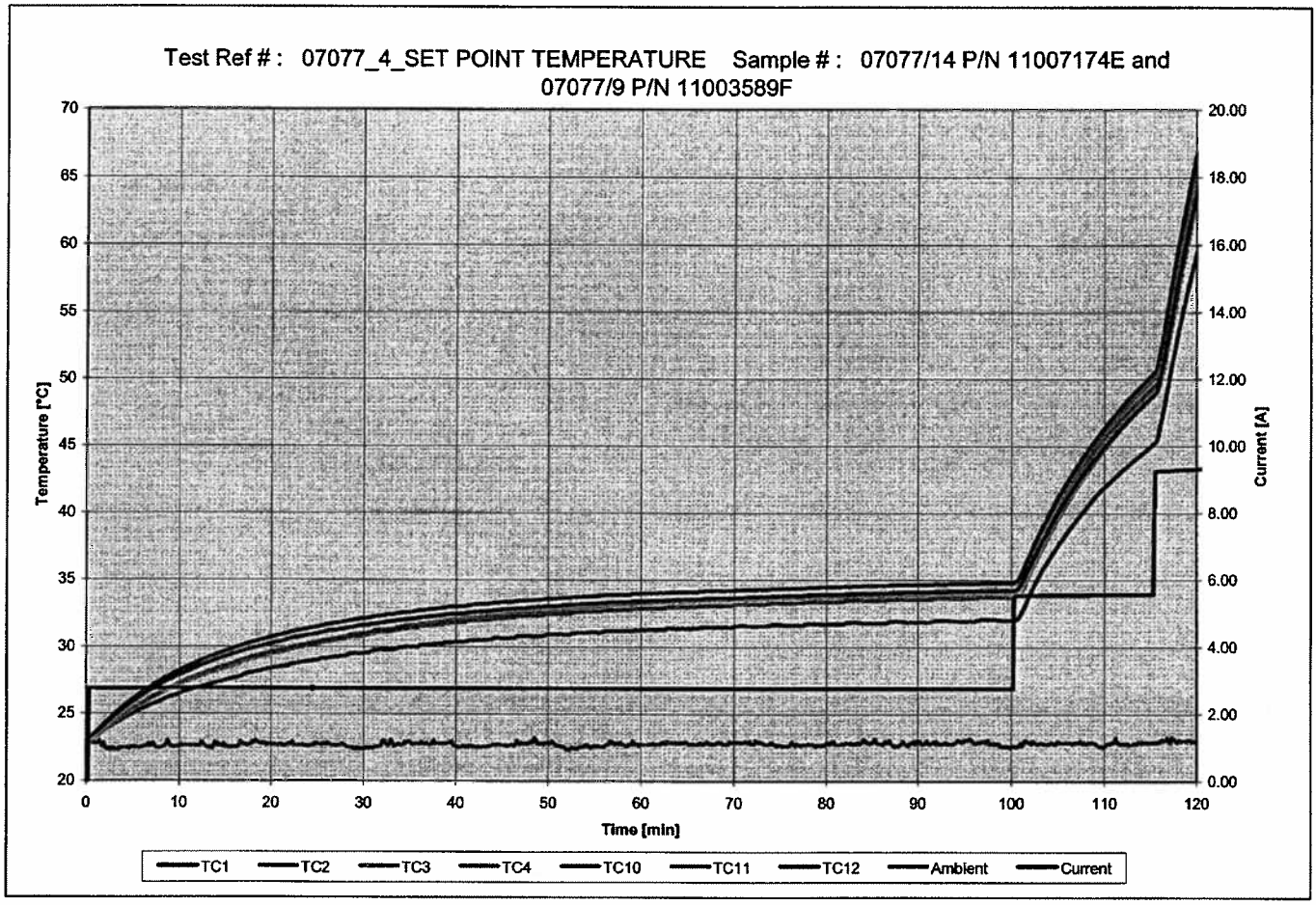


Image 5: Shows individual thermocouple temperatures and current draw for sample 07077/14 P/N 11007174E and 07077/9 P/N 11003589F.

Table 3

MAXIMUM THERMOCOUPLE TEMPERATURES			
LOCATION	TC #	MAXIMUM TEMPERATURE	PASS/FAIL CRITERIA <70°C
CUSHION	1	59.37	PASS
CUSHION	2	66.72	PASS
CUSHION	3	65.79	PASS
BOLSTER	4	65.30	PASS
BACK	10	63.24	PASS
BACK	11	66.62	PASS
BACK	12	63.72	PASS

Table 3: Shows maximum thermocouple temperatures for samples 07077/14 P/N 11007174E and 07077/9 P/N 11003589F.

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8
Phone (519) 735-1818
Fax (519) 735-5224

Image 6

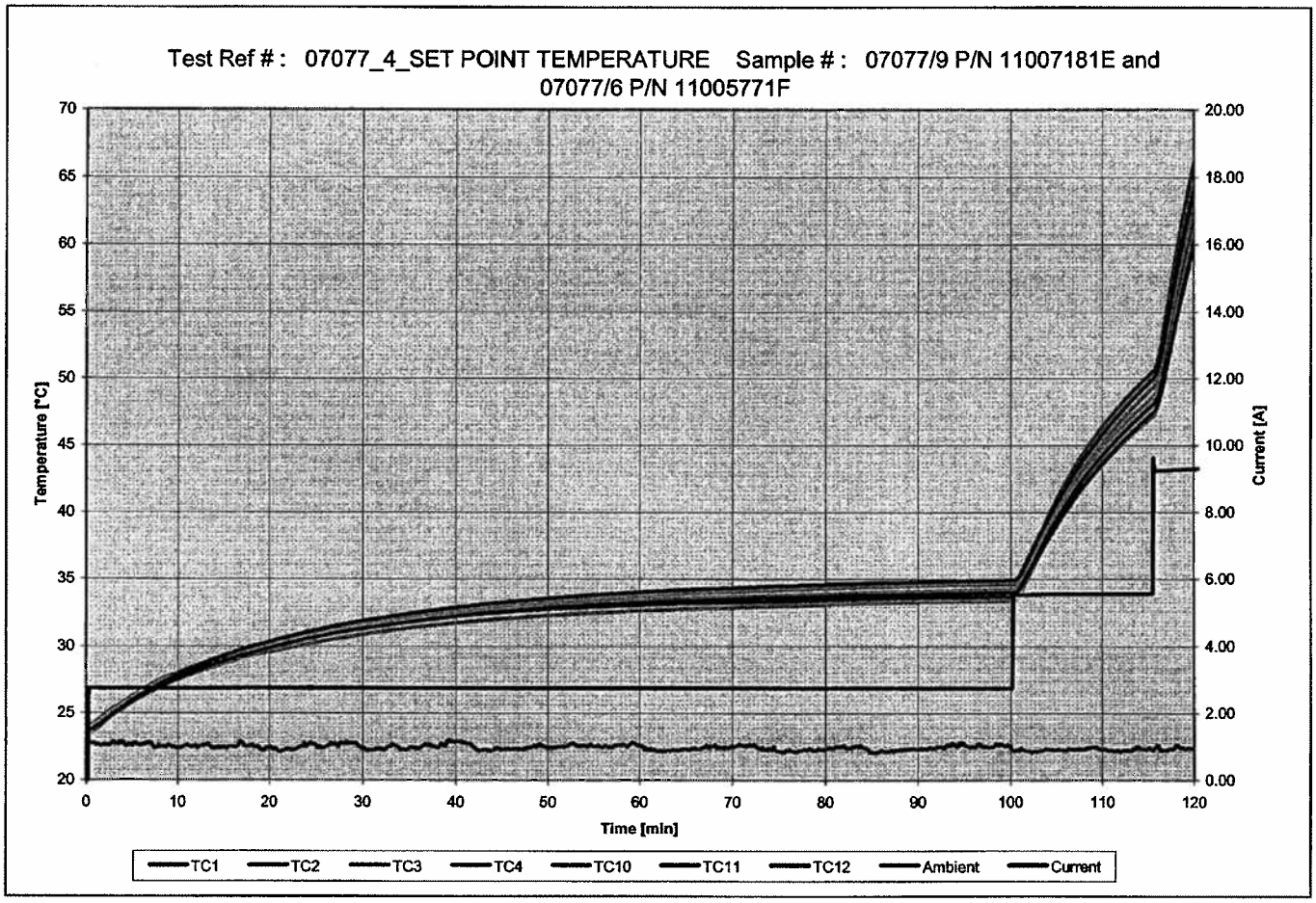


Image 6: Shows individual thermocouple temperatures and current draw for samples 07077/9 P/N 11007181E and 07077/6 P/N 11005771F

Table 4

MAXIMUM THERMOCOUPLE TEMPERATURES			
LOCATION	TC #	MAXIMUM TEMPERATURE	PASS/FAIL CRITERIA <70°C
CUSHION	1	62.33	PASS
CUSHION	2	60.81	PASS
CUSHION	3	63.25	PASS
BOLSTER	4	66.08	PASS
BACK	10	62.91	PASS
BACK	11	64.18	PASS
BACK	12	60.01	PASS

Table 4: Shows maximum thermocouple temperatures for samples 07077/9 P/N 11007181E and 07077/6 P/N 11005771F.

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8
Phone (519) 735-1818
Fax (519) 735-5224

Image 7

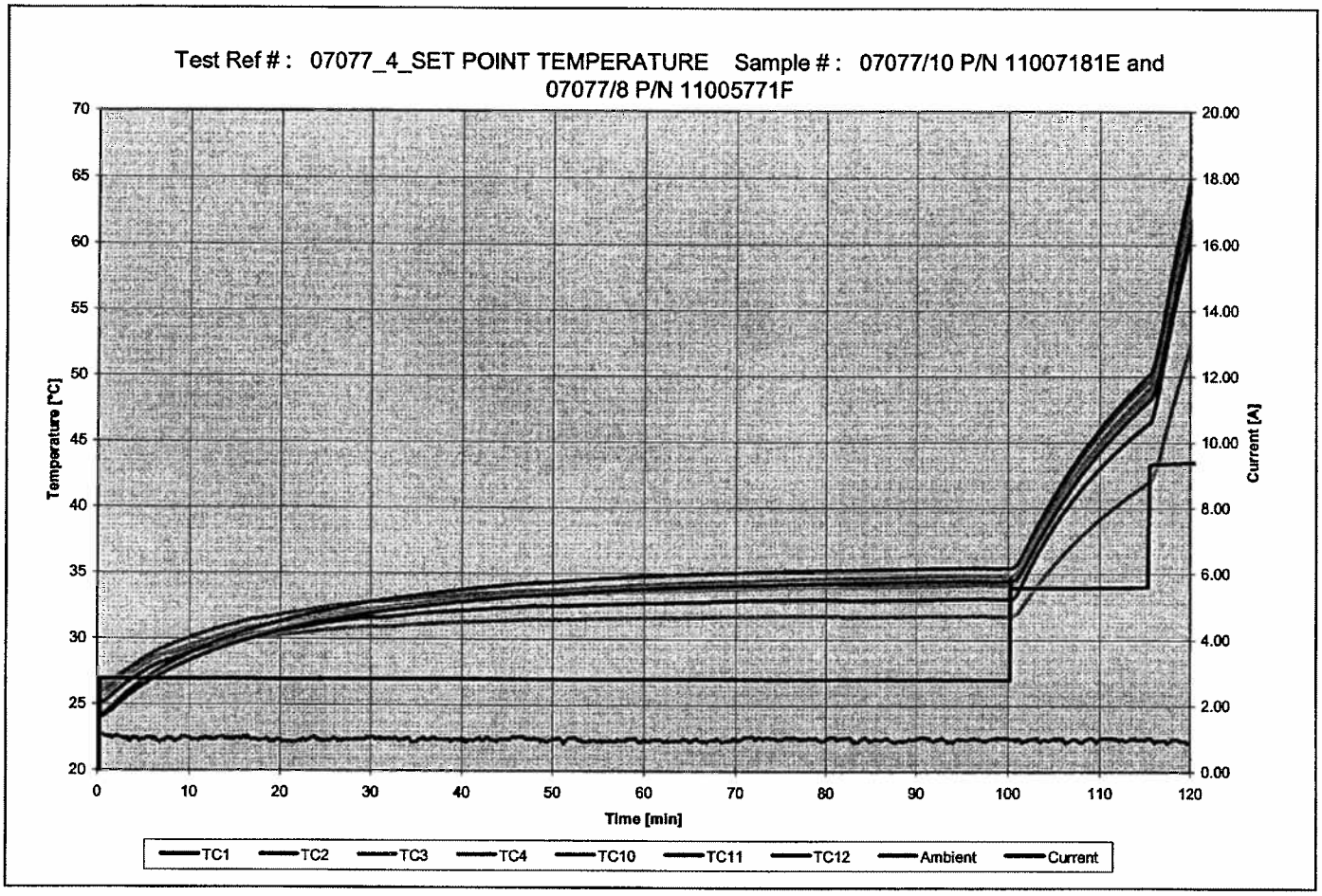


Image 7: Shows individual thermocouple temperatures and current draw for samples 07077/10 P/N 11007181E and 07077/8 P/N 11005771F.

Table 5

MAXIMUM THERMOCOUPLE TEMPERATURES			
LOCATION	TC #	MAXIMUM TEMPERATURE	PASS/FAIL CRITERIA <70°C
CUSHION	1	60.62	PASS
CUSHION	2	52.28	PASS
CUSHION	3	63.68	PASS
BOLSTER	4	64.84	PASS
BACK	10	62.70	PASS
BACK	11	64.28	PASS
BACK	12	61.16	PASS

Table 5: Shows maximum thermocouple temperatures for samples 07077/10 P/N 11007181E and 07077/8 P/N 11005771F.

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8
Phone (519) 735-1818
Fax (519) 735-5224
Image 8

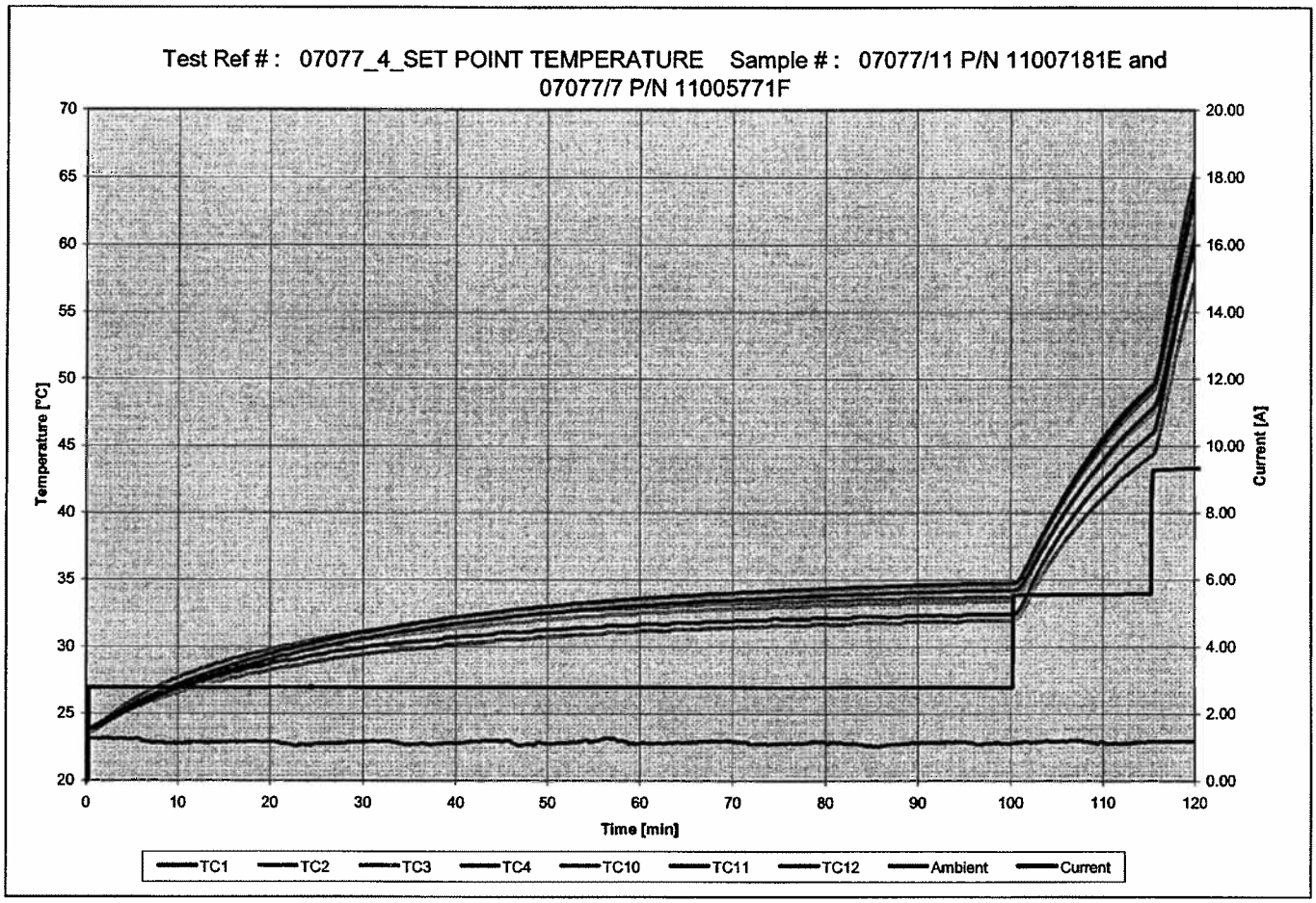


Image 8: Shows individual thermocouple temperatures and current draw for samples 07077/11 P/N 11007181E and 07077/7 P/N 11005771F.

Table 6

MAXIMUM THERMOCOUPLE TEMPERATURES			
LOCATION	TC #	MAXIMUM TEMPERATURE	PASS/FAIL CRITERIA <70°C
CUSHION	10	56.74	PASS
CUSHION	11	57.05	PASS
CUSHION	12	56.2	PASS
BACK	1	61.59	PASS
BACK	2	61.38	PASS
BACK	3	58.6	PASS

Table 6: Shows maximum thermocouple temperatures for samples 07077/11 P/N 11007181E and 07077/7 P/N 11005771F.

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8
Phone (519) 735-1818
Fax (519) 735-5224

Test Report No.: 07077_5 (Homogeneity Verification of Heaters)

Name:	Andrew Dixon	**Requested by:**	Vince Libbrecht
Date of report:	September 05, 2006		

Purpose (incl. remarks & deviations):

Purpose: Design Validation
Samples tested with 13.5Vdc for 2 and 10 minutes

Sample(s) (& sample received date):

- Three **Mercedes W164 / BR251** (Serial Production) FS CH LH Basis Leather heater elements, W.E.T. P/N 11007174E, sample # 07077/8, 11, and 12.
- Three **Mercedes W164 / BR251** (Serial Production) FS BK RH/LH Basis heater elements, W.E.T. P/N 11003589F, sample # 07077/ 1, 2, and 10.
- Three **Mercedes W164 / BR251** (Serial Production) FS CH LH Multikontur heater elements, W.E.T. P/N 11007181E, sample # 07077/12, 13, and 14.
- Three **Mercedes W164 / BR251** (Serial Production) FS BK LH/RH Basis Nappa heater elements, W.E.T. P/N 11005771F, sample # 07077/2, 9, and 10.

Specification (section if applicable / version / release date):

W.E.T 40-0000717Rev002 section 1.5 (Homogeneity Verification Heaters) Release date: December 3, 2003.

Summary - Results:

All samples met the requirements of the specification. Samples were required to have no hot spots and a temperature difference of no greater than 8°C throughout the heated zones.

_____ Steve Braido
Date approved by

The test results apply only to the tested parts.

Equipment used (incl. calibration information):

Stop Watch (#168)	Calibration due date: July 6, 2007
IR Camera "Flir Systems S40" (#98)	Calibration due date: November 8, 2006
DC Power Supply (#172)	Calibration due date: March 21, 2007
W.E.T Data Acquisition Station (#170)	Calibration due date: August 9, 2007

Procedure (Incl. supporting data, graphs, images, pass/fail criteria, date of test)

Procedure:
The IR scanner station was set up.
Heater element was placed on foam (area 0.76 x 1m and height 25 mm) with surface closest to the occupant air space up and was connected to a power supply.
The test began by turning the power supply on.
First image was taken after the sample was energized for two minutes and second image was taken after the sample was energized for ten minutes.
After the test, IR image of the heater element taken after 10 minutes was examined for the temperature difference between heated areas.
Voltage of 13.5 ± 0.1 Vdc was supplied to the heater elements set.
The test was performed at room temperature (22 ± 2°C).

Pass/Fail Criteria:
The sample should not have hot spots. The difference in average temperature per heated zone should not be more than 8°C after 10 minutes. Heated zone is surface inside perimeter line that connects outside peaks of heating wire or carbon fibers.

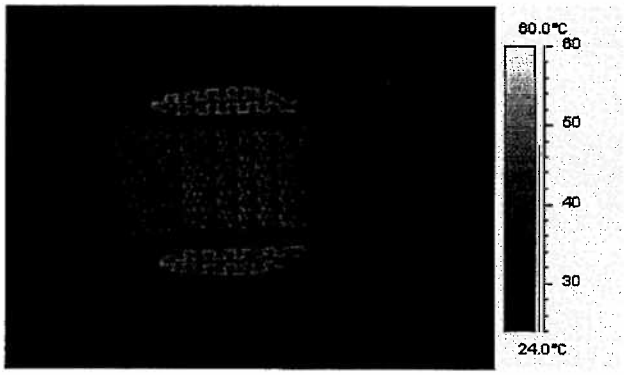


Image 1: 07077/8 (11007174E) 2min

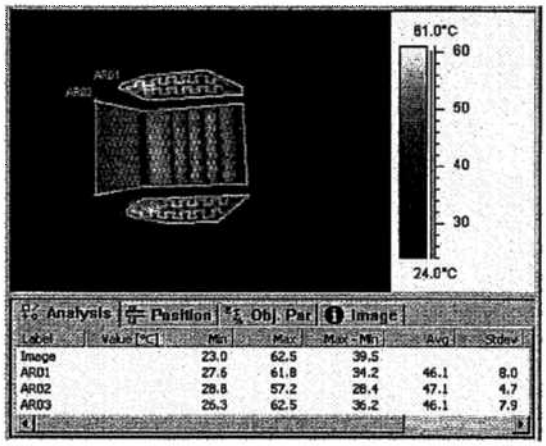


Image 2: 07077/8 (11007174E) 10min

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8
Phone (519) 735-1818
Fax (519) 735-5224

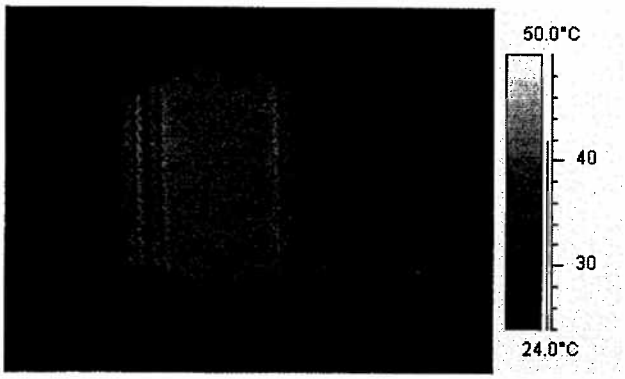


Image 3: 07077/1 (11003589F) 2min

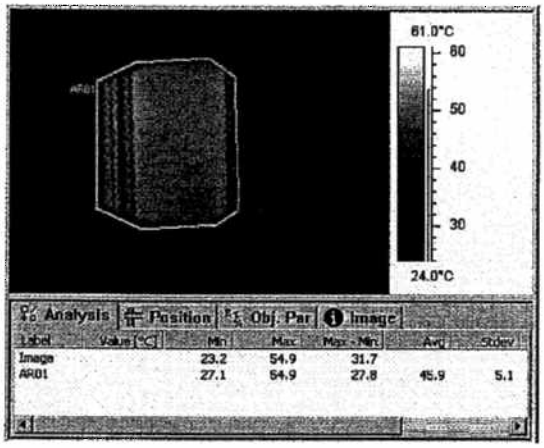


Image 4: 07077/1 (11003589F) 10min

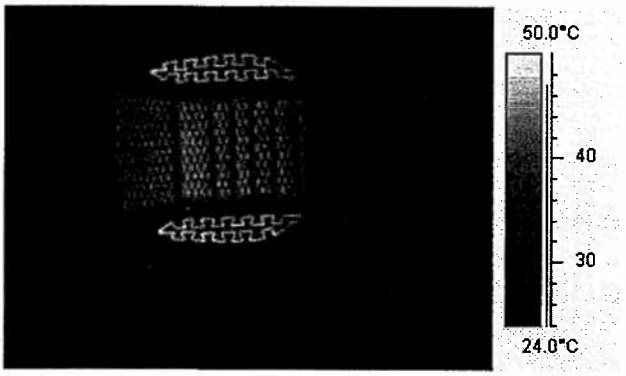


Image 5: 07077/11 (11007174E) 2min

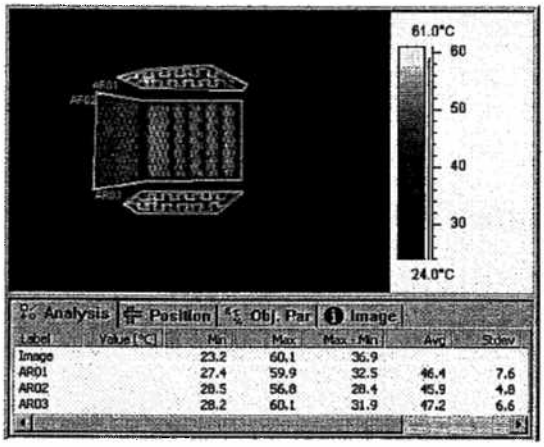


Image 6: 07077/11 (11007174E) 10min

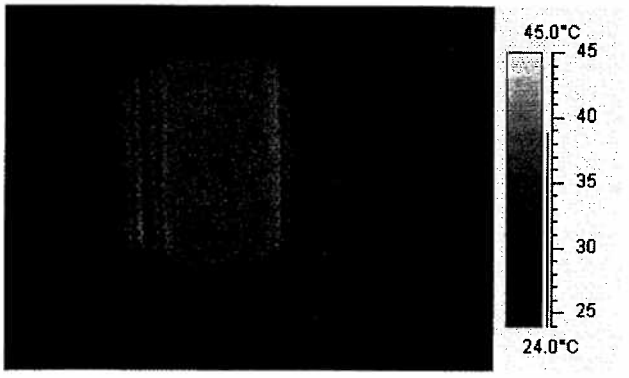


Image 7: 07077/2 (11003589F) 2min

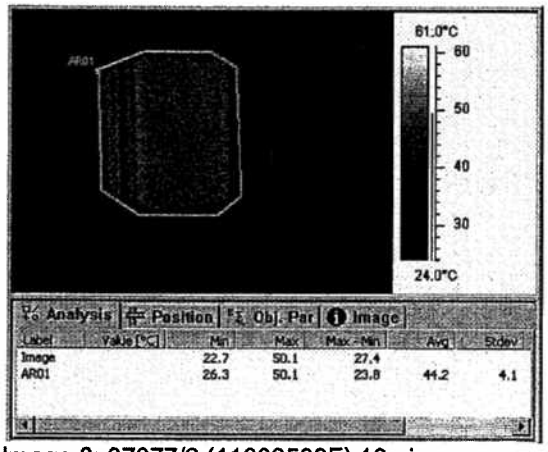


Image 8: 07077/2 (11003589F) 10min

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8
Phone (519) 735-1818
Fax (519) 735-5224

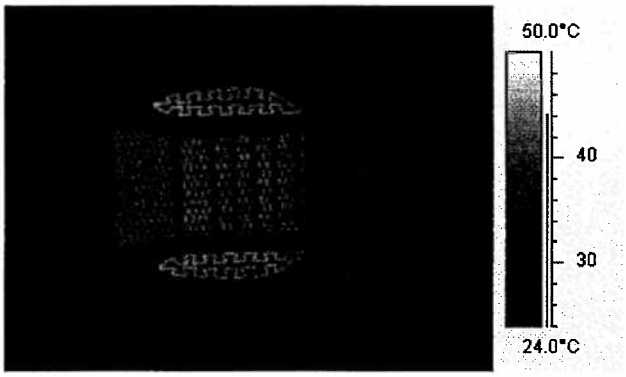


Image 9: 07077/12 (11007174E) 2min

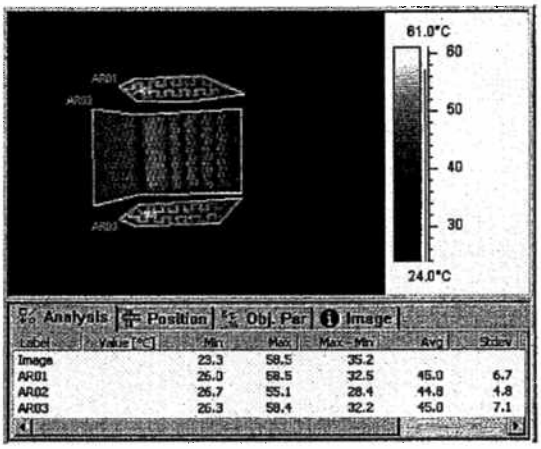


Image 10: 07077/12 (11007174E) 10min

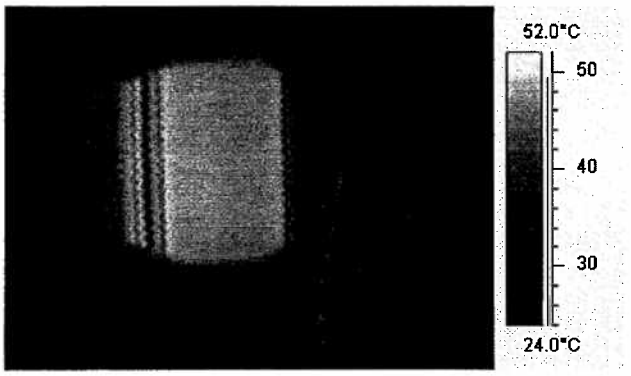


Image 11: 07077/10 (11003589F) 2min

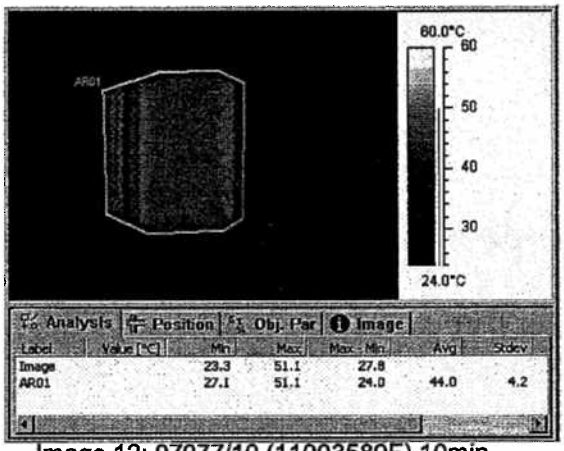


Image 12: 07077/10 (11003589F) 10min

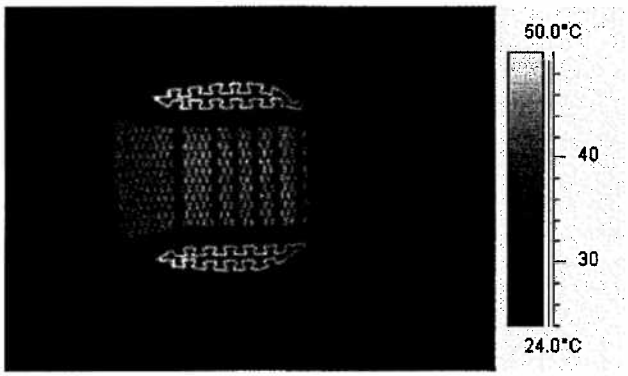


Image 13: 07077/12 (11007181E) 2min

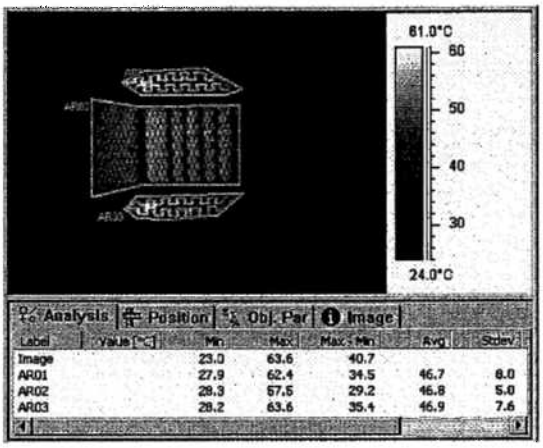


Image 14: 07077/12 (11007181E) 10min

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8
Phone (519) 735-1818
Fax (519) 735-5224

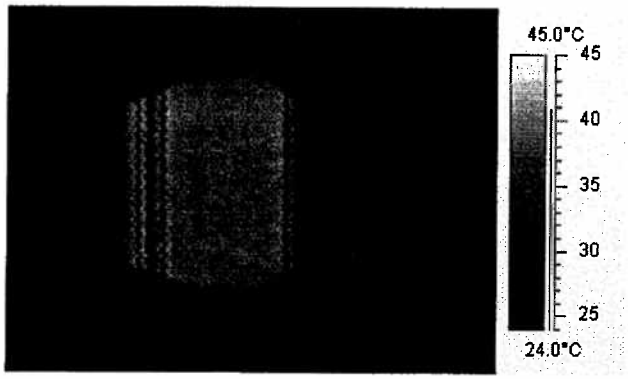


Image 15: 07077/2 (11005771F) 2min

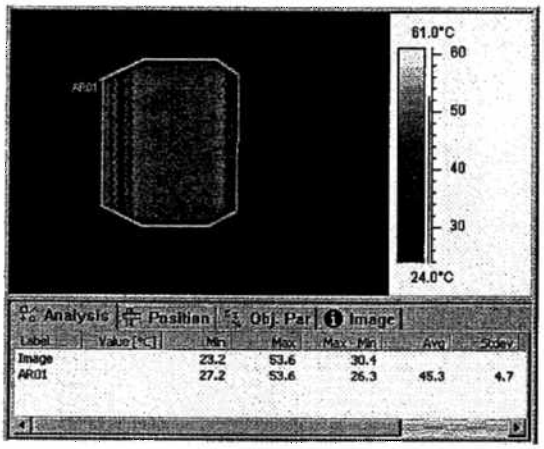


Image 16: 07077/2 (11005771F) 10min

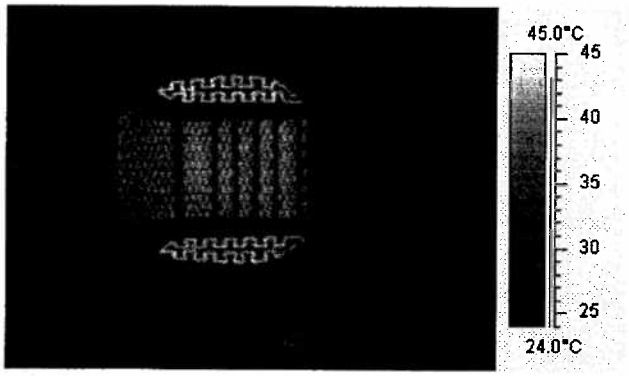


Image 17: 07077/13 (11007181E) 2 min

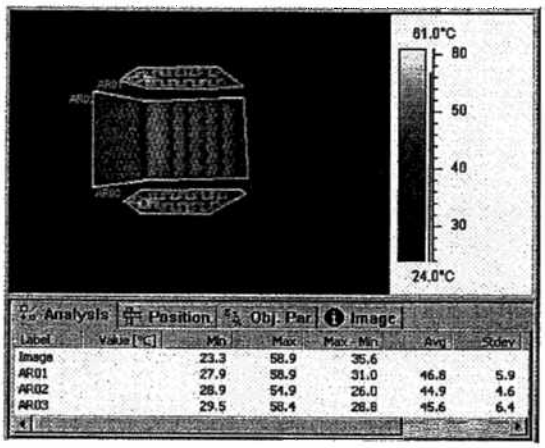


Image 18: 07077/13 (11007181E) 2min

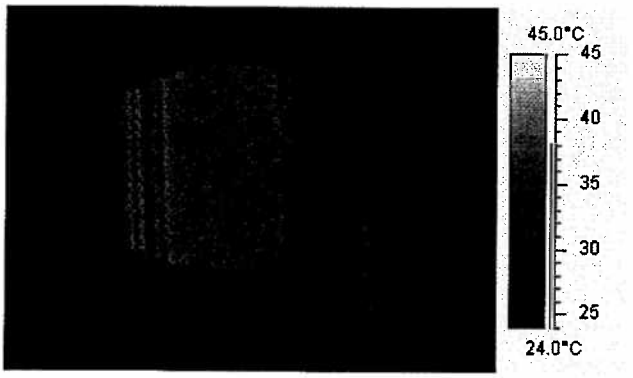


Image 19: 07077/1 (11003589F) 10min

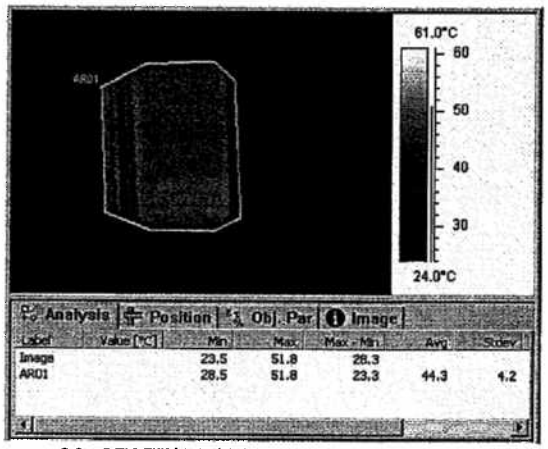


Image 20: 07077/11 (11007174E) 10min

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8
Phone (519) 735-1818
Fax (519) 735-5224

Test Report No.: 07077_6 (Maximum Wire Temperature)

Name:	Andrew Dixon	**Requested by:**	Vince Libbrecht
Date of report:	September 05, 2006		

Purpose (incl. remarks & deviations):

Purpose:
- To verify that the heating system works as per design.

Remarks:
- Design Validation.
- As per requestor's instructions the test was performed: 5 minutes at 100% power (13V), 15 minutes at 60% power (7.8 V), and 100 minutes at 30% power (3.9 V).
- 1 extra thermocouple was used on the cushion samples over the bolster area.
- The test was performed with cushion and back heater elements set in position as a unit.

Sample(s) (& sample received date):
- Three **Mercedes W164 / BR 251** (Serial Production) FS CH LH Basis Leather heater elements, W.E.T. P/N 11007174E, sample # 07077/13, 14, and 15.
- Three **Mercedes W164 / BR251** (Serial Production) FS BK RH/LH Basis heater elements, W.E.T. P/N 11003589F, sample # 07077/3, 5, and 9.
- Three **Mercedes W164 / BR251** (Serial Production) FS CH LH Multikontur heater elements, W.E.T. P/N 11007181E, sample # 07077/9, 10, and 11.
- Three **Mercedes W164 / BR251** (Serial Production) FS BK LH/RH Basis Nappa heater elements, W.E.T. P/N 11005771F, sample # 07077/6, 7, and 8.

Specification (section if applicable / version / release date):

W.E.T 40-0000717Rev002 Release date: December 3, 2003.
Section 1.7 Maximum Wire Temperature

Summary - Results:

The heater element sets **met** the requirements of the specification.
No temperature exceeded 90°C.

Please refer to attached tables and images for more details.

Steve Braido
Date approved by

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8
Phone (519) 735-1818
Fax (519) 735-5224

The test results apply only to the tested parts.

Equipment used (incl. calibration information):

Stop Watch (#168)	Calibration due date: July 6, 2007
W.E.T. Data Acquisition Station (#44)	Calibration due date: November 7, 2006
DC Power Supply (#106)	Calibration due date: October 13, 2006

Procedure (incl. supporting data, graphs, images, pass/fail criteria, date of test)

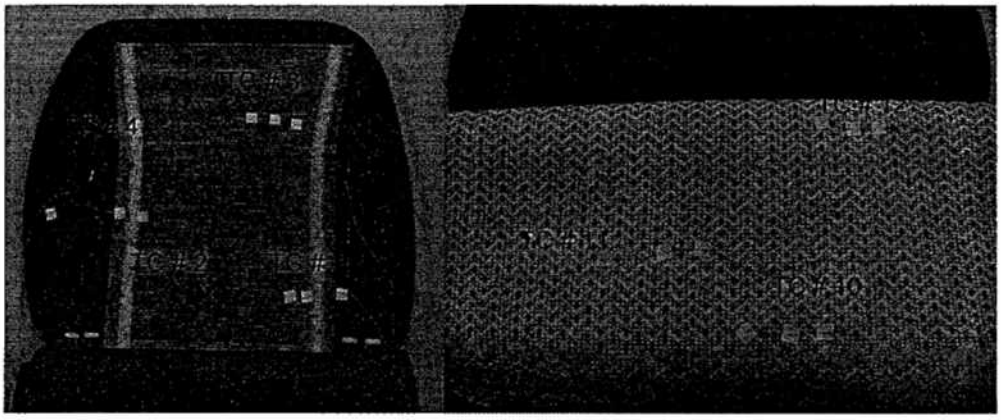
Procedure:

1. Place 3 thermocouples on each heater element.
2. Place heaters between two foams
3. Energize sample with 13.0Vdc for 5 minutes, 7.8Vdc for 15 minutes and 3.9Vdc for 100 minutes.
4. Record current draw and thermocouple temperatures throughout the test.

Pass/Fail Criteria:

Samples must not exceed 90°C.

Image 1 and 2



Images 1 and 2: Shows thermocouple placement on the samples.

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8
Phone (519) 735-1818
Fax (519) 735-5224

Image 3

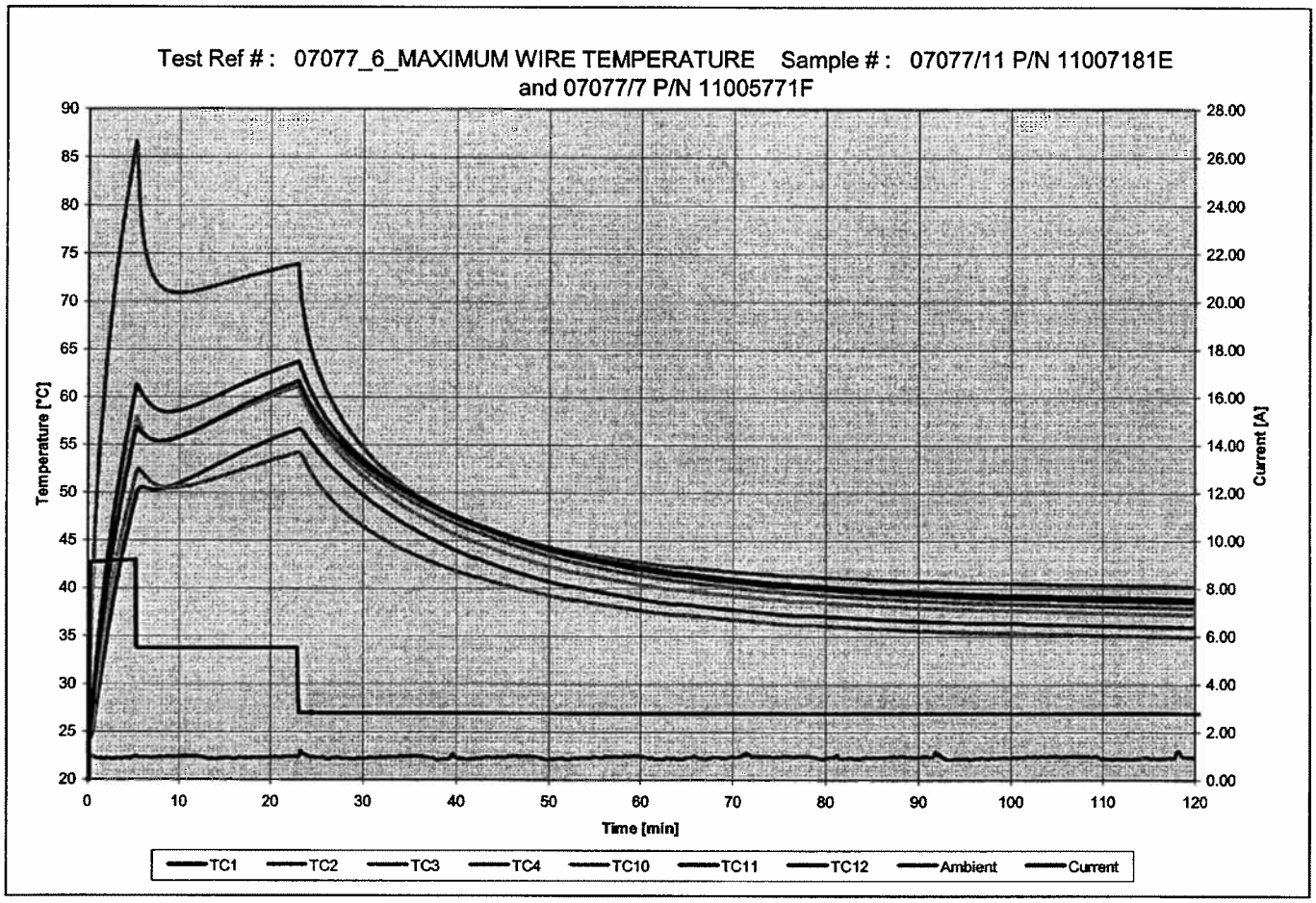


Image 3: Shows individual thermocouple temperatures and current draw for samples 07077/7 P/N 11005771F and 07077/11 P/N 11007181E.

Table 2

MAXIMUM THERMOCOUPLE TEMPERATURES			
LOCATION	TC #	MAXIMUM TEMPERATURE	PASS/FAIL CRITERIA <90°C
CUSHION	1	56.65	PASS
CUSHION	2	54.22	PASS
CUSHION	3	61.14	PASS
BOLSTER	4	86.59	PASS
BACK	10	61.31	PASS
BACK	11	61.66	PASS
BACK	12	63.73	PASS

Table 2: Shows maximum thermocouple temperature for samples 07077/7 P/N 11005771F and 07077/11 P/N 11007181E.

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8
Phone (519) 735-1818
Fax (519) 735-5224

Image 4

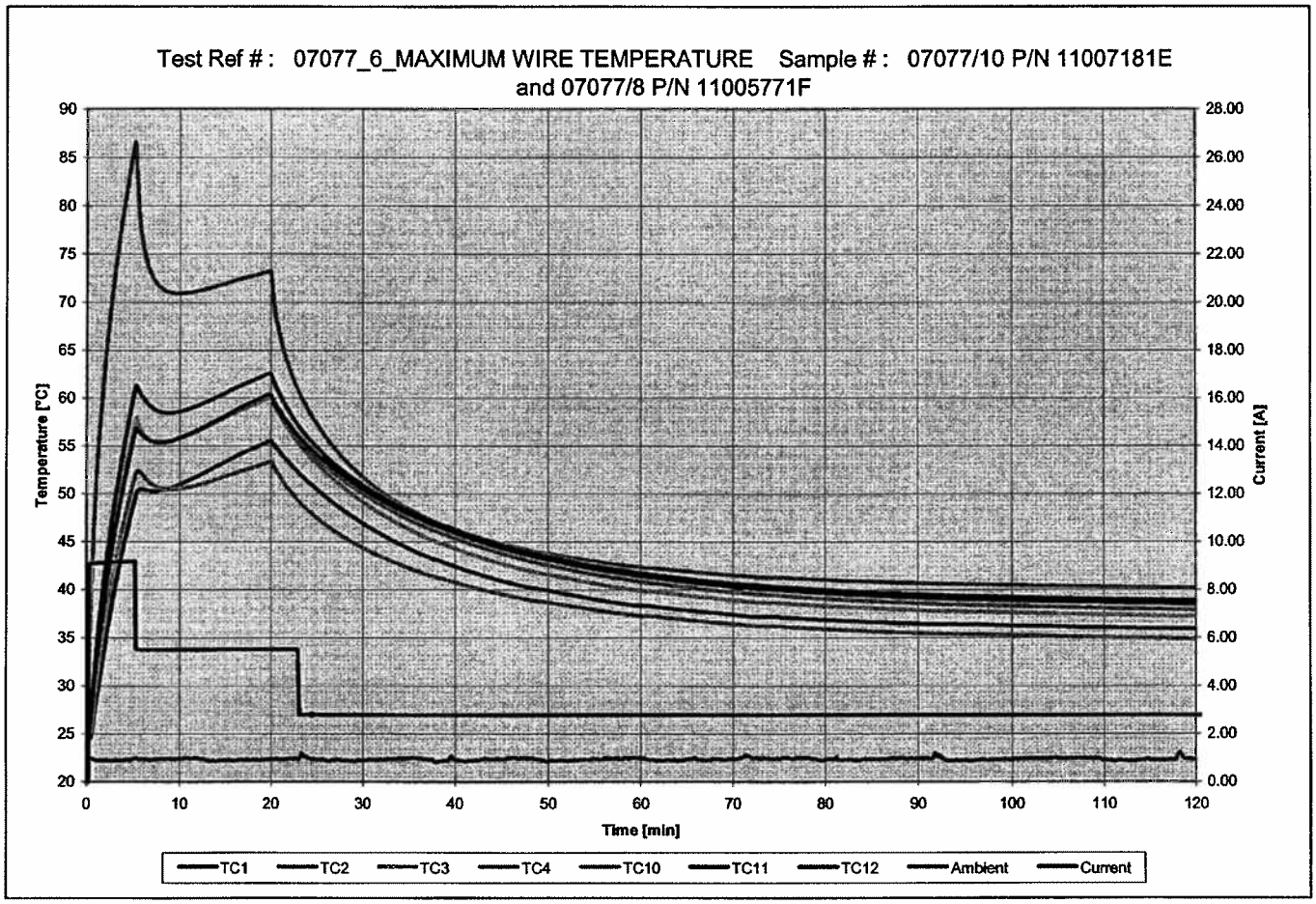


Image 4: Shows individual thermocouple temperatures and current draw for samples 07077/8 P/N 11005771F and 07077/10 P/N 11007181E.

Table 2

MAXIMUM THERMOCOUPLE TEMPERATURES			
LOCATION	TC #	MAXIMUM TEMPERATURE	PASS/FAIL CRITERIA <90°C
CUSHION	1	55.51	PASS
CUSHION	2	53.35	PASS
CUSHION	3	60.08	PASS
BOLSTER	4	86.59	PASS
BACK	10	60.13	PASS
BACK	11	60.42	PASS
BACK	12	62.58	PASS

Table 2: Shows maximum thermocouple temperature for samples 07077/8 P/N 11005771F and 07077/10 P/N 11007181E.

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8
Phone (519) 735-1818
Fax (519) 735-5224

Image 5

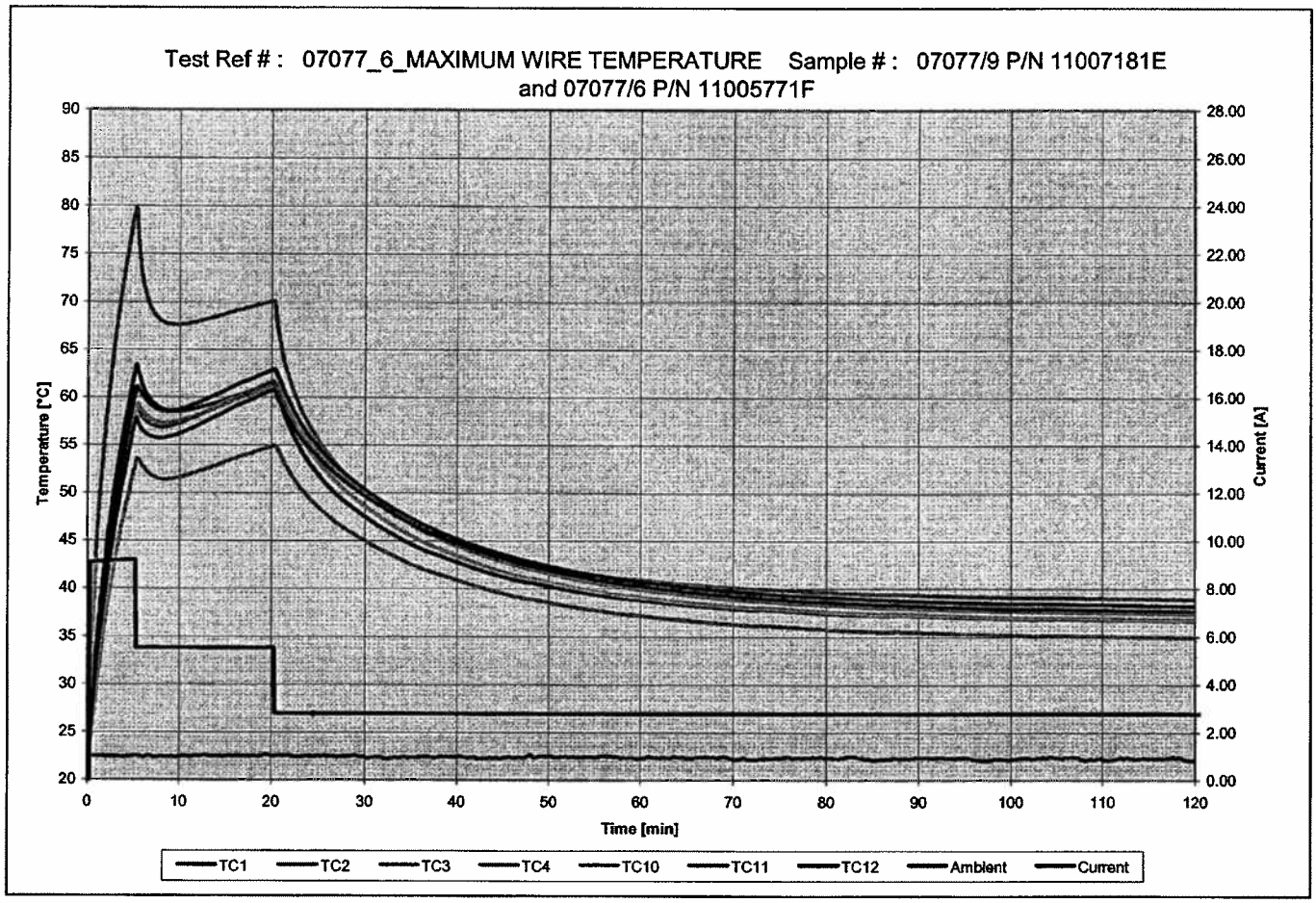


Image 5: Shows individual thermocouple temperatures and current draw for samples 07077/9 P/N 11007181E and 07077/6 P/N 11005771F

Table 3

MAXIMUM THERMOCOUPLE TEMPERATURES			
LOCATION	TC #	MAXIMUM TEMPERATURE	PASS/FAIL CRITERIA <90°C
CUSHION	1	63.43	PASS
CUSHION	2	54.94	PASS
CUSHION	3	61.22	PASS
BOLSTER	4	79.84	PASS
BACK	10	61.66	PASS
BACK	11	60.81	PASS
BACK	12	62.92	PASS

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8
Phone (519) 735-1818
Fax (519) 735-5224

Table 4: Shows maximum thermocouple temperatures for samples 07077/9 P/N 11007181E and 07077/6 P/N 11005771F.

Image 6

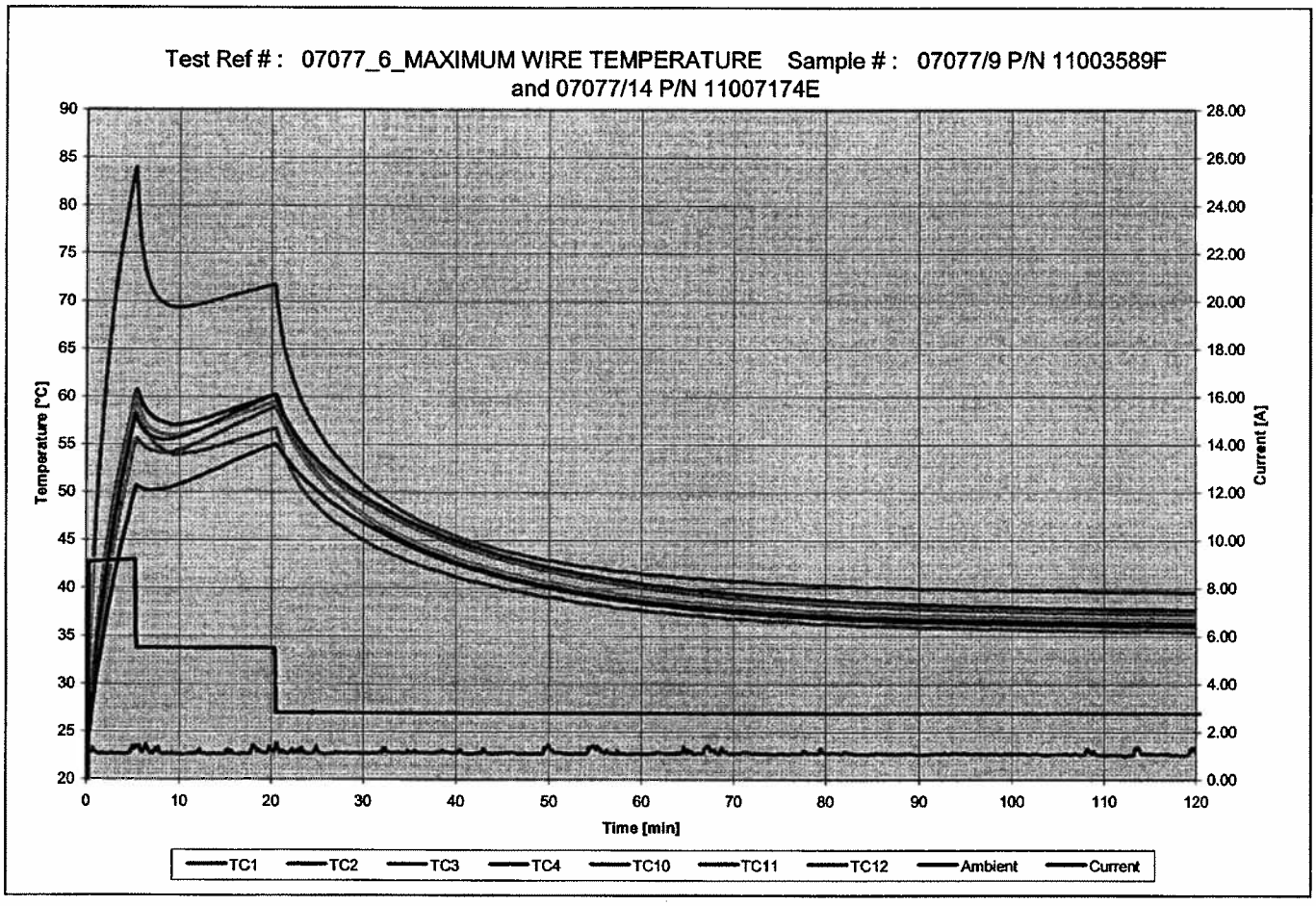


Image 6: Shows individual thermocouple temperatures and current draw for sample 07077/14 P/N 11007174E and 07077/9 P/N 11003589F.

Table 3

MAXIMUM THERMOCOUPLE TEMPERATURES			
LOCATION	TC #	MAXIMUM TEMPERATURE	PASS/FAIL CRITERIA <90°C
CUSHION	1	60.73	PASS
CUSHION	2	60.25	PASS
CUSHION	3	59.53	PASS
BOLSTER	4	83.97	PASS
BACK	10	58.93	PASS
BACK	11	60.19	PASS

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8
Phone (519) 735-1818
Fax (519) 735-5224

BACK	11	60.90	PASS
BACK	12	63.16	PASS

Table 5: Shows maximum thermocouple temperatures for samples 07077/5 P/N 11003589F and 07077/15 P/N 11007174E.

mage 8

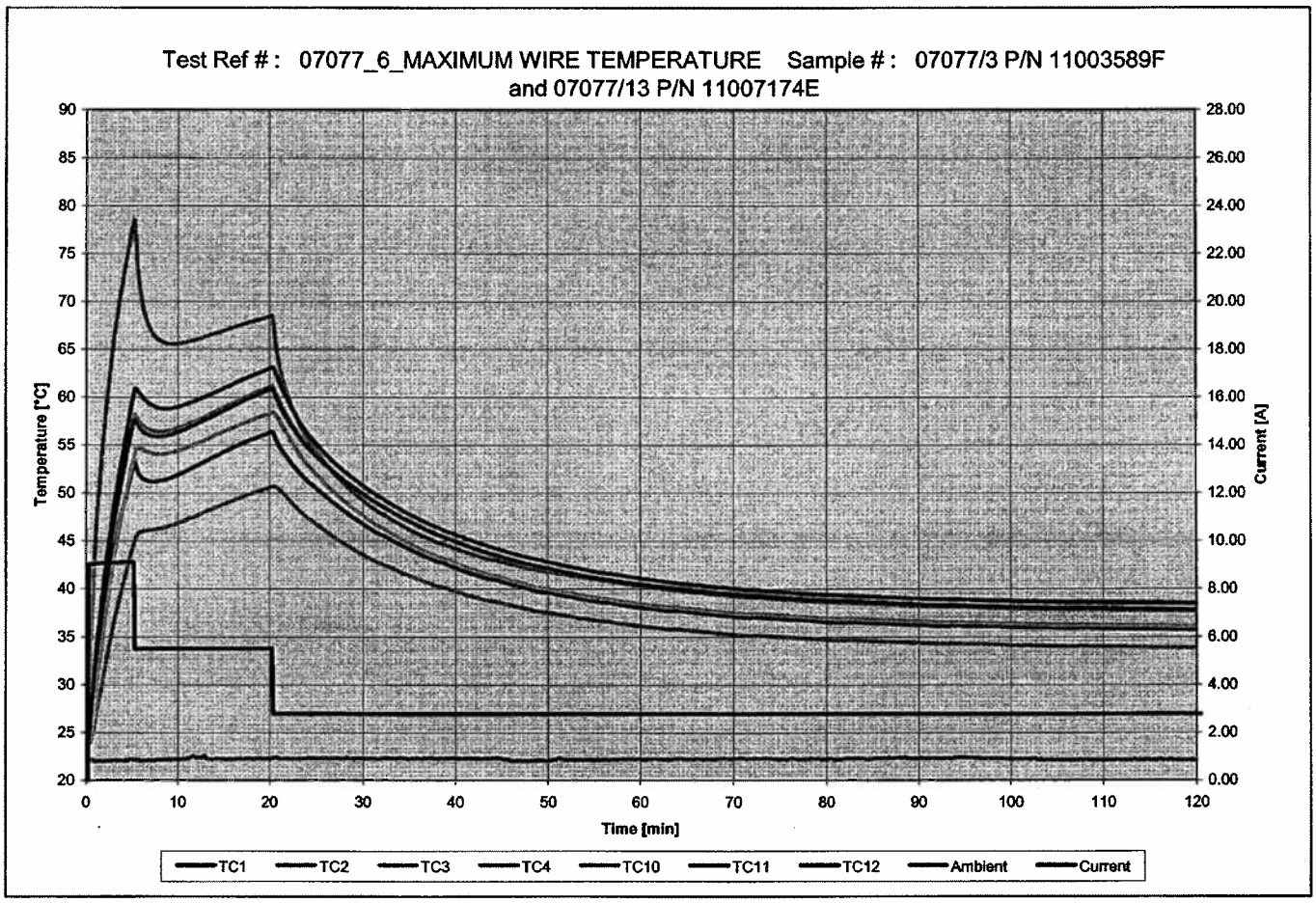


Image 8: Shows individual thermocouple temperatures and current draw for samples 07077/3 P/N 11003589F and 07077/13 P/N 11007174E.

Table 6

MAXIMUM THERMOCOUPLE TEMPERATURES			
LOCATION	TC #	MAXIMUM TEMPERATURE	PASS/FAIL CRITERIA <90°C
CUSHION	1	56.40	PASS
CUSHION	2	50.72	PASS
CUSHION	3	58.44	PASS
BOLSTER	4	78.52	PASS

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8
Phone (519) 735-1818
Fax (519) 735-5224

BACK	10	61.19	PASS
BACK	11	60.91	PASS
BACK	12	63.12	PASS

Table 6: Shows maximum thermocouple temperatures for samples 07077/3 P/N 11003589F and 07077/13 P/N 110174E.

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8
Phone (519) 735-1818
Fax (519) 735-5224

Test Report No.: 07077_7_Connection_Integrity_Test

Name:	Bozena Kasprowicz	**Requested by:**	Monica Mihalceanu
Date of report:	November 01, 2006	**Customer Program Name:**	Mercedes W164 / BR251

Purpose (incl. remarks & deviations):

Purpose:

- To verify that heater elements meet the requirements of the specification.

Remarks:

- All tested samples undergo minimum of 10,000 cycles.
- Samples identified in this Test Report as sample # 07077/1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12 and 13 were tested at two location: at the jumper / bus bar connection and at the jumper / bolster connection.

Sample(s) (& sample received date):

- Six **Mercedes W164 / BR 251** (Serial Production) FS CH LH Basis Leather heater elements, W.E.T. P/N 11007174E, sample # 07077/8, 9, 10, 11, 12, and 13.
- Six **Mercedes W164 / BR251** (Serial Production) FS BK RH/LH Basis heater elements, W.E.T. P/N 11003589F, sample # 07077/1, 3, 5, 9, and 11.
- Six **Mercedes W164 / BR251** (Serial Production) FS CH LH Multikontur heater elements, W.E.T. P/N 11007181E, sample # 07077/1, 2, 3, 5, 6, and 7.
- Six **Mercedes W164 / BR251** (Serial Production) FS BK LH/RH Basis Nappa heater elements, W.E.T. P/N 11005771F, sample # 07077/1, 2, 8, 9, 10, and 11.

Specification (section if applicable / version / release date):
W.E.T. Heated Seat Test Specification 40-0000717 / 002 / December 03, 2003
Section 1.8 Connection Integrity Test

Summary - Results:

Samples **met** the requirements of the specification.
All samples had continuity and functioned as intended after completion of required number of cycles.

Please refer to attached tables for further details.

Date

Steve Braido
Approved by (Test Lab Manager)

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8
Phone (519) 735-1818
Fax (519) 735-5224

	Test Report Form Sheet	Doc.-No./ Version: 80-0000158/ 002 Date: 26-Nov-04 Scope: North America

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8

PHONE: (519) 735-1818
FAX: (519) 735-5224

Harness Retention Force

Test Reference # 06159_7

Requested by:	Monica Mihalceanu	**Address:**	9475 Twin Oaks Dr. Windsor, Ontario N8N 5B8
Sample(s) In Lab:	March 3, 2006		
Date of Test:	April 6, 2006	**Key Words:**	Mercedes W164 AMG 2007, harness retention, DVP
Date of Report:	April 6, 2006		

Specification:	**Section:**	**Date:**
40-0000717	**1.9**	**Dec 03, 2003**

Remarks/Deviation(s)	None.
Purpose:	To verify that the harness connection area meet the specifications.
Pass/Fail Criteria:	The peak force needed to separate the harness from the harness connection area must be greater than 60 N for pull test and 40N for the peel test.
Samples:	3 Mercedes AMG 07 FS RH CH P/N #11009013C, samples #06159/17, 18, 20, 3 Mercedes AMG 07 FS LH CH P/N #11009014C, samples #06159/57, 58, 60, 6 Mercedes AMG 07 FS BK P/N #1009015B, samples #06159/64, 65, 66, 67, 68, 69.
Procedure:	**Pull Test:** The samples were placed into the stationary clamp on the base of the motorized test stand one at a time. Samples were fixed on side opposite to the harness direction. The harness wires were then placed into a vice grip connected to the digital force gauge. The harnesses were pulled apart from the heater element at a speed of 315.0 ± 2mm/min. The peak values were measured and recorded. **Peel Test:** The samples were placed into the stationary clamp on the base of the motorized test stand one at a time. Samples were fixed on the same side as the harness direction. The harness wires were then placed into a vice grip connected to the digital force gauge. The harnesses were peeled apart from the heater element at a speed of 315.0 ± 2mm/min. The peak values were measured and recorded. The test was done at room temperature of 22 ± 2°C.
Equipment:	Digital Force Gauge (#71) Calibration due date: November 15, 2006 Force Testing Stand (#30) Calibration due date: April 26, 2006
Results:	Please refer to tables for details. All samples **met** the requirements of the specification

Name & Title	Stephen Seguin (Test Lab Technician)	Steve Braido (Test Lab Manager)

Signed and Controlled Document is Electronic Version Only!

Table #1: Peak Force Values for Cushion and Back Pull Test.

Pull Test			
Sample #	Force [N]	Min Required [N]	Met Spec
06159/17	150.9	60	Yes
06159/18	143.9	60	Yes
06159/20	16138	60	Yes
06159/64	150.6	60	Yes
06159/65	146.9	60	Yes
06159/66	165.4	60	Yes

Table #2: Peak Force Values for Cushion and Back Peel Test.

Peel Test			
Sample #	Force [N]	Min Required [N]	Met Spec
06159/57	164.2	40	Yes
06159/58	175.4	40	Yes
06159/60	154.3	40	Yes
06159/67	117.7	40	Yes
06159/68	178.1	40	Yes
06159/69	154.3	40	Yes

Test Report
Form Sheet

Doc.-No./ Version:	80-0000158/ 002
Date:	26-Nov-04
Scope:	North America

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8

PHONE: (519) 735-1818
FAX: (519) 735-5224

Terminal Retention Force Test

Test Reference # 06159_8

Requested by:	Monica Mihalceanu	**Address:**	9475 Twin Oaks Dr. Windsor, Ontario N8N 5B8
Sample(s) in Lab:	March 3, 2006		
Date of Test:	April 6, 2006	**Key Words:**	Mercedes W164 AMG 2007, terminal retention, DVP
Date of Report:	April 6, 2006		

Specification:	**Section:**	**Date:**
40-0000717	**1.10**	**Dec 03, 2003**

Remarks/Deviation(s)	None.
Purpose:	To verify that the heater element connectors meet the specification.
Pass/Fail Criteria:	The peak force needed to separate terminal from connector or break the wire must be more than 53N.
Samples:	3 Mercedes AMG 07 FS RH CH P/N #11009013C, samples #06159/17, 18, 20, 3 Mercedes AMG 07 FS BK P/N #1009015B, samples #06159/64, 65, 66.
Procedure:	The connector body was placed into the stationary clamp on the base of the motorized test stand. Harness wire was placed into a vice grip connected to the digital force gauge. Each wire was pulled at a speed of 315 mm/min until terminal separated from connector or wire broke. The peak values were measured and recorded. Test was done at room temperature (22±2°C).
Equipment:	Digital Force Gauge (#71) — Calibration due date: November 15, 2006 Force Testing Stand (#30) — Calibration due date: April 26, 2006
Results:	All samples **met** the requirement of the specification. Please refer to tables for more details.

Name & Title	Stephen Seguin (Test Lab Technician)	Steve Braido (Test Lab Manager)

Signed and Controlled Document Is Electronic Version Only!

Table # 1: Force values for 2 – wire terminals.

Sample #	Wire #	Force [N]	Min Required [N]	Met Spec
06159/17	1	203.4	100	Yes
	2	181.7	100	Yes
06159/18	1	189.7	100	Yes
	2	179.3	100	Yes
06159/20	1	190.3	100	Yes
	2	182.4	100	Yes
06159/64	1	180.5	100	Yes
	2	180.3	100	Yes
06159/65	1	182.8	100	Yes
	2	169.9	100	Yes
06159/66	1	160.8	100	Yes
	2	175.6	100	Yes

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8
Phone (519) 735-1818
Fax (519) 735-5224

Test Report No.: 07077_10_Lamination_Bond

Name:	Bozena Kasprowicz	**Requested by:**	Monica Mihalceanu
Date of report:	November 01, 2006	**Customer Program Name:**	Mercedes W164 / BR251

Purpose (incl. remarks & deviations):

Purpose:

- To verify that heater elements meet the requirements of the specification.

Remarks:

- Design Validation.

Sample(s) (& sample received date):

- Three **Mercedes W164 / BR251** (Serial Production) FS CH LH Basis Leather heater elements, W.E.T. P/N 11007174E, sample # 07077/1, 4, and 11.
- Three **Mercedes W164 / BR251** (Serial Production) FS BK RH/LH Basis heater elements, W.E.T. P/N 11003589F, sample # 07077/ 3, 5, and 9.
- Three **Mercedes W164 / BR251** (Serial Production) FS CH LH Multikontur heater elements, W.E.T. P/N 11007181E, sample # 07077/1, 2, and 3.
- Three **Mercedes W164 / BR251** (Serial Production) FS BK LH/RH Basis Nappa heater elements, W.E.T. P/N 11005771F, sample # 07077/1, 2, and 8.

Specification (section if applicable / version / release date):

W.E.T. Heated Seat Test Specification 40-0000717 / 002 / December 03, 2003

Summary - Results:

Samples **met** the requirements of the specification.
In each case the peak force to separate laminated material was greater than 5 N.

Please refer to attached tables for further details.

Date

Steve Braido
Approved by (Test Lab Manager)

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8
Phone (519) 735-1818
Fax (519) 735-5224

Equipment used (incl. calibration information):

DC Power Supply (#85)	Calibration due date: October 25, 2006
Modified Kneeload Tester (#14)	Calibration due date: August 10, 2006
Digital Thermo-Hygrometer (#125)	Calibration due date: July 22, 2006

Procedure (incl. supporting data, graphs, Images, pass/fail criteria, date of test)

Pass / Fail Criteria:

Peak force must be greater than 5 N to separate the laminated materials.

Procedure:

1. The test is performed by obtaining a 50 x 150 mm specimen of the laminated element.
2. The sample must be cooled to ambient conditions 22±5 °C prior the test.
3. The laminated pad portion of the test specimen is placed into the stationary clamp and the carrier material is placed into clamp connected to the force gauge.
4. The pulling speed must be 315 mm/min.

The test was performed at an ambient room temperature of 23 ± 2 °C.

Additional Data / Supporting Data

Table 1: Lamination Bond Peak Force

Sample Part Number	W.E.T. Test Lab Sample Number	Specimen Number	Peak Force [N]
11007174E	07077/1	1	8.5
		2	6.8
		3	7.0
	07077/4	1	6.3
		2	5.2
		3	5.8
	07077/11	1	7.1
		2	6.6
		3	6.1
		Minimum:	5.2
		Maximum:	8.5
		Average:	6.6

Table 2: Lamination Bond Peak Force

Sample Part Number	W.E.T. Test Lab Sample Number	Specimen Number	Peak Force [N]
11003589	07077/3	1	9.8
		2	7.3
		3	7.1
	07077/5	1	8.5
		2	7.3
		3	7.6
	07077/9	1	7.9
		2	6.9
		3	7.1
		Minimum:	6.9
		Maximum:	9.8
		Average:	7.7

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8
Phone (519) 735-1818
Fax (519) 735-5224

Table 3: Lamination Bond Peak Force

Sample Part Number	W.E.T. Test Lab Sample Number	Specimen Number	Peak Force [N]
11007181E	07077/1	1	14.7
		2	13.5
		3	15.4
	07077/2	1	12.3
		2	12.9
		3	15.7
	07077/3	1	16.3
		2	14.7
		3	15.3
		Minimum:	12.3
		Maximum:	16.3
		Average:	14.5

Table 4: Lamination Bond Peak Force

Sample Part Number	W.E.T. Test Lab Sample Number	Specimen Number	Peak Force [N]
11005771F	07077/1	1	8.2
		2	9.7
		3	7.0
	07077/2	1	13.7
		2	14.2
		3	10.9
	07077/8	1	12.6
		2	11.3
		3	13.7
		Minimum:	7.0
		Maximum:	14.2
		Average:	11.3

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8
Phone (519) 735-1818
Fax (519) 735-5224

Test Report No.: 07077_13_Watering_And_Continuous_Operation

Name:	Bozena Kasprowicz	**Requested by:**	Monica Mihalceanu
Date of report:	October 31, 2006	**Customer Program Name:**	Mercedes BR W164 / 251

Purpose (incl. remarks & deviations):

Purpose:

- To verify that heater elements meet the requirements of the specification.

Remarks:

- High setting is performed by energizing the heater with 13.0 Vdc.
- Heaters have no control module or thermostat.
- Design Validation.

Sample(s) (& sample received date):

One **Mercedes W164/251** heater elements set consisting of:

- One FS CH LH Basis Leather heater element, W.E.T. P/N 11007174E, sample # 07077/4.
- One FS BK RH/LH Basis heater element, W.E.T. P/N 11003589F, sample # 07077/11.

One **Mercedes W164/251** serial production heater elements set consisting of:

- One FS CH LH Multikontur heater element, W.E.T. P/N 11007181E, sample # 07077/8.
- One FS BK LH/RH Basis Nappa heater element, W.E.T. P/N 11005771F, sample # 07077/1.

Specification (section if applicable / version / release date):

W.E.T. Heated Seat Test Specification 40-0000717 / 002 / December 03, 2003

Summary - Results:

Samples **met** the requirements of the specification.
After the test all samples had measured resistance values within the required tolerance ranges.

Please refer to attached table and images for further details.

Steve Braido
Date — Approved by (Test Lab Manager)

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8
Phone (519) 735-1818
Fax (519) 735-5224

Equipment used (incl. calibration information):

DC Power Supply (#62)	Calibration due date: January 20, 2007
Data Acquisition Station (#169)	Calibration due date: June 30, 2007
Digital Thermo-Hygrometer (#49)	Calibration due date: January 24, 2007

Procedure (incl. supporting data, graphs, images, pass/fail criteria, date of test)

Date of Test:

October 18 -27, 2006

Pass / Fail Criteria:

Heater element must be functional 48 hours after the spill. Functionality is within ±10% of design resistance.

Procedure:

- Lay the heater elements on flat surface.
- Orientation and position of the heaters must be as in seat.
- Cover heater elements with felt (2 mm thick).
- Start current recording.
- Turn on heater to the highest temperature setting.
- Pour 1 l of tap water in center of the cushion and 1 l in center of the back pouring height 75 mm, pouring speed approximately 15 sec for 1 l.
- Record current draw for 2 hours.
- Turn off power and remove felt cover and excessive liquid.
- Verify functionality after 48 hours.

The test was performed at an ambient room temperature of 23 ± 2 °C and an applied voltage of 13.0 ± 0.1 Vdc was supplied to the heater system.

Additional Data / Supporting Data

Table 1: Resistance Measurement

Sample Description		Applied Voltage [V]	Pre Test		Post Test		Deviation [%]
			Measured Current [A]	Calculated Resistance Value [Ω]	Measured Current [A]	Calculated Resistance Value [Ω]	
FS CH	07077/4	13.0 ± 0.1	4.16	3.13	4.15	3.13	0.24
FS BK	07077/11		4.81	2.70	4.79	2.71	0.42
FS CH	07077/8		4.25	3.06	4.15	3.13	2.41
FS BK	07077/1		4.90	2.65	4.82	2.70	1.66

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8
Phone (519) 735-1818
Fax (519) 735-5224

Watering and Continuous Operation

Test Ref # : 07077_13_Watering_and_Continuous_Operation Sample # : 07077/4 and 11

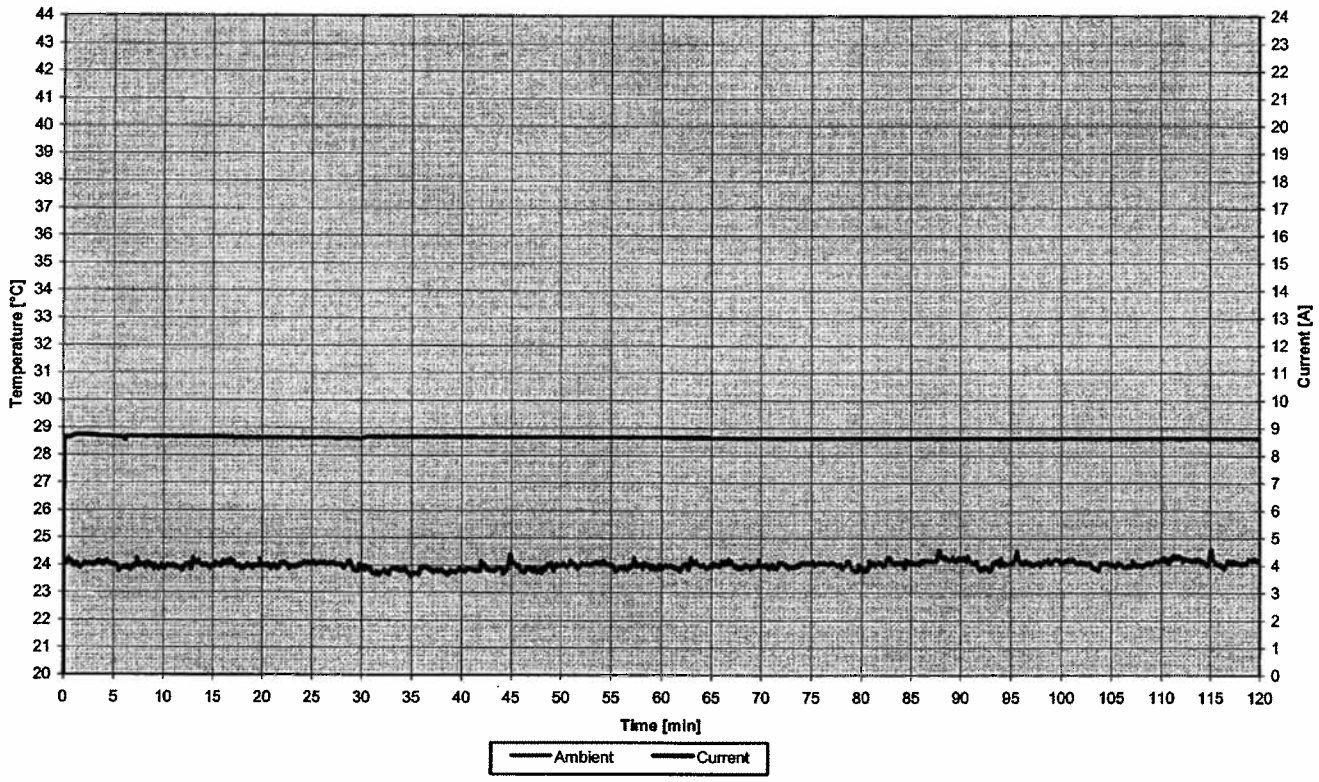


Image # 1: Sample # 07077/4 and 11
Temperature and Current vs. Time

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8
Phone (519) 735-1818
Fax (519) 735-5224

Test Ref # : 07077_13_Watering_and_Continuous_Operation Sample # : 07077/8 and 1

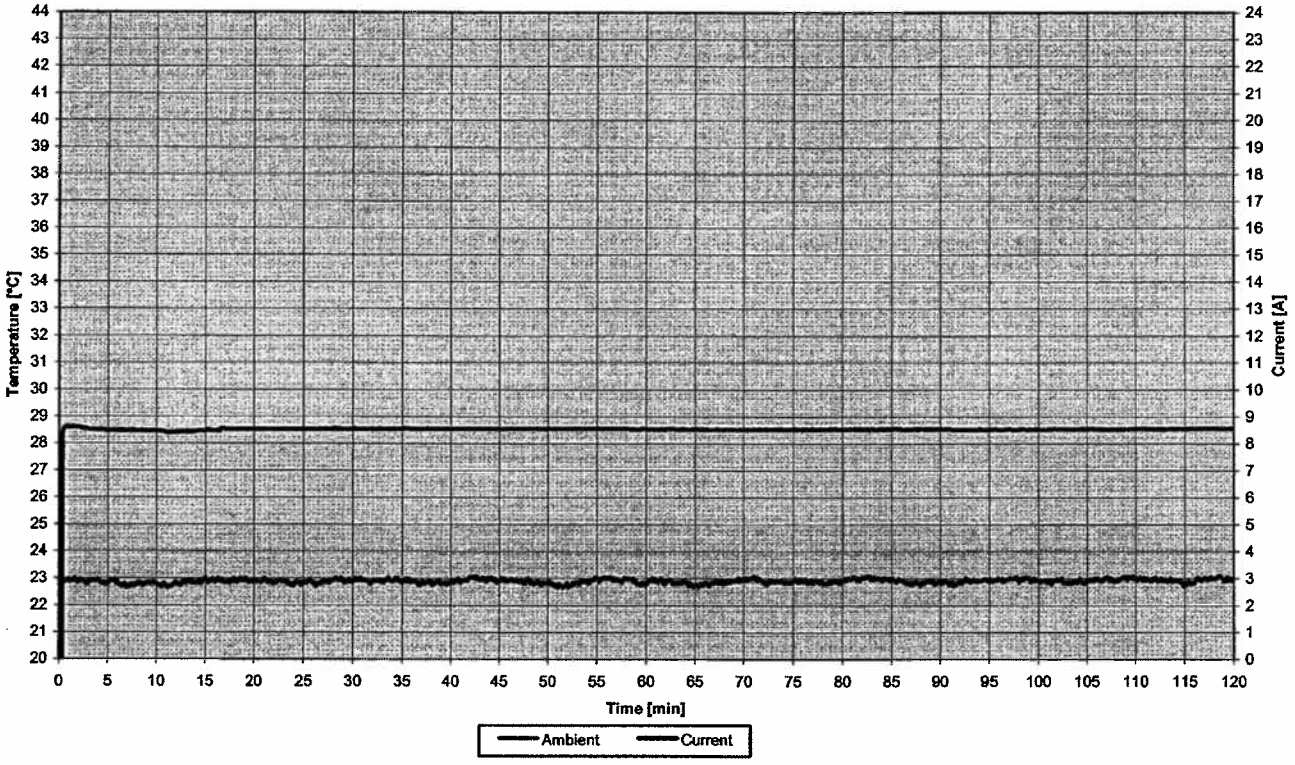


Image # 2: Sample # 07077/8 and 1
Temperature and Current vs. Time

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8
Phone (519) 735-1818
Fax (519) 735-5224

Test Report No.: 07077_15_Overvoltage

Name:	Bozena Kasprowicz	**Requested by:**	Monica Mihalceanu
Date of report:	November 01, 2006	**Customer Program Name:**	Mercedes W164 / BR251

Purpose (incl. remarks & deviations):

Purpose:

- To verify that heater elements meet the requirements of the specification.

Remarks:

- Design Validation.
- The test was performed with cushion and back heater elements set in position as a unit.

Sample(s) (& sample received date):

- One **Mercedes W164 / BR 251** (Serial Production) FS CH LH Basis Leather heater elements, W.E.T. P/N 11007174E, sample # 07077/8.
- One **Mercedes W164 / BR251** (Serial Production) FS BK RH/LH Basis heater elements, W.E.T. P/N 11003589F, sample # 07077/11.
- One **Mercedes W164 / BR251** (Serial Production) FS CH LH Multikontur heater elements, W.E.T. P/N 11007181E, sample # 07077/3.
- One **Mercedes W164 / BR251** (Serial Production) FS BK LH/RH Basis Nappa heater elements, W.E.T. P/N 11005771F, sample # 07077/2.

Specification (section if applicable / version / release date):
W.E.T. Heated Seat Test Specification 40-0000717 / 002 / December 03, 2003
Section 3.2 Overvoltage

Summary - Results:

The heater element sets **met** the requirements of the specification.
No heater element surface temperature exceeded 180°C.
No damage occurred to the seat heaters or the surrounding components.

Please refer to attached images and tables for more details.

Steve Braldo
Date — Approved by (Test Lab Manager)

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8
Phone (519) 735-1818
Fax (519) 735-5224

Equipment used (incl. calibration information):

DC Power Supply (#62)	Calibration due date: January 20, 2007
Data Acquisition Station (#169)	Calibration due date: June 30, 2007
Stop Watch (#166)	Calibration due date: July 06, 2007
Digital Thermo-Hygrometer (#49)	Calibration due date: January 24, 2007

Procedure (incl. supporting data, graphs, images, pass/fail criteria, date of test)

Date of Test:

November 07, 2006

Pass / Fail Criteria:

- The heater surface temperatures must not exceed 180°C.
- No damage is to occur to the seat heater or the surrounding components.

Procedure:

- Six thermocouples were attached to the heater element set, three at the center of cushion heated zone and three at the center of back heated zone. Each thermocouple was fixed to a copper plate dim. 25 x 50 x 0.076 mm.
- The heater element set was placed between two foam pads (0.76 x 1m, 25 mm in thickness each and 35 kg/m^3 density). The foams were loaded with a ½" wood plate, (0.76 x 1m with specific load of 20 kg/m^2).
- The heater element set was connected to the power supply. 16.0 ± 0.1 Vdc was supplied to the heater system.
- Temperature and current were measured and recorded throughout the one-hour test.
- After the test, samples and surrounding components were inspected for damage.

- The test was performed at an ambient room temperature of 23 ± 2 °C.

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8
Phone (519) 735-1818
Fax (519) 735-5224

Additional Data / Supporting Data

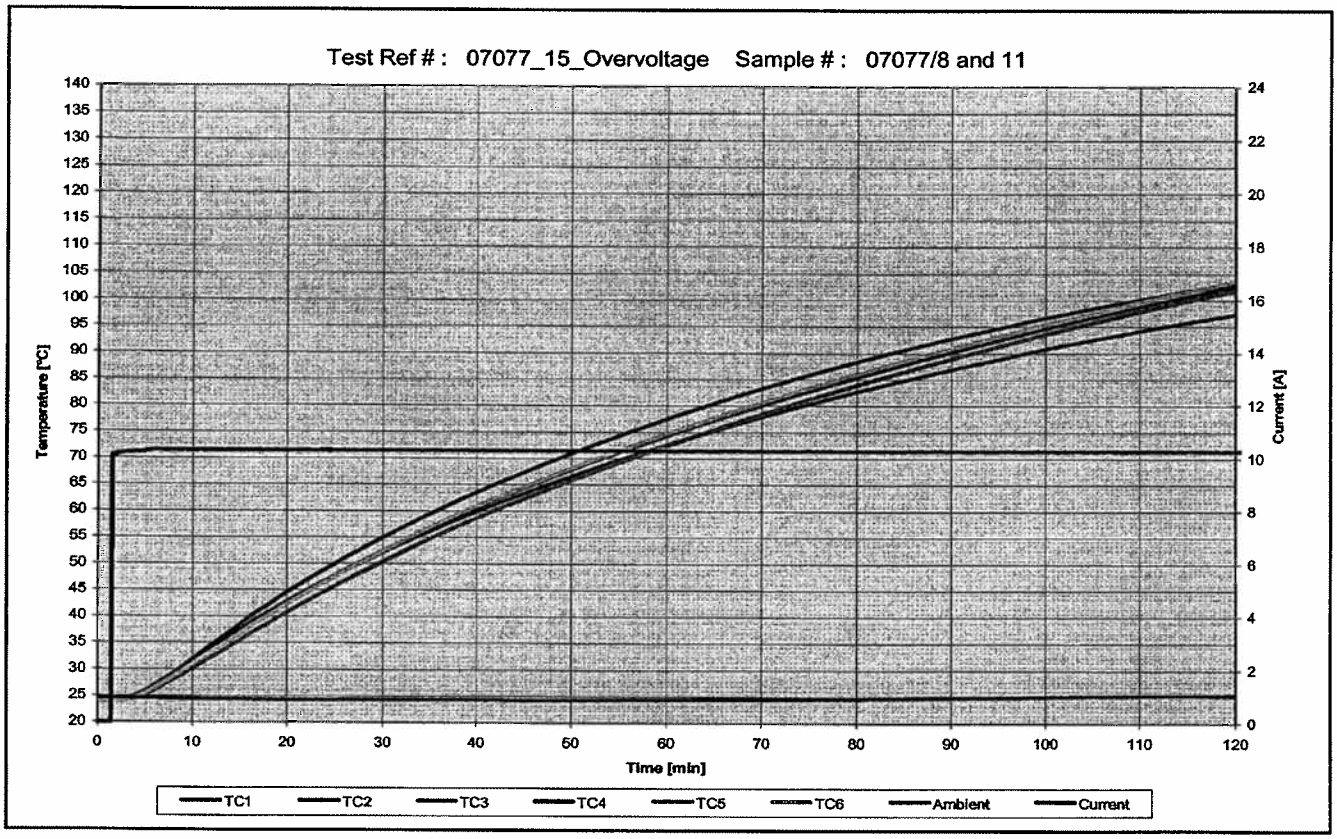


Image # 1: Sample # 07077/8 and 11
Temperature and Current Draw vs. Time

Image # 2: Sample # 07077/11 – no damage to the heater after the test

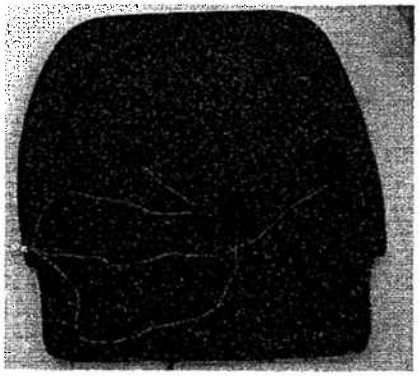


Image # 3: Sample # 07077/8 – no damage to the heater after the test

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8
Phone (519) 735-1818
Fax (519) 735-5224

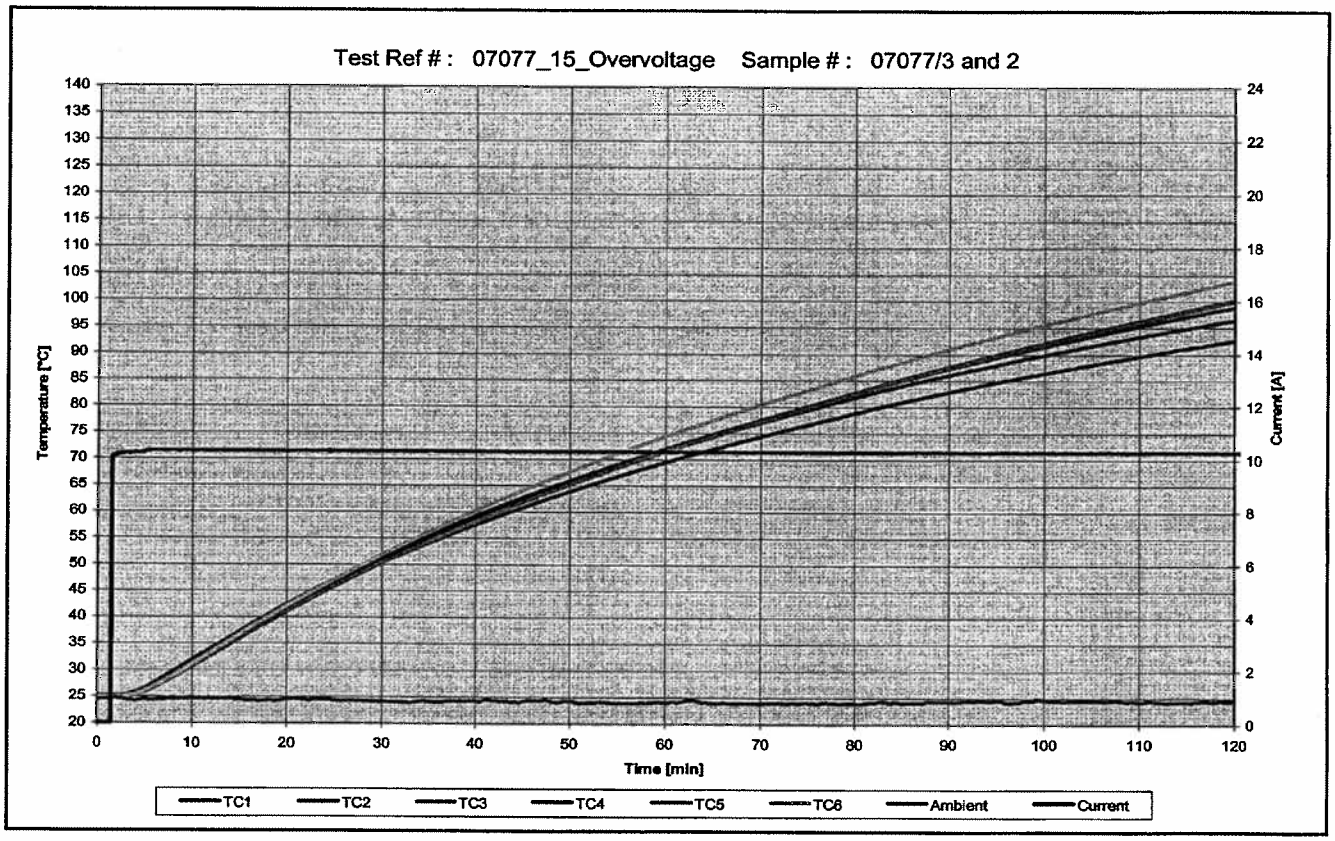


Image # 4: Sample # 07077/3 and 2
Temperature and Current Draw vs. Time

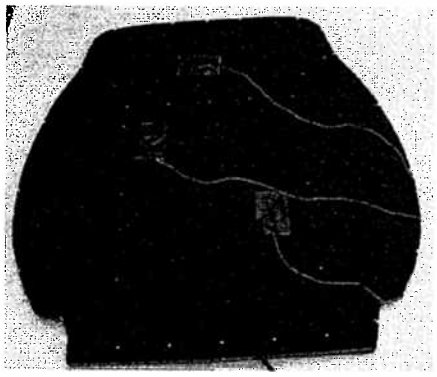


Image # 5: Sample # 07077/2 – no damage to the heater after the test

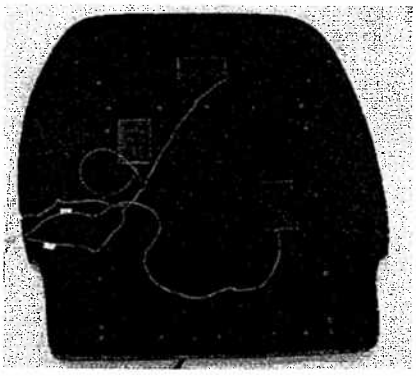


Image # 6: Sample # 07077/3 – no damage to the heater after the test

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8
Phone (519) 735-1818
Fax (519) 735-5224

W.E.T. Automotive Systems Ltd.
9475 Twin Oaks Drive
Windsor, ON N8N 5B8
Phone (519) 735-1818
Fax (519) 735-5224

Verteilen: E, L, LE, Liefrant

12/02/97

1802510GR

WÄRME & ELEKTRO TECHNIK

Ausstellungsdatum / Date of issue: 16/1/97

(1) Wärme- und Elektrotechnik B. Ruthenberg GmbH
Rudolf-Diesel-Straße 12 · 85235 Odelzhausen

(2) Tenax Fibers GmbH&Co
Boos-Fremery-Str.
D-52525 Heinsberg

Erstmusterprüfbericht
Berichtsergebnis

Initial Sample Submission Report
Submission Result

X	(3) Meßbericht Dimensional Report		(4) Werkstoffbericht Laboratory Report		(5) Funktionsbericht Eng. Test Report
Lieferant Supplier: Tenax Fibers		(6) Bericht Nr. Report No.			(7) Zeichen Reference
Abnehmer (Besteller) Purchaser: WET		(8) Bericht Nr. Report No.: 1997 0021			(9) Zeichen Reference
Lieferanten-Nr. Supplier Code: 70P5004			Blatt 1 von Sheet 1 of: 8		Blatt Sheet

WE

Lieferant / Supplier: Tenax Fibers		Abnehmer / Purchaser: WET- Odelzhausen	
(10) Sachnummer (Zeichnungs-Nr.) Part No. (Drawing No.): 25106	(11) Änderungsstand / Datum Revn No. / Date	(13) Sachnummer (Zeichnungs-Nr.) Part No. (Drawing No.): 25106	(11) Änderungsstand / Datum Revn No. / Date: C1/13.09.96
(12) Benennung Part Name: Carbon 200 tex		(15) Benennung Part Name: Carbon 200 tex	
(16) Bestell-/Abruf-Nr. Purchase Order No.: 94054	(17) Bestell-/Abruf-Datum Date of Purchase Order		(18) Abladestelle Destination
(19) Lieferschein-Nr. Delivery Note No.: 43131	(20) Lieferschein-Datum Delivery Note Date		(21) Anzahl der Muster Quantity of Samples: 30

„D"-Teil (Dokumentationspflichtiges Teil)
Part requiring documentation
○ (22) ja / yes ☒ (23) nein / no

Grund der Erstmusterprüfung
Reason for submission
○ (24) neuer Lieferant / new Supplier
☒ (25) neues Teil / New part
○ (26) geänderte Spezifikationen / Changed specification
○ (27) geänderte Fertigungsbedingungen / Changed production process
○ (28) neuer Fertigungsort / New manufacturing location
○ (29) längeres Aussetzen der Fertigung / Extended interruption of production

Die für die Erstmusterprüfung zwischen dem Abnehmer (Besteller) und Lieferant vereinbarten Spezifikationen sind in folgenden Unterlagen enthalten:
Applicable specifications for sample submission are contained in the following documents:

Prüfergebnisse siehe Folgeblätter:
Dokumentationspflichtige Merkmale sind mit einem „D" gekennzeichnet.
Die Ist-Werte sind in der Reihenfolge der Musternumerierung aufgeführt.
Nicht eingehaltene Spezifikationen sind durch Unterstreichen gekennzeichnet.

/

For check results refer to attached forms:
Items requiring documentation are identified: „D".
Actual measurements are listed in line with sample number:
Measurements deviating from specification are underlined:

Bemerkungen / Remarks:	Bemerkungen / Remarks:

Bestätigung / Certify

Wir bestätigen,
1. daß die vorgestellten Erstmuster vollständig mit serienmäßigen Betriebsmitteln und unter serienmäßigen Bedingungen hergestellt worden sind;
2. die korrekte Durchführung der Erstmusterprüfung und ihre Darstellung in diesem Erstmusterbericht (Abweichungen davon sind in diesem Bericht besonders angegeben).
3. daß eine Freigabe den Lieferanten nicht von der Verantwortung, nach der jeweils gültigen Zeichnung bzw. Lehre und vorgeschriebenen Funktionsvorschrift zu liefern, entbindet.

We hereby certify,
1. That samples submitted are completely made with regular production tooling following regular production methods.
2. Correct sample inspections and their listing in this report (deviations are especially shown).
3. That a sample approval will not relieve the source of the responsibility to deliver material according to the applicable drawings and specifications.

Name / Hausruf – (bei Rückfragen)
Name / Telephone No. (In case of inquiry)

Datum / Date — verantwortliche Unterschriften / Supplier Official

Entscheidung / Decision

	Approved / freigegeben		Approved or concession / freigegeben mit Auflage		Rejected, new samples required / abgelehnt neue Muster erforderlich	
Maß Dimensions		(30) X		(34)		(38)
Werkstoff Laboratory		(31)		(35)		(39)
Funktion Eng. Test		(32)		(36)		(40)
Entscheidung Decision		(33)		(37) X		(41)

Auflagen / Conditions

i.V.

31/1/97 i.A. QK

Datum / Date — Einkauf / Purchase Official — Qualitätsleitung / Quality Control Official

Techn. Daten
techn. data

Bezeichnung/description:		Tenax –J HTA 5131
Garnfeinheit/yarn fineness:	[tex]	200 ②
Filamentanzahl/number of fibre:		3000
Camdrehung/cam torsion:	[t/m]	Z15
Filament ø/fibre diameter:	[µm]	7
Lauflänge/length:	[m]	5000 od. 10000 ④
Spulengewicht, netto: net weight of coil:	[kg]	1 od. 2 ①
Eigenschaften (typische Werte) characteristics:		
Dichte/density:	[g/cm ^{3}]	1,77
Zugfestigkeit/pull–strength:	[MPa]	3950
Zug–E–Modul/elasticity of elongation	[GPa]	238
Bruchdehnung/breaking extension:	[%]	1,55
Spezifische Wärme/specific heat:	[J/kgK]	710
Wärmeleitzahl/heat conducting rate:	[W/mK]	17
Wärmeausdehnungskoeffizent: thermal expansion coefficent:	[10 $^{-6}$/K]	–0,1
Spez. elektr. Widerstand/resistivity:	[Ω/cm]	1,6x10 $^{-3}$
Längenwiderstand/length resistance:	[Ω/m]	139,8 (±5%) ③
Lieferform/form of delivery:		Spulen/coils
Bestellbezeichnung/article number:		HTA 5131 200tex Z15 ⑤
Lieferant/supplier:		70 88 004

01. OKT. 1996

⑫	...	...	...	D/▽	ISO 128 E	Parts name/Benennung	Carbon 200 tex
⑪	...	...	...			...	carbon fibre 200 tex
⑩	...	...	...		Datum	Name	WET–Nr.
⑨	...	...	...	Bearbeitet	17.04.96	go	25 106
⑧	...	...	...	Geprüft	17.04.96	Brandl	
⑦	...	...	...	Frei f. Prod.	...	...	
⑥	...	...	...	Dateiname	25106		
⑤	...	...	...				Kde–Nr.
④	...	...	...				...
③	...	...	...				
②	...	...	...				
①	s.Ä.A.	13.09.96	go				
State Zust.	Change Änderung	Date Datum	Name Name				Repl.m.by/Ers.durch: ... Repl.m.for/Ers.für:

Scale Maßstab: ...
Sh.–No. Blatt: 1
of/von: 1

ACAD–AAA/05.11.92

WÄRME & ELEKTRO TECHNIK

Ausstellungsdatum 16/1/97

Erstmusterprüfbericht

Prüfergebnis
(Berichtsergebnis siehe Blatt 1)

X (3) Meßbericht		(4) Werkstoffbericht		(5) Funktionsbericht

Lieferant	(6) Bericht Nr.	(7) Zeichen
Tenax Fibers		
Abnehmer (Besteller) WET	(8) Bericht Nr.	(9) Zeichen

Blatt 2 von Blatt 2

Lieferant Tenax Fibers GmbH & Co
(10/12) Sachnummer/Benennung
25106

Abnehmer (Besteller) WET
(13/15) Sachnummer/Benennung
25106

(42) Pos.	(43) Merkmal/Sollwert	(44) IST-Wert (Lieferant)	(45) IST-Wert (Abnehmer)
1	Spulengewicht 1,0-2 kg		i.O. / i.O. / i.O. / i.O. / i.O.
2	Garnfeinheit 200 tex		i.O. / i.O. / i.O. / i.O. / i.O.
3	Widerstand 1398 ± 5% Ω		$\bar{R}$ = 1417 Ω
4	Lauflänge 5000 o. 10000 m		i.O. / i.O. / i.O. / i.O. / i.O.
5	Prüfzeugnis vorhanden		i.O.
			i.O. 31.1.97

(46) Bemerkung (Lieferant)
Pos 3. Widerstandswert wird vom Lieferanten nicht garantiert.
z.Zt. so i.O., interne Abstimmungen Garn laufen, Entscheidungen bis Ende Febr. 97

31.1.97

(47) Bemerkung (Abnehmer)

Datum	verantwortliche Unterschriften	Datum	verantwortliche Unterschriften
		22/1/97	

C

Tenax Fibers

Tenax Fibers
GmbH & Co. KG
A Joint Venture between
Toho Rayon Co., Ltd.,
Japan and
Akzo Nobel Faser AG,
Germany

D-52523 Heinsberg
Office address:
Boos-Fremery-Straße
D-52525 Heinsberg
Telephone +49 2452 15-0
Telefax +49 2452 6 48 99
USt-Id.No. DE 811370843

Datum: 18.12.1996

6 von 8

Wärme- und Elektrotechnik
B. Ruthenberg GmbH

Rudolf-Diesel-Str. 12

D 85235 Odelzhausen

Werkszeugnis / 199635306

(EN 10204 2.2)

Tenax® HTA 5131 200tex f 3000 Z15

Betreff: Ihre Bestellung vom 09.12.96 Auftrag: 32542

Menge: 32 kg Lieferdatum: 18.12.1996 Charge: 963359_00016 Ls.: 43131

Lot-Nr. 60812	Einheit	Mittelwert	C.V. (%)
Zugfestigkeit	MPa	4126	4.9
E-Modul aus Zugversuch	GPa	240.6	1.1
Bruchdehnung	%	1.64	4.8
Feinheit (ohne Präparation)	tex	201.7	0.8
Präparationsmasseanteil	%	1.27	-
Kurzstabbiegefestigkeit (ILSF)	MPa	124.6	-
Dichte	g/ccm	1.76	-
Filamentdurchmesser	µm	7	-

Tenax Fibers GmbH & Co. KG
Qualitäts-Management

F. Horst

Tenax Fibers

Tenax Fibers
GmbH & Co. KG
A Joint Venture between
Toho Rayon Co., Ltd.,
Japan and
Akzo Nobel Faser AG,
Germany

D-52523 Heinsberg
Office address:
Boos-Fremery-Straße
D-52525 Heinsberg
Telephone +49 2452 15-0
Telefax +49 2452 6 48 99
USt-Id.No. DE 811370843

Datum: 18.12.1996

7 von 8

Wärme- und Elektrotechnik
B. Ruthenberg GmbH

Rudolf-Diesel-Str. 12

D 85235 Odelzhausen

Werkszeugnis / 199635305

(EN 10204 2.2)

Tenax® HTA 5131 200tex f 3000 Z15

Betreff: Ihre Bestellung vom 09.12.96 Auftrag: 32542

Menge: 16 kg Lieferdatum: 18.12.1996 Charge: 963259_00016 Ls.: 43131
10 kg 18.12.1996 963259_01010 Ls.: 43131

Lot-Nr. 60811	Einheit	Mittelwert	C.V. (%)
Zugfestigkeit	MPa	4035	5.1
E-Modul aus Zugversuch	GPa	239.9	1.1
Bruchdehnung	%	1.6	5.0
Feinheit (ohne Präparation)	tex	202.5	0.8
Präparationsmasseanteil	%	1.27	-
Kurzstabbiegefestigkeit (ILSF)	MPa	123.8	-
Dichte	g/ccm	1.76	-
Filamentdurchmesser	µm	7	-

Tenax Fibers GmbH & Co. KG
Qualitäts-Management

F. Horst

Tenax Fibers

Tenax Fibers
GmbH & Co. KG

A Joint Venture between
Toho Rayon Co., Ltd.,
Japan and
Akzo Nobel Faser AG,
Germany

D-52523 Heinsberg
Office address:
Boos-Fremery-Straße
D-52525 Heinsberg
Telephone +49 2452 15-0
Telefax +49 2452 6 48 99

USt-Id.No. DE 811370843

Datum: 18.12.1996

Wärme- und Elektrotechnik
B. Ruthenberg GmbH

Rudolf-Diesel-Str. 12

D 85235 Odelzhausen

8 von 8

Werkszeugnis / 199635304

(EN 10204 2.2)

Tenax® HTA 5131 200tex f 3000 Z15

Betreff: Ihre Bestellung vom 09.12.96 Auftrag: 32542

Menge: 2 kg Lieferdatum: 18.12.1996 Charge: 962606_03002 Ls.: 43131

Lot-Nr. 60511	Einheit	Mittelwert	C.V. (%)
Zugfestigkeit	MPa	4205	4.3
E-Modul aus Zugversuch	GPa	239.2	1.2
Bruchdehnung	%	1.67	4.2
Feinheit (ohne Präparation)	tex	202	0.9
Präparationsmasseanteil	%	1.25	-
Kurzstabbiegefestigkeit (ILSF)	MPa	127	-
Dichte	g/ccm	1.76	-
Filamentdurchmesser	µm	7	-

Tenax Fibers GmbH & Co. KG
Qualitäts-Management

F. Horst

(Seite 3)

Erstmusterprüfbericht	Initial sample inspection report
Prüfergebnis	Test result
Berichtsergebnis siehe Blatt 1	Report result, see sheet 1
Meßbericht	Measurement report
Werkstoffbericht	Material testing report
Ausstellungsdatum	Date of issue
Funktionsbericht	Function report
Lieferant	Supplier
Abnehmer (Besteller)	Purchaser (orderer)
Tenax Fibers (GmbH & Co.)	Tenax Fibers (GmbH & Co.)
Bericht Nr.	Report no.
Zeichen	Indication
Sachnummer / Benennung	Object no./designation
Merkmal / Sollwert	Characteristic/specified value
IST Wert (Lieferant)	ACTUAL value (supplier)
IST Wert (Abnehmer)	ACTUAL value (purchaser)
Bemerkung/Lieferant	Comment/supplier
Bemerkung / Abnehmer	Comment/purchaser
Verantwortliche Unterschriften	Signatures of resp. parties
Spulengewicht	Spool weight
Garnfeinheit	Yarn fineness
Widerstand	Resistance
Lauflänge	Length
Prüfzeugnis vorhanden	Test certificate present
i.O.	OK
Pos. 3 Widerstandswert wird vom Lieferanten nicht garantiert. z.Zt so i.O., interne Abstimmungen hierzu laufen, Entscheidungen bis Ende Febr. 97	Item 3 Resistance value is not guaranteed by supplier. Currently OK, internal coordination underway, decision expected at end of February '97.
Blatt	Sheet
WET	WET

(Seite 4)
Tenax Fibers

Wärme- und Elektrotechnik
B. Ruthenberg GmbH
Rudolf-Diesel-Str. 12
D-85235 Odelzhausen

Tenax Fibers
GmbH & Co. KG
A Joint Venture between
Toho Rayon Co., Ltd.,
Japan and
Akzo Nabel Faser AG,
Germany

D-52523 Heinsberg
Office address:
Boos-Fremery-Strasse
D-52525 Heinsberg
Telephone +49-2452-15-0
Fax +49-2452-648-99

VAT ID no. DE 811370843

.... Date: 18.12.1996
Test report / 199635306
(EN 10204 2.2)

Tenax HTA 5131 200tex f 3000 Z15

Regarding: Your order dated 09.12.96
Order: 32542

Quantity: 32 kg
Delivery date: 18.12.1996
Batch: 963359_00016
Delivery note: 43131

Lot no. 60812	Unit	Mean value	C.V. (%)
Tensile strength	MPa	4126	4.9
Coefficient of elasticity from tensile test	GPa	240.6	1.1
Breaking elongation	%	1.64	4.8
Fineness (without preparation)	tex	201.7	0.8
Preparation mass share	%	1.27	
Short-rod bending strength (ILSF)	MPa	124.6	
Density	g/ccm	1.76	
Filament diameter	µm	7	

Tenax Fibers GmbH & Co. KG
Quality Management
F. Horst

Registered Office of Limited Partnership: Wuppertal, Registry: Wuppertal Reg. A No. 16611
General Partner: Tenax Fibers Verwaltungs- und Beteiligungs-GmbH, Registered Office: Wuppertal.
Reg. B No. 7984
Administrative Board: Jinnosuke Takeda, Chairman
Management: Jinnosuke Takeda, Hans-Dieter Gölden (President), Tadao Haruki
REG.NO 31 746

Bank Account: Deutsche Bank AG

Heinsberg Branch, Account No. 5844451 (Bank Code 390 700 20)

(Seite 5)
Tenax Fibers

Wärme- und Elektrotechnik
B. Ruthenberg GmbH
Rudolf-Diesel-Str. 12
D-85235 Odelzhausen

Tenax Fibers
GmbH & Co. KG
A Joint Venture between
Toho Rayon Co., Ltd.,
Japan and
Akzo Nabel Faser AG,
Germany

D-52523 Heinsberg
Office address:
Boos-Fremery-Strasse
D-52525 Heinsberg
Telephone +49-2452-15-0
Fax +49-2452-648-99

VAT ID no. DE 811370843

.... Date: 18.12.1996
Test report / 199635306
(EN 10204 2.2)

Tenax HTA 5131 200tex f 3000 Z15

Regarding: Your order dated 09.12.96
Order: 32542

Quantity: 16 kg
Delivery date: 18.12.1996
Batch: 963259_00016
Delivery note: 43131
Quantity: 10 kg
Delivery date: 18.12.1996
Batch: 963259_01010
Delivery note: 43131

Lot no. 60812	Unit	Mean value	C.V. (%)
Tensile strength	MPa	4035	5.1
Coefficient of elasticity from tensile test	GPa	239.9	1.1
Breaking elongation	%	1.6	5.0
Fineness (without preparation)	tex	202.5	0.8
Preparation mass share	%	1.27	
Short-rod bending strength (ILSF)	MPa	123.8	
Density	g/ccm	1.76	
Filament diameter	µm	7	

Tenax Fibers GmbH & Co. KG
Quality Management
F. Horst

Management: Jinnosuke Takeda, Hans-Dieter Gölden (President), Tadao Haruki
REG.NO 31 746

Bank Account: Deutsche Bank AG
Heinsberg Branch, Account No. 5844451 (Bank Code 390 700 20)

Tenax Fibers

Wärme- und Elektrotechnik
B. Ruthenberg GmbH
Rudolf-Diesel-Str. 12
D-85235 Odelzhausen

Tenax Fibers
GmbH & Co. KG
A Joint Venture between
Toho Rayon Co., Ltd.,
Japan and
Akzo Nabel Faser AG,
Germany

D-52523 Heinsberg
Office address:
Boos-Fremery-Strasse
D-52525 Heinsberg
Telephone +49-2452-15-0
Fax +49-2452-648-99

VAT ID no. DE 811370843

.... Date: 18.12.1996
Test report / 199635306
(EN 10204 2.2)

Tenax HTA 5131 200tex f 3000 Z15

Regarding: Your order dated 09.12.96
Order: 32542

Quantity: 2 kg
Delivery date: 18.12.1996
Batch: 962606_03002
Delivery note: 43131

Lot no. 60812	Unit	Mean value	C.V. (%)
Tensile strength	MPa	4205	4.3
Coefficient of elasticity from tensile test	GPa	239.2	1.2
Breaking elongation	%	1.67	4.2
Fineness (without preparation)	tex	202	0.9
Preparation mass share	%	1.25	
Short-rod bending strength (ILSF)	MPa	127	
Density	g/ccm	1.76	
Filament diameter	µm	7	

Tenax Fibers GmbH & Co. KG
Quality Management
F. Horst

Registered Office of Limited Partnership: Wuppertal, Registry: Wuppertal Reg. A No. 16611
General Partner: Tenax Fibers Verwaltungs- und Beteiligungs-GmbH, Registered Office: Wuppertal.
Reg. B No. 7984
Administrative Board: Jinnosuke Takeda, Chairman
Management: Jinnosuke Takeda, Hans-Dieter Gölden (President), Tadao Haruki
REG.NO 31 746

Bank Account: Deutsche Bank AG

Heinsberg Branch, Account No. 5844451 (Bank Code 390 700 20)

CONFIDENTIAL INFORMATION REDACTED

18025106A 1/4

-Deckblatt- Erstbemusterprüfbericht VDA
-Cover sheet- First Sample Test Report VDA

Nummbers of Characteristics	
Document with special archives	

Lieferant/Supplier:

SOFICAR

Kunde/Customer:

WET Automotive Systems

☒ **Erstmusterprüfbericht VDA/First Sample Test Report VDA**
- ☒ Erstbemusterung/First sampling
- ☐ Nachbemusterung/Re-sampling
- ☐ Neuteile/New part
- ☐ Produktänderung/Product modification
- ☐ Produktionsverlagerung/Production transfer
- ☐ Änderung von Produktionsverfahren/Change in production procedures
- ☐ Längeres Aussetzen der Fertigung/Long production pause
- ☐ Neuer Unterlieferant/New subcontractor
- ☐ Produkt mit DmbA/Product with DwSpA
- ☐ Fertigungs-/Prüfplan erstellt/Production/Inspecion and Test Plan prepared
- ☐ FMEA durchgeführt/FMEA carried out

☐ **Prüfbericht sonstige Muster/Test Report other samples**

Anlagen/Appendices

☒ 01 Funktionsprüfung/ Funktional Test	☐ 07 Prüfmittelfähigkeitsnachweis/ Evidence for Inspection and Test Equipment Capability	☐ 13 Erscheinungsbild/ Appearance
☒ 02 Maßprüfung/ Dimensional Check	☐ 08 Prüfmittelliste/ Inspection and Test Equipment List	☒ 14 Zertifikate/ and test report Certificate
☒ 03 Werkstoffprüfung/ Material Test	☒ 09 EG-Datensicherheitsblatt/ EU-Data Safety Sheet	☐ 15 Konstruktionsfreigabe/ Design Approval
☐ 04 Zuverlässigkeitsprüfung/ Reliability Test	☐ 10 Haptik/ Haptics	☐ 16 Inhaltsstoffe in Zukaufteilen/ Constituents of Purchased Parts
☐ 05 Prozeßfähigkeitsnachweis/ Process Capability Evidence	☐ 11 Akustik/ Acoustics	☐ 17 Sonstiges/ Other
☐ 06 Prozeßablaufdiagram/ Process Flow Chart	☐ 12 Geruch/ Odors	

Kennnummer, Lieferant/Identification Number, Supplier:	Kennnummer, Kunde/Identification Number, Customer:
Prüfberichts-Nr./Test Report No.: 1 Version/Revision: 1	Prüfberichts-Nr./Test Report No.: 2002/136 Version/Revision:
Sach-Nr./Subject No: FT300-3000-50A	Sach-Nr./Subject No: Carbon-Filament-Yarn 3K
Zeichnungs-Nr./Drawing No:	Zeichnungs-Nr./Drawing No: 28025106 A
Stand/ Datum/Status/ Date:	Stand/ Datum/Status/ Date: 23.5.2001
Änderungs-Nr./Revision No:	Änderungs-Nr./Revision No: 2
Benennung/Designation:	Benennung/Designation:
Bestellabruf-Nr./-datum/Order Call-off No./Date:	
Lieferschein-Nr./-datum/Delivery Note No./Date: 18/12/2001	Wareneingangs-Nr./-datum/Incoming Goods No./Date:
Liefermenge/Quantity delivered: 2950 Kg Chargen-Nr./Charge No.: Lot F111111 Mustergewicht/Sample Weight: 2 kg	Abladestelle/Delivery Destination:

Bestätigung Lieferant/Supplier Confirmation:
Hiermit wird bestätigt, daß die Bemusterungen entsprechend der VDA Schrift 2 Ziffer 4 durchgeführt worden sind.
It is hereby confirmed, that the sampling has been carried out according to VDA Volume 2 Chapter 4.

Name: MARIE-LUCE ALEGRE
Abteilung/Department: SOFICAR QUALITY DIRECTOR
Tel./Phone / Fax 0559607100/0559607140
E-Mail marieluce.alegre@soficar-carbon.com
Datum/Date: 18/03/02 Unterschrift/Signature

Bemerkung/Comment:

Entscheidung Kunde/Customer Decision:	Gesamt/ Overall	Gemäß Anlage/According to Appendix: 01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17
Frei/Approved:	☒	☒	☒	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Frei mit Auflagen/Conditionally approved:	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Abgelehnt, Nachbemusterung erforderlich/ Rejected, re-sampling necessary.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Abweich- Genehmigung- Nr./Deviation Concession No.:
Bei Rücksendung Lieferschein-Nr./-datum/When returning, Delivery Note No.:

Name: Wolfgang Lapp - FL4
Abteilung/Department:
Tel./Phone /Fax 0049-8134 933 528
E-Mail 0049-8134 933 580
Datum/Date: 27.2002 i.V. Unterschrift/Signature

Bemerkung/ Comments:

Verteiler/Distribution:	1	2	3	4	5	6	7	8	9	10	11	12	13	14

-Prüfergebnisse- Erstmusterprüfbericht VDA
-Test Result- First Sample Test Report VDA

Nummbers of Characteristics	
Document with special archives	

Seite/Page Von/of

Anlagen/Appendices

- [ ] 01 Funktionsprüfung/Functional Test
- [ ] 02 Maßprüfung/Dimensional Check
- [ ] 03 Werkstoffprüfung/Material Test
- [ ] 04 Zuverlässigkeitsprüfung/Reliability Test
- [ ] 05 Prozeßfähigkeitsnachweis/Process Capability Evidence
- [ ] 06 Prozeßablaufdiagram,/Process Flow Chart
- [ ] 07 Prüfmittelfähigkeitsnachweis/ Evidence for Inspection and Test Equipment Capability
- [ ] 08 Prüfmittelliste/Inspection and Test Equipment List
- [ ] 09 EG-Datensicherheitsblatt/EU-Data Safety Sheet
- [ ] 10 Haptik/Haptics
- [ ] 11 Akustik/Acoustics
- [ ] 12 Geruch/Odors
- [ ] 13 Erscheinungsbild/Appearance
- [ ] 14 Zertifikate/Certificate and test report
- [ ] 15 Konstruktionsfreigabe/Design Approval
- [ ] 1 Inhaltsstoffe in Zukaufteilen/Constituents of Purchased Parts
- [ ] 17 Sonstiges/Other

- [x] **Erstmusterprüfbericht VDA/First Sample Test Report VDA**
- [x] Erstbemusterung/First sampling
- [ ] Nachbemusterung/Re-sampling
- [ ] Neuteile/New part
- [ ] Produktänderung/Product modification
- [ ] Produktionsverlagerung/Production transfer
- [ ] Änderung von Produktionsverfahren/Change in production procedures
- [ ] Längeres Aussetzen der Fertigung/Long production pause
- [ ] Neuer Unterlieferant/New subcontractor
- [ ] Produkt mit DmbA/Product with DwSpA
- [ ] Fertigungs-/Prüfplan erstellt/Production/Inspecion and Test Plan prepared
- [ ] FMEA durchgeführt/FMEA carried out
- [ ] **Prüfbericht sonstige Muster/Test Report other samples**

Kennnummer, Lieferant/Identification Number,Supplier:	Kennnummer, Kunde/Identification Number, Customer:
Prüfberichts-Nr./Test Report No.: 1 Version/Revision: 1	Prüfberichts-Nr./Test Report No.: Version/Revision:
Sach-/Zeichnungs-/Änderungs-Nr./Stand/Datum: Subject/Drawing/RevisionNo./Status/Date: FT300-3000-50A	Sach-/Zeichnungs-/Änderungs-Nr./Stand/Datum: Subject/Drawing/RevisionNo./Status/Date: 28025106-23.5.01-2
Benennung/Designation:	Benennung/Designation: Carbon Fiber Yarn 3K

Ref.-Nr./ Ref.-No.:	Forderungen/ Requirements	IST-Wert Lieferant/ Actual-Value Supplier	Bewertung/Evaluation I.O./Satisfactory	n.I.O./Not Satisfactory
1. Linear density	198 ± 6 tex (Pct average)		☒	☐
2. yarn twist	15 ± 3 turn/m (Pct average)		☒	☐
Running length	10100 m → 2.0 kg ± 0,5%		☒	☐
4. Sizing	type "5"		☒	☐
Content	0,8 ~ 1,6% (Pct average)		☒	☐
5. Specific dimension	ϕ_i = 76 mm, ϕ_{max} = 157 mm, ρ = 192 mm.		☒	☐
6 Splice	no joint		☒	☐
7. Tensile Strength	> 3340 MPa (Pct average)		☒	☐
8 Breaking elongation	> 1,3% (Pct average)		☒	☐
9. Electric data	166 Ω/m ± 8% (Pct average)		☒	☐

Bestätigung Lieferant/Supplier Confirmation: Confirmed

Bemerkung/Comment:

Entscheidung Kunde/Customer Decision:

Frei/Approved:	☒
Frei mit Auflagen/Conditionally approved:	☐
Abgelehnt, Nachbemusterung erforderlich/ Rejected, re-sampling required	☐

Name: Marie-Luce ALEGRE
Abteilung/Department: SOFICAR QUALITY DIRECTOR
Tel./Phone /Fax: 0559607100/ 0559607140
E-Mail: marieluce.alegre@sofica-carbon.com

Datum/Date: 18/07/02 Unterschrift/Signature

Name: Lapp Wolfgang / FL4
Abteilung/Department:
Tel./Phone / Fax
E-Mail:

27.7.2002 i.V.

Datum/Date: Unterschrift/Signature

64150 ABIDOS
Fibres de Carbone
Carbon Fibers
"TORAYCA"
MADE IN FRANCE

CERTIFICAT DE CONFORMITE N° V0850
RELEASE CERTIFICATE
NFL00.015/EN10204 PAGE : 1/ 1

Type de fibres : FT300-3000-50A
Yarn type

Torsion : S15
Yarn twist

CARACTÉRISTIQUES MOYENNES du LOT
Lot properties

N° de Lot	Traction *Tensile strength* MPa (Kg/mm²)	Module *Tensile Modulus* GPa (T/mm²)	Allongt *Elong.* %	Masse volumique *Density* g/cm³	Masse linéique *Yield* g/10³m	Ensimage *Sizing* %	Poids *Weight* Kg	Nombre bobines *Number bobbins*
F115071	3792 (387)	234 (23.8)	1.62	1.76	198	1.2	1800	900
%CV	2.7	1.2	2.4	0.4	1.2			

Observations :
Notes

-Nous certifions que sauf exceptions ou derogations enumerees ci-dessus,la fourniture citee a ete fabriquee conformement aux specifications techniques du marche,et que toutes les operations de controle et essais effectues,elle repond sous tous ses aspects aux specifications,ainsi qu'aux normes et reglements en vigeur .
-We certify that subject to the above mentionned exceptions or concessions,the present supply has been manufactured to the technical specifications of customer's contract,and that after completion of all inspections and test,it complies in every respect with relevant specifications and standards,and regulation in force .

Poids (kg) : *Weight :* 1800	Commande : *Order :* WET-4027-06-05	Les indications ci-dessus sont certifiées exactes.	NOMS *Names*	DATE
Nbre bobines : *Nr of bobbins :* 900	Client : *Customer :* WAERME UND ELEKTRO	Responsable Qualité	FKH om ESTREEN	15/07/05
	Lieu de livraison :	Contrôle officiel ou		

SOFICAR

64150 ABIDOS
Fibres de Carbone
Carbon Fibers
"TORAYCA"
MADE IN FRANCE

CERTIFICAT DE CONFORMITE N° V1249
RELEASE CERTIFICATE
NFL00.015/EN10204 PAGE : 1/ 1

Type de fibres : FT300-3000-50A
Yarn type

Torsion : S15
Yarn twist

CARACTÉRISTIQUES MOYENNES du LOT

Lot properties

N° de Lot	Traction *Tensile strength* MPa (Kg/mm^2)	Module *Tensile Modulus* GPa (T/mm^2)	Allongt *Elong.* %	Masse volumique *Density* g/cm^3	Masse linéique *Yield* $g/10^3m$	Ensimage *Sizing* %	Poids *Weight* Kg	Nombre bobines *Number bobbins*
F115101	3739 (381)	233 (23.8)	1.61	1.76	198	1.3	1650	825
F115101	3739 (381)	233 (23.8)	1.61	1.76	198	1.3	150	

Observations :
Notes

-Nous certifions que sauf exceptions ou derogations enumerees ci-dessus,la fourniture citee a ete fabriquee conformement aux specifications techniques du marche,et que toutes les operations de controle et essais effectues,elle repond sous tous ses aspects aux specifications,ainsi qu'aux normes et reglements en vigeur .

-We certify that subject to the above mentionned exceptions or concessions,the present supply has been manufactured to the technical specifications of customer's contract,and that after completion of all inspections and test,it complies in every respect with relevant specifications and standards,and regulation in force .

Poids (kg) : *Weight :* 1800	Commande : *Order :* WET-4083-10-05	Les indications ci-dessus sont certifiées exactes.	NOMS *Names*	DATE
Nbre bobines : *Nr of bobbins :*	Client : *Customer :* WET AUTOMOTOVE SYS	Responsable Qualité	C. VIGNAU - LAULHERE	25/10/2005
	Lieu de livraison : *Delivery location :* ODELZHAUSEN	Contrôle officiel ou Contrôle client.		

IMPR. MOULIA FR. - ORTHEZ

SOFICAR

64150 ABIDOS
Fibres de Carbone
Carbon Fibers
"TORAYCA"
MADE IN FRANCE

CERTIFICAT DE CONFORMITE N° V1452
RELEASE CERTIFICATE
NFL00.015/EN10204 PAGE : 1/ 1

Type de fibres: FT300-3000-50A
Yarn type

Torsion: S15
Yarn twist

CARACTÉRISTIQUES MOYENNES du LOT

Lot properties

N° de Lot	Traction *Tensile strength* MPa (Kg/mm²)	Module *Tensile Modulus* GPa (T/mm²)	Allongt *Elong.* %	Masse volumique *Density* g/cm³	Masse linéique *Yield* g/10³m	Ensimage *Sizing* %	Poids *Weight* Kg	Nombre bobines *Number bobbins*
F115105	3735 (381)	231 (23.6)	1.61	1.76	199	1.3	1640	820
F115105	3735 (381)	231 (23.6)	1.61	1.76	199	1.3	160.3	

Observations:
Notes

-Nous certifions que sauf exceptions ou derogations enumerees ci-dessus,la fourniture citee a ete fabriquee conformement aux specifications techniques du marche,et que toutes les operations de controle et essais effectues,elle repond sous tous ses aspects aux specifications,ainsi qu'aux normes et reglements en vigeur .
-We certify that subject to the above mentionned exceptions or concessions,the present supply has been manufactured to the technical specifications of customer's contract,and that after completion of all inspections and test,it complies in every respect with relevant specifications and standards,and regulation in force .

Poids (kg): *Weight:* 1800.3	Commande: *Order:* WET-4083-10-05	Les indications ci-dessus sont certifiées exactes	NOMS *Names*	DATE
Nbre bobines: *Nr of bobbins:*	Client: *Customer:* WET AUTOMOTOVE SYS	Responsable Qualité		13/12/05
	Lieu de livraison: *Delivery location:* ODELZHAUSEN	Contrôle officiel ou Contrôle client		

GESAMT SEITEN 07

SOFICAR
64150 ABIDOS
Fibres de Carbone
Carbon Fibers
"TORAYCA"
MADE IN FRANCE

CERTIFICAT DE CONFORMITE N° W0027
RELEASE CERTIFICATE
NFL00.015/EN10204 PAGE : 1/ 1

Type de fibres: FT300-3000-50A
Yarn type

Torsion: S15
Yarn twist

CARACTÉRISTIQUES MOYENNES du LOT

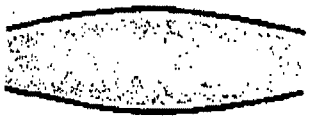
Lot properties

N° de Lot	Traction *Tensile strength* MPa (Kg/mm²)	Module *Tensile Modulus* GPa (T/mm²)	Allongt *Elong.* %	Masse volumique *Density* g/cm³	Masse linéique *Yield* g/10³m	Ensimage *Sizing* %	Poids *Weight* Kg	Nombre bobines *Number bobbins*
F115121	3699 (377)	232 (23.6)	1.60	1.76	198	1.3	1464	732
F115121	3699 (377)	232 (23.6)	1.60	1.76	198	1.3	179.6	

Observations:
Notes

-Nous certifions que sauf exceptions ou derogations emmerees ci-dessus,la fourniture citee a ete fabriquee conformement aux specifications techniques du marche,et que toutes les operations de controle et essais effectues,elle repond sous tous ses aspects aux specifications,ainsi qu'aux normes et reglements en vigeur .
-We certify that subject to the above mentionned exceptions or concessions,the present supply has been manufactured to the technical specifications of customer's contract,and that after completion of all inspections and test,it complies in every respect with relevant specifications and standards,and regulation in force .

Poids (kg): *Weight:* 1643.6	Commande: *Order:* WET-4099-12-05	Les indications ci-dessus sont certifiées exactes.	NOMS *Names*	DATE
Nbre bobines: *Nr of bobbins:*	Client: *Customer:* WET AUTOMOTOVE SYS	Responsable Qualité	FKR	9/01/06
	Lieu de livraison: *Delivery location:* ODELZHAUSEN	Contrôle officiel ou Contrôle client.		



64150 ABIDOS
Fibres de Carbone
Carbon Fibers
"TORAYCA"
MADE IN FRANCE

CERTIFICAT DE CONFORMITE N° X0145
RELEASE CERTIFICATE
NFL00.015/EN10204 PAGE : 1/ 1

Type de fibres : FT300-3000-50A
Yarn type

Torsion : S15
Yarn twist

CARACTÉRISTIQUES MOYENNES du LOT
Lot properties

N° de Lot	Traction *Tensile strength* MPa (Kg/mm²)	Module *Tensile Modulus* GPa (T/mm²)	Allongt *Elong.* %	Masse volumique *Density* g/cm³	Masse linéique *Yield* g/10³m	Ensimage *Sizing* %	Poids *Weight* Kg	Nombre bobines *Number bobbins*
F116101	3687 (376)	233 (23.8)	1.58	1.78	200	1.2	2084	1042

Observations :
Notes

-Nous certifions que sauf exceptions ou derogations énumerees ci-dessus,la fourniture citee a ete fabriquee conformement aux specifications techniques du marche.et que toutes les operations de controle et essais effectues,elle repond sous tous ses aspects aux specifications,ainsi qu'aux normes et reglements en vigeur .
-We certify that subject to the above mentionned exceptions or concessions,the present supply has been manufactured to the technical specifications of customer's contract,and that after completion of all inspections and test,it complies in every respect with relevant specifications and standards,and regulation in force .

Poids (kg) : *Weight :* 2084	Commande : *Order :* WET-4260-12-06	Les indications ci-dessus sont certifiées exactes.	NOMS *Names*	DATE
Nbre bobines : *Nr of bobbins :* 1042	Client : *Customer :* WET AUTOMOTIVE SYS	Responsable Qualité	C. VIGNAU - VALVISERE	05 02 2007
	Lieu de livraison : *Delivery location :* ODELZHAUSEN	Contrôle officiel ou Contrôle client.		

CONFIDENTIAL INFORMATION REDACTED

JOHNSON CONTROLS Automotive Group	☐ Summary Report ☒ Test Report ***Scouring test side bolster backrest with heating***	**WO-No.: 0704422** **Rev.: 0**

Test Report to: Guido Kunz, Jörg Plaum, Martin Gutenschwager

Requestor:	DaimlerChrysler BU	**Project number:**	01.00554
Customer:	DaimlerChrysler	**Program:**	W164 1st row non DVP
Phase:	Series		
Resp. Engineering:	Martin Gutenschwager	**Resp. Prod. Val.:**	Klaus Langenhorst

Purpose: Evaluation of the heater mat functionality; attempt to reproduce malfunction in series

Result:

Part 1	Part 2	Part ID
X	X	The tested sample meets the requirements
		The tested sample meets the requirements partly
		The tested sample does not meet the requirements
		Engineering Information

Note: Malfunction could not be reproduced; no evaluation of the trim cover

Part Description: 1st row backrest with heating; part 1: ID 25129 PS, leather artico; part 2: ID DS, leather artico (warranted cover No 4); details see 5.3

Drawing Number:

Level: Series

Index:

Specification:	Following: 5. Dauerfunktionsprüfung	**Rev./Date:**	05/05
Testprocedure:	Following: 5.17.1 (W164, X164, W251)	**Rev./Date:**	05/05
Requirement:	Following:	**Rev./Date:**	
Date of test:	2007-01-30 – 2007-02-16	**Test location:**	JC Product Validation Burscheid / Germany
Test carried out by:	W. Vogt, J. Duering		
Enclosure:	photos, diagrams		

Burscheid	2007-02-16	K. Langenhorst	G. Roth	1592480
Place	Date	Created [K. Langenhorst]	Approved [G. Roth]	PDM-Document-No.

Table of Contents

1 Test Setup and Constraints

1.1 Test System / Test Rig

#	ID	Test rig	Manufacturer	Type	Cal. valid (MM/YYYY)	Comment
1		Scheuerprüfstand				Self construction

1.2 Fixture

Self made (see paragraph 1.5 Setup)

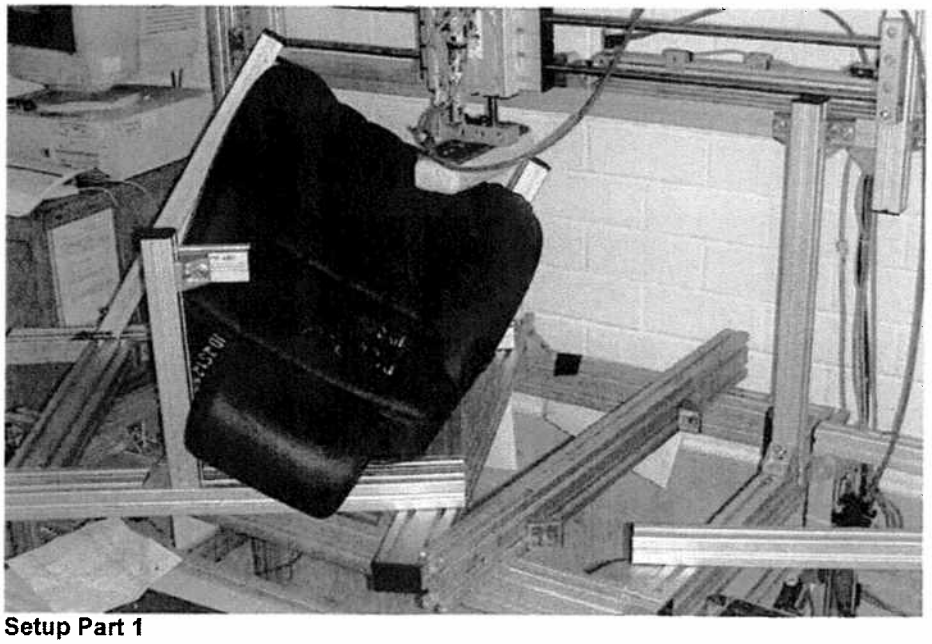
1.3 Devices / Gages

#	ID	Device / Gage family	Manufacturer	Type	Cal. valid (MM/YY)	Comment
1	SO674	Measurement PC	Dewetron		04/07	
2	SO661	Thermo Tracer	NEC	TH7100	03/08	
3		Progr. Power Supply	Voltcraft	DPS-2010PFC		Checked with SO674
4						

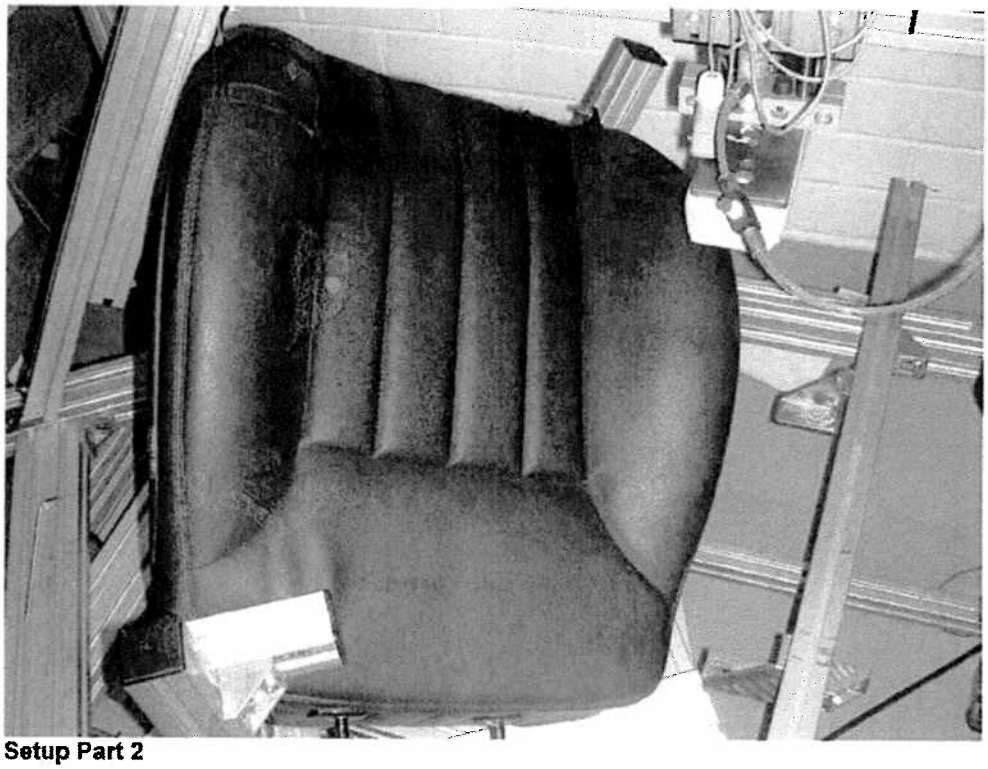
1.4 Test Conditions

Climate: DIN 50 014 23 °C, 50 % r. h

1.5 Setup

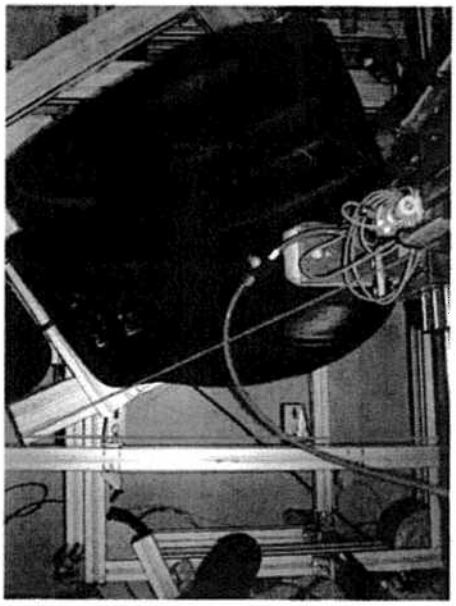


Setup Part 1

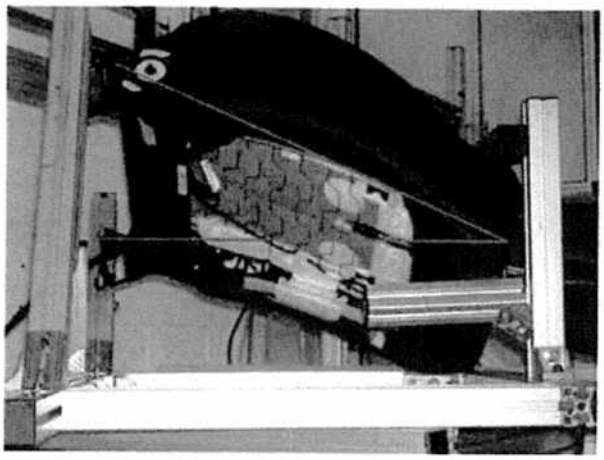


Setup Part 2

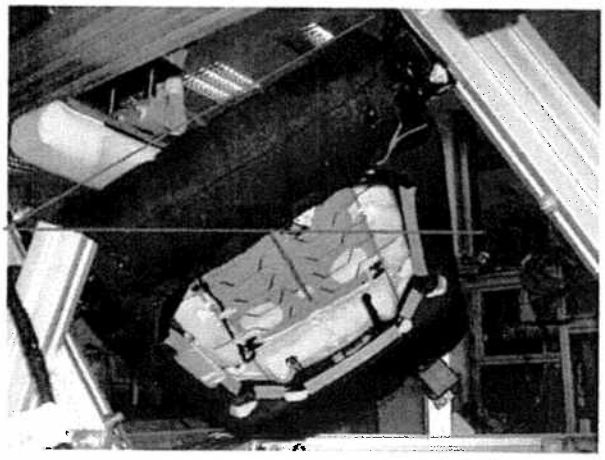
Adjustment of the angles



Angel in horizontal plane XY 33,5°



Angel in vertical plane XZ 26,5°



Angel in vertical plane YZ 31,3°

1.6 Specific Features & Deviations

Scouring direction and scouring area as shown in paragraph 1.5 Setup.

2 Test description

Simulation of Ingress/Egress Motion :
Parameter following DC 5.16.1:

Force:	150N
Force application point:	Area of side bolster where burn out occurred in series
Force direction:	nearly sideways, see adjustment of angles; similar to ingress/ egress
Test rubbing device:	self made; body covered with foam and cloth
Speed:	2cycles/min
Number of cycles:	10 000 (1 cycle=rubbing to and fro)
Heater mat:	cyclic 2 h on / 2 h off

Voltage: U = 13V

Level 3	5 min.	100% Power
Level 2	15 min.	60% Power
Level 1	100 min.	30% Power
Aus	120 min.	

Climate: DIN 50 014 23 °C, 50 % r. h.

3 Evaluation Criteria

Heater mat must remain functional.

4 Results

Part 1:

- No damage of the heater mat.
  Resistance pre and post test **R = 2.25 Ohm**
- Strong wrinkles on the side bolster

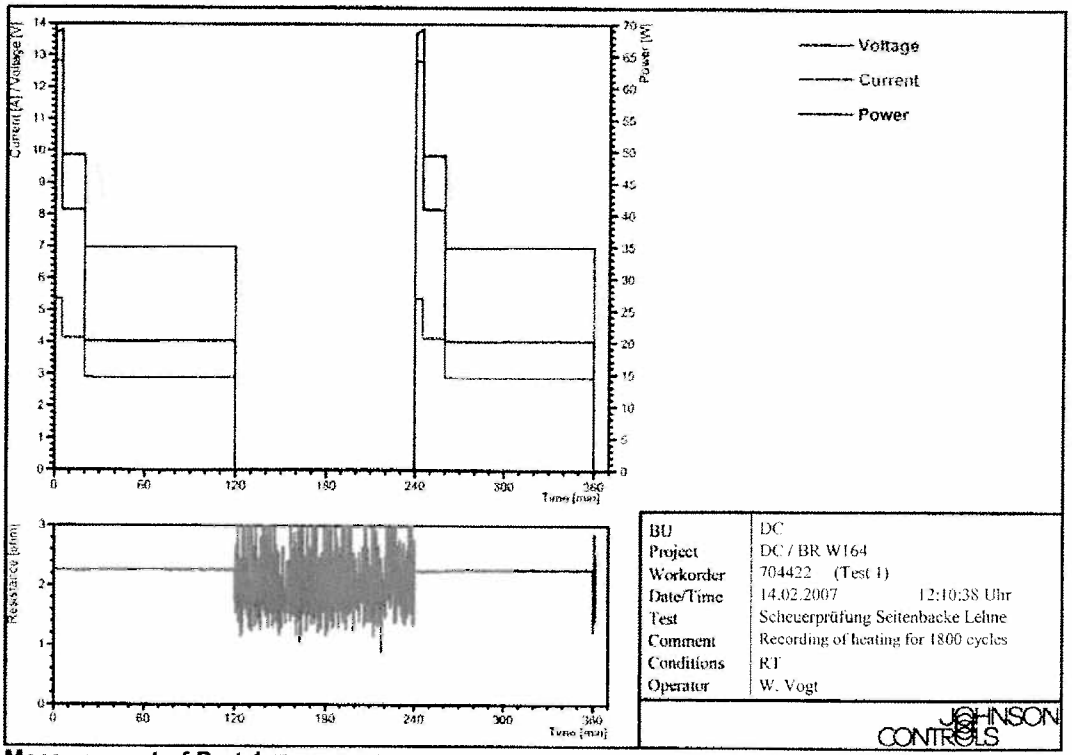
Part 2:

- No damage of the heater mat.
  Resistance pre and post test **R = 2.53 Ohm**
- Strong wrinkles on the side bolster

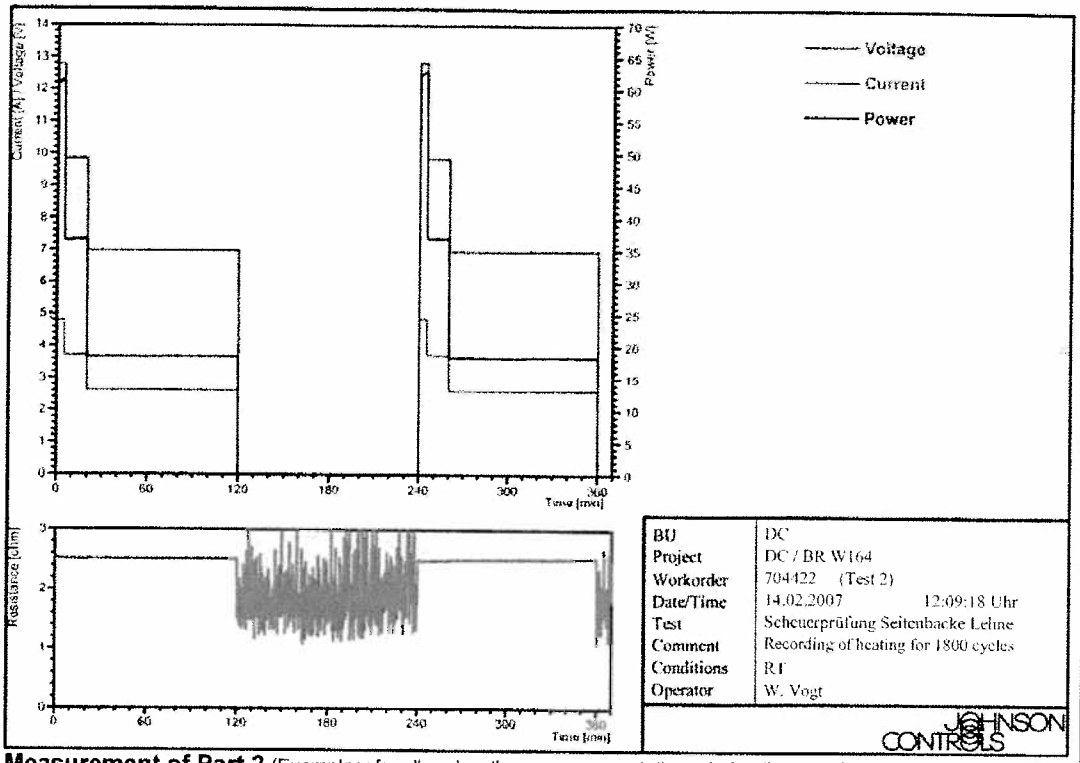
5 Documentation

5.1 Diagrams

Note: Because of technical reasons the resistance could not be measured when power was off.



Measurement of Part 1 (Exemplary for all cycles; there were no variations during the complete test)



Measurement of Part 2 (Exemplary for all cycles; there were no variations during the complete test)

5.2 Diagrams heat-up phase, sample 1

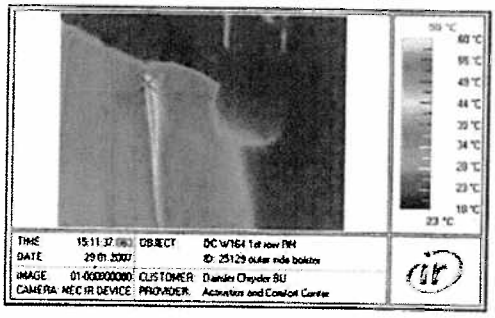


Fig. 5.2.1: Start of durability run (heating on)

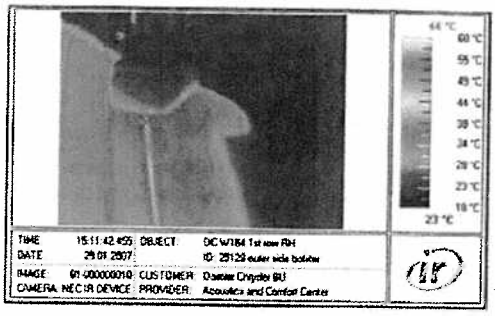


Fig. 5.2.2: Start of durability run (heating on)

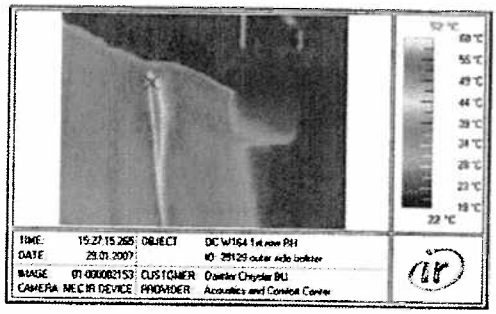


Fig. 5.2.3: Start of durability run (heating on)

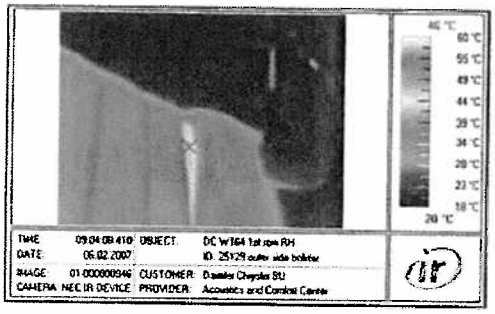


Fig. 5.2.4: End of durability run (heating on)

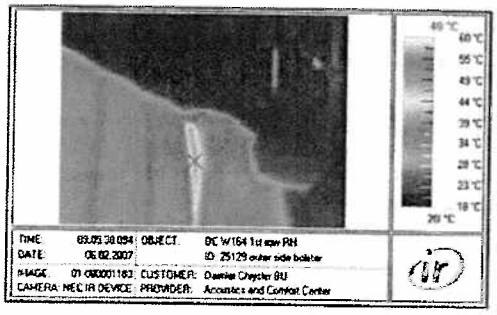


Fig. 5.2.5: End of durability run (heating on)

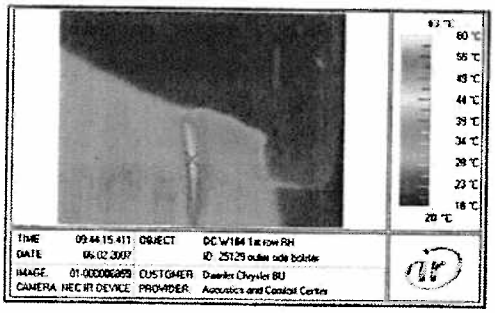


Fig. 5.2.6: End of durability run (heating on)

5.3 Diagrams heat-up phase, sample 2

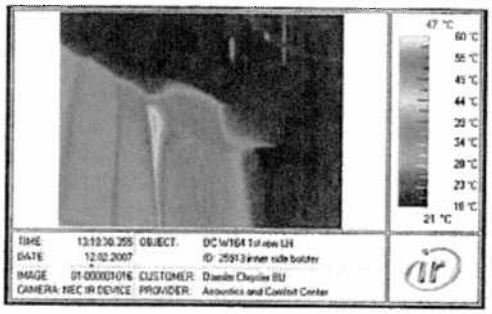


Fig. 5.3.7: During durability run (heating on)

Fig. 5.3.8: During durability run (heating on)

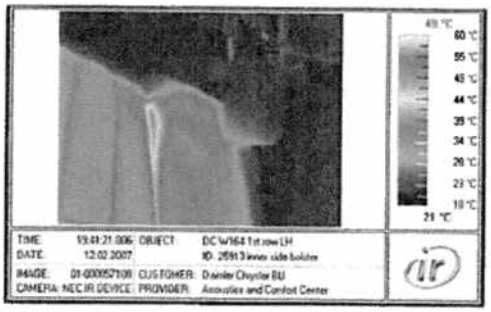


Fig. 5.3.9: During durability run (heating on)

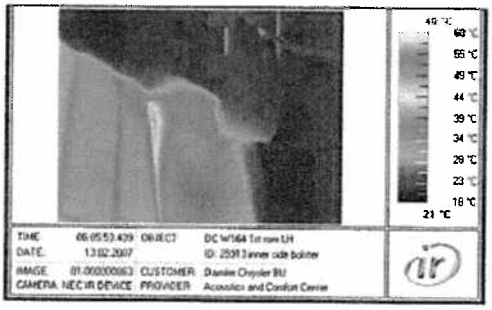


Fig. 5.3.10: End of durability run (heating on)

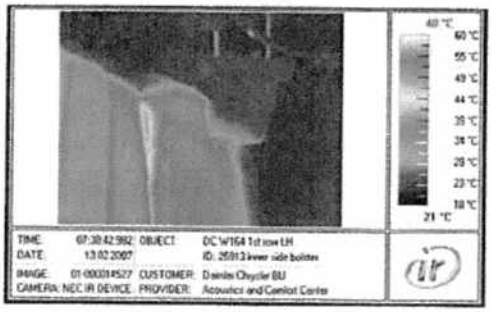


Fig. 5.3.11: End of durability run (heating on)

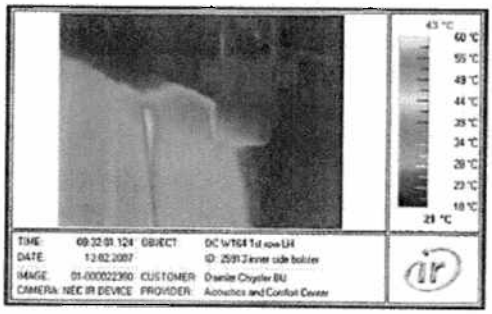
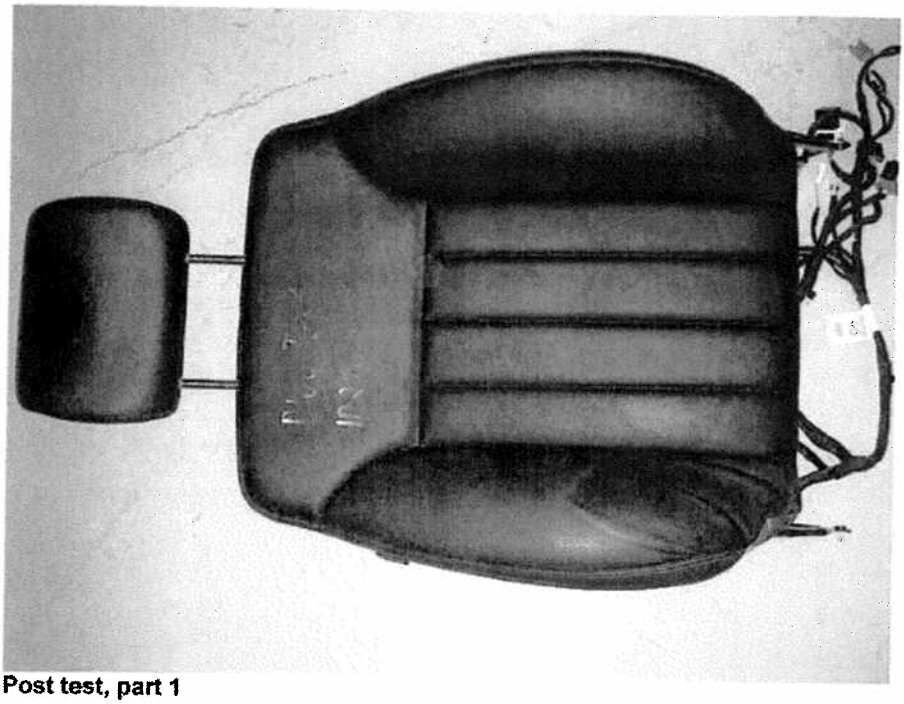
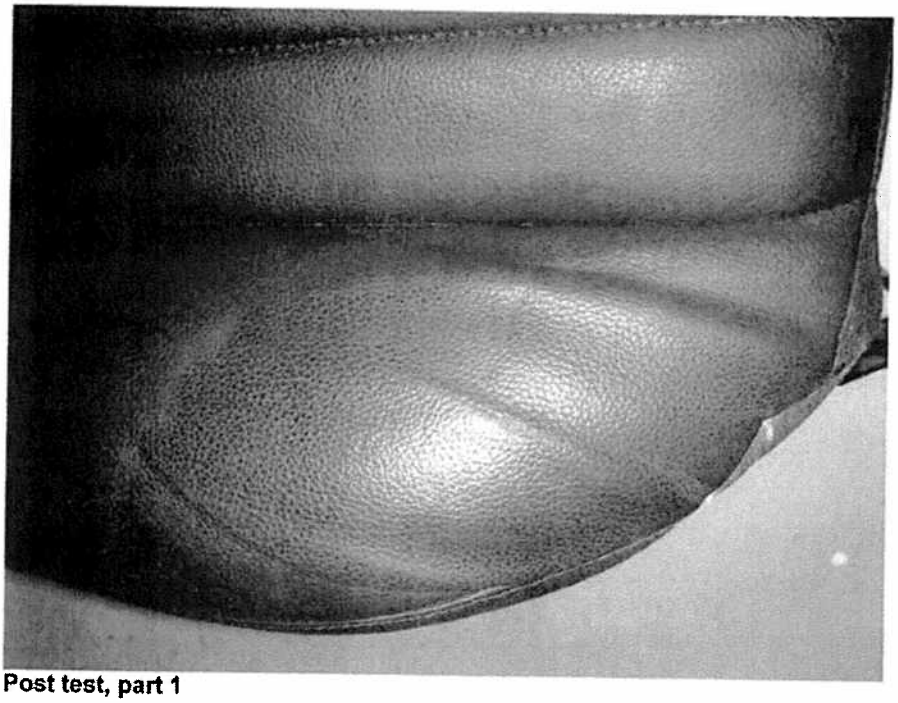


Fig. 5.3.12: End of durability run (heating on)

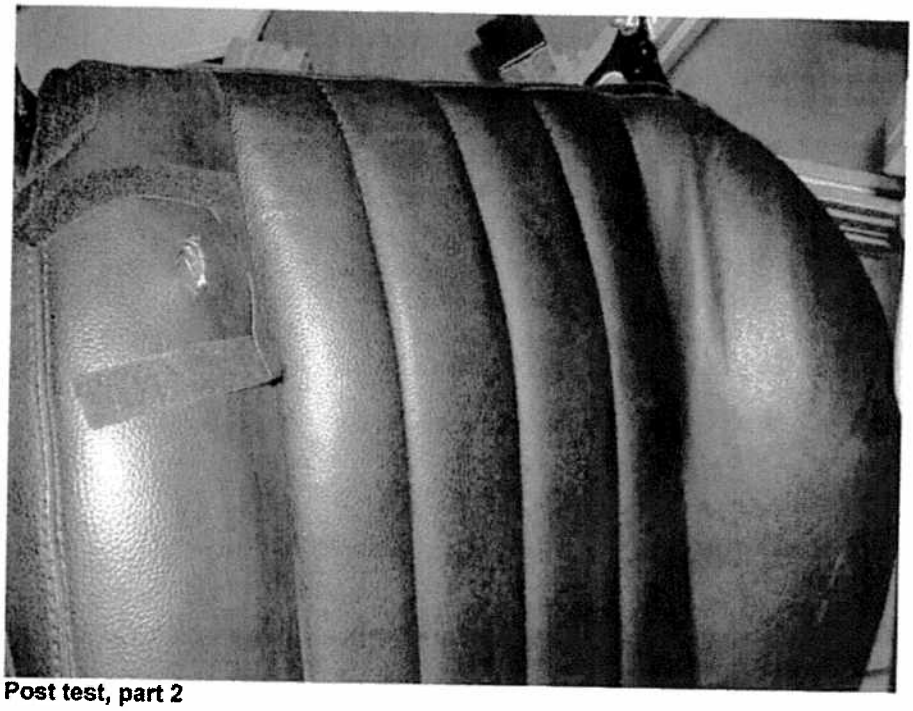
5.4 Photos



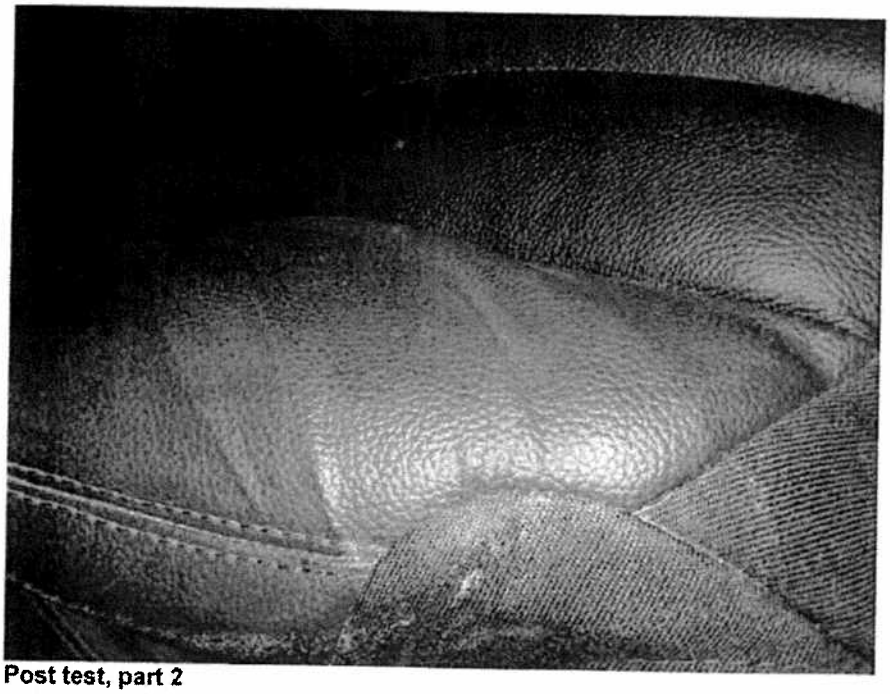
Post test, part 1



Post test, part 1



Post test, part 2



Post test, part 2

5.5 Quality Documents

ID 25129

Precise Part Definition / Baustandsdefinition

JOHNSON CONTROLS

Customer :	Daimler Chrysler	x Prototype	Sample		
Project Name :	BR-164	MaPlan ID-No.:	25129		
Project No. :	01.00554	Vehicle - No. :		Phone	02174-653137
Cost center :	91424010	Task :	da-ptc-plr1	Name:	S.Witte
				Program Mgr.	Joerg Plaum

type of prototype "X"

Seat	x	Colour:	black
Bench		Row:	1.Row
OHS		Fabric / Leather:	Artico
Doorpanel		LH / RH:	RH
Cockpit		any others:	
Sundry goods	nur Lehne BH		

Recipient: Klaus Langenhorst

Purpose: Testing Scheuertest Heizung

Remarks:

Customer Purchase Order Number :

Lieferantennummer :

Aufbauort / JR Plant :

Part Name / Artikelbezeichnung	JCI Part No.	Lev	JC Drawing No.	Lev	Quantity	Remarks
ZB EL. LTGS. SATZ (6CS) MIT SH. FLCAK	1437061	1	1437061		1	
LEITUNGSSATZ / ZB EL. WIRING HARNESS	1472656	1	322911		1	
ZB Bezug Lehne re Artico,BH ohne Lord	379834	004	309206		1	
ZB backrest cover RH Artico,sh without						
ZB Auflage Lehne RE [ohne LORD] / Assy back foam pad RH (without LORD)						
Flügelclip (blau) / butterfly clip (blue)	149434	001	149434		6	POM C 9021 blau
Polsterclip / Trim clip	373874	1	373874		4	POM
ZB Lehnenrahmen RE MK / Assy backrest frame MC RH	374760	7	1488530		1	
Befestigungsbuegel (Lehne+Kissen) / mounting bracket (driver back+cushion)	373080	000	373080		1	Draht DIN 2076-B-02.2mm
Befestigungsbuegel (Längsabstellung Lehne) / mounting bracket (driver back)	373081	000	373081		2	Draht DIN 2076-B-02.2mm
ZB Verkleidung vst / Assy trim compl.	1426667	1	1426671		1	
ZB Halter LI / Assy bracket LH	382451	3	379356		1	
ZB Halter Re / Assy bracket RH	382452	3	379356		1	
ZB Fuehrung Kopfstuetze / Bezel with push button	384469	4	387451		1	PA 6.6 + X 12 Cr Ni 17 7k (Feder)
ZB Fuehrung Kopfstuetze RE / Bezel RH	309485	3	309485		1	PA 6.6
Blechschraube / screw backpanel (JCI)	1233251	1	1233251		2	1022 Steel case harden 45ec
Sidebag RE / sidebag RH	281928	4	252890		1	
Sidebag Verstaerkungsplatte RE / Reinforcing plate RH	385483	2	385484		1	EU: H320LA US: SAE J 2340 GRADE 300 XF CR
Blindniet / pop rivet	280856	000	280856		3	St
Stecker 5H Kunst. / Plug	357743	000	357743		1	POM nach DBL 5420 00

ID 25913

No quality papers attached
Backrest delivered on 2007-02-09 from engineering
Warranted cover No 4 because of burn out; wiring provisory soldered at burn out point of heating to put heating into operation. Therefore scouring area was inboard.

6 Notes

7 Appendix

W.E.T. Automotive Systems AG
Rudolf-Diesel-Str. 12
D-85235 Odelzhausen

VERSUCHSBERICHT / Test Report Nr. / No.: 08116

Name:	Christian Fendt	**Auftraggeber / Requested by:**	J. Schumacher (VP-2)
Datum / Date of report:	2007-03-15	**Kundenprogramm / Customer Program Name:**	DC M-Class W164

Aufgabe / Purpose (incl. remarks & deviations):

In order to reproduce field failures on an m-class (W164) backrest, perform pressure distribution measurements. After that, use the information of the pressure mappings and also of optical inspection of the ingress/egress test with occupants and create a "worst case" pressure profile with a seat-tester.

Prüfling(e) (mit Eingangsdatum) / sample(s) (&sample received date):

M-class back rest W164; driver seat received on 2007-02-28

Prüfvorschrift / Specification (section if applicable / version / release date):

W.E.T. WI 40-0001754 000
W.E.T. WI 40-0001593 001

Zusammenfassung - Ergebnisse / Summary - Results:

Two seat tests profiles were created, regarding the worst case male and female pressure distribution.
For finding out about the worst case profiles, the test persons had to get in and out of the test car several times under different conditions (i.e. narrow parking spot, door quite close during ingress/egress, women getting into the car with skirts/trousers).
Further the pressure profiles of the seat test robot were documented.

Datum / Date

freigegeben durch / approved by Sylvia Summerer (test lab manager)

Die Prüfergebnisse gelten nur für die getesteten Prüflinge. The test results apply only to the tested parts.

Index

1 Verwendete Prüfmittel / Equipment used (incl. calibration information):

Pressure mats PM 042028-O (* calibration file created on 2006-09-20)

Seat test robot S2, force cell PM 022018-O; calibrated due 2008-02

Occuform (small) covered with silicon and "DB-Geflecht"

2 Testpersons

Name	size of occupant [cm]	weight of occupant if available [kg]	percentile relating to size of occupant
Mrs. Summerer	160	55	≈50
Monika	159	52	5<x<50
"Adyie"	150	47	<50
Katharina	172	87	≈95
Mrs. Thoma	158	63	5<x<50
Mrs. Pöhlmann	183	77	>95
Mrs. Herrmann	168	63	50<x<95
Mrs. Dragica	156	62	5<x<50
Mr. Armbruster	173	92	50
Mr. Johann	190	120	>95
Mr. Fendt	184	≈80	≈95
Mr. Haller	188	110	>95
Mr. Schäkel	193	100	>95
Mr. Schubert	186	105	>95
Mr. Deininger	175	64	≈50
Mr. Gutschwager	170	n.a.	<50
Mr. Djordjevic	176	84	50<x<95
Mr. Teufelhart	171	93	<50
Mr. Reindl			
Mr. Richter	179	73	50<x<95

Table 1: Test-persons

3 pressure mappings

Altogether 125 measurements were performed. In this report only the pressure mappings with relevant data (i.e. measurements with high pressure peaks) are listed below. Each test person had to perform several ingress/ egress situations (For example normal parking spot/narrow parking spot, some women performed the ingress egress with skirt and with trousers; further different situations like "a man gets into the car, after a small woman was driving with the car and the seat position was forward). After that the worst case for each test person was chosen. Some test persons didn't cause any relevant pressure peaks. These pressure distributions are not documented in this test report, but they are linked in the related test report sketch.

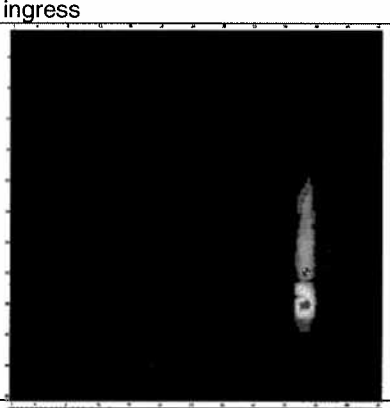
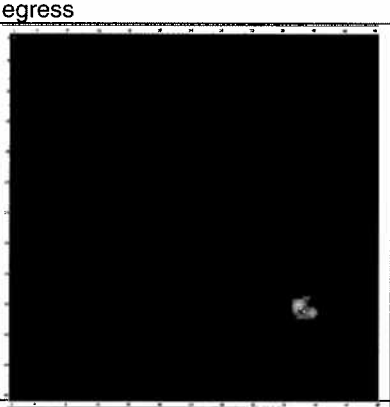
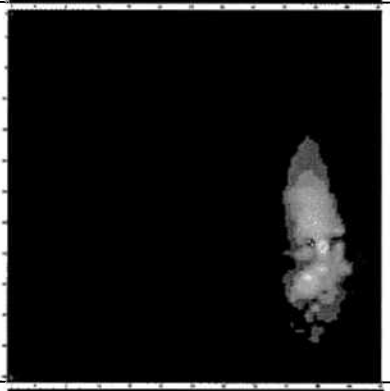
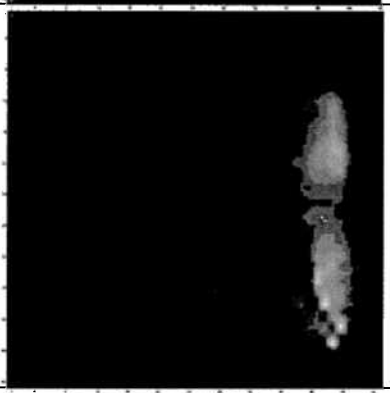
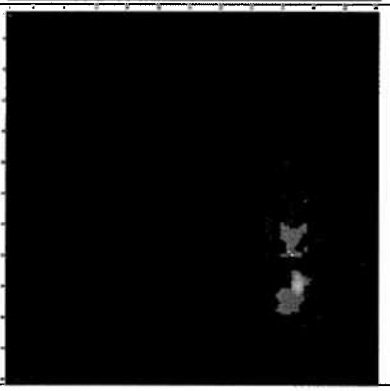
Regarding the relevant pressure distributions, it is noticeable, that the pressure-peaks of the male occupants occur mostly during the ingress. However the female occupants cause the critical pressure peaks during the egress.
The occupant Mr Johann causes the "worst case" pressure peaks of the male test persons during the ingress and also during the egress. Further the pressure peaks are in the critical area, were field problems occurred.

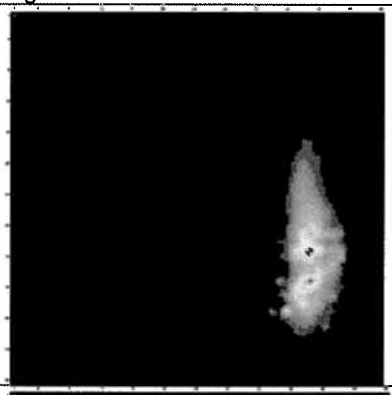
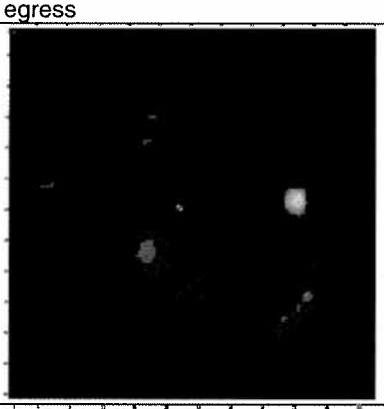
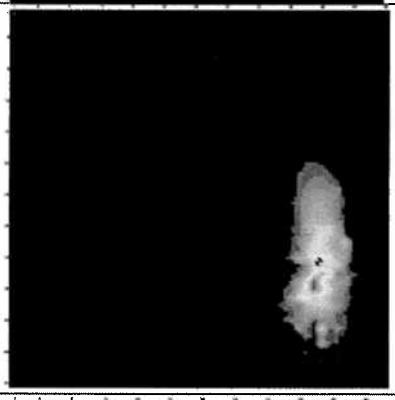
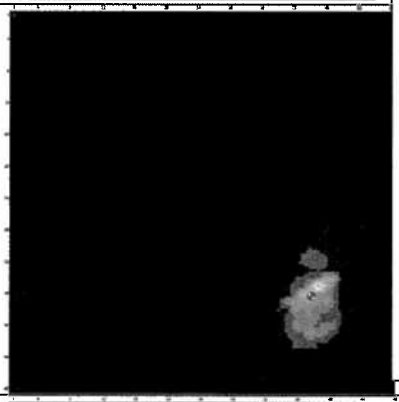
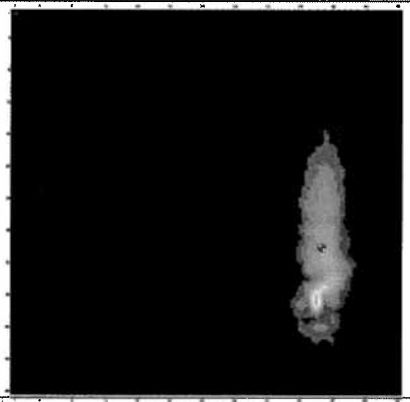
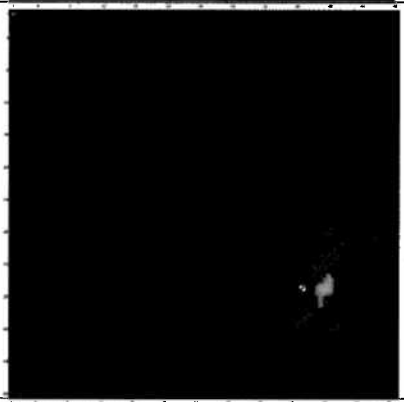
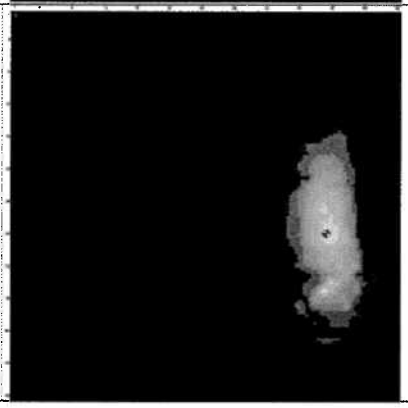
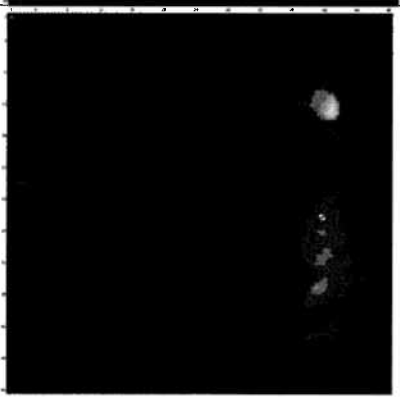
On the other hand, regarding the relevant, female pressure distributions, Mrs Summerer caused the maximum pressure peaks, especially during the egress. In this case during the egress the pressure-stress on the bolster was higher, when the test person was wearing trousers than with a skirt. Also here, the pressure peaks are within the critical area. Also in the upper and middle part of the back-bolster, pressure peaks result during the egress of test person "Mrs Summerer".

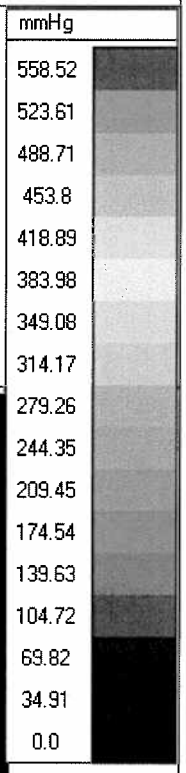
Regarding the comparison of the worst case profile (male) and the seat test robot (male pressure profile) it can be said, that during the ingress, the robot has a higher pressure peak (about 700mmHg) then the male occupant, because of the time lapse. But the location of the maximum pressure peak of the test form is at the same position as the one of the worst case man. The pressure locations are of the same size and intensity.

For reproducing the pressure distributions of the worst case female test person, it was necessary to split up the movement, as the contact surface of the test form is not as high as the one of the test person. Further the test form is not as flexible as the body of a human test person. That is why it was not possible to press against an as large area as the test person at the same time.
In the critical area the area with maximum pressure is not as big as it was with the test person. But here the pressure peak is at the right location. The upper part of the bolster is also in contact with the test form, although it is considered that it is not responsible for the field problems.

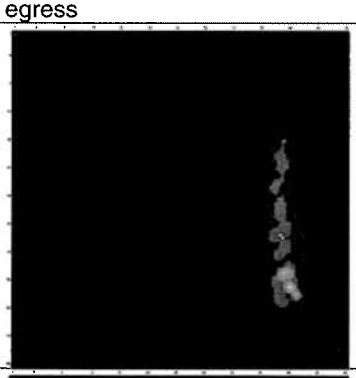
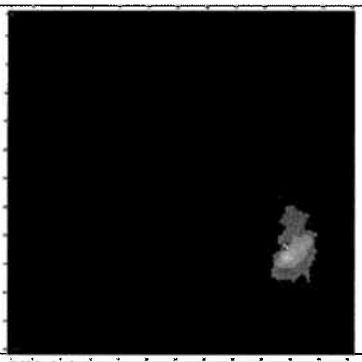
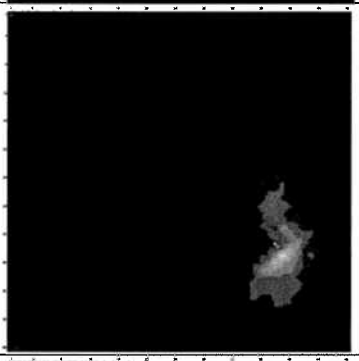
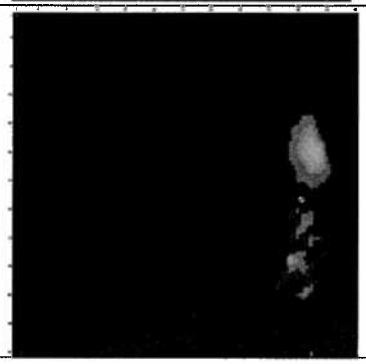
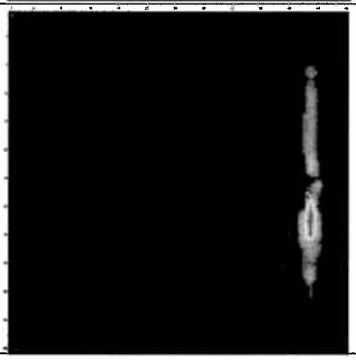
3.1 male occupants

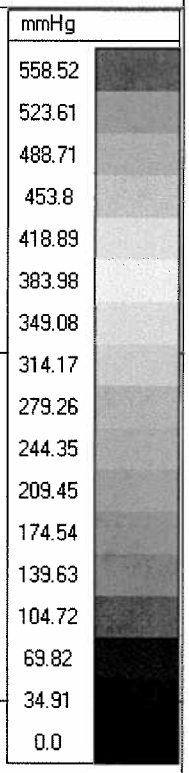
occupant name	ingress	egress
Mr. Deininger (DC) normal seating position, narrow parking spot		
Mr. Armbruster seat ahead, narrow parking spot		
Mr. Teufelhardt, seat ahead, narrow parking spot		
Mr. Schubert, seat ahead		

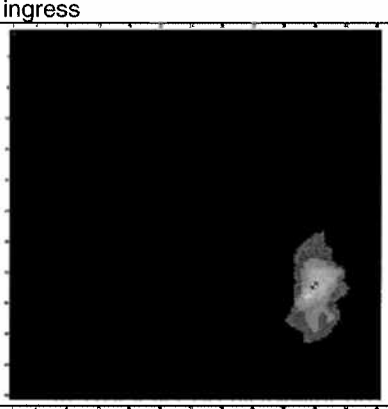
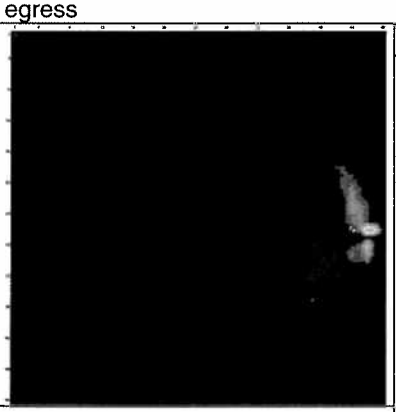
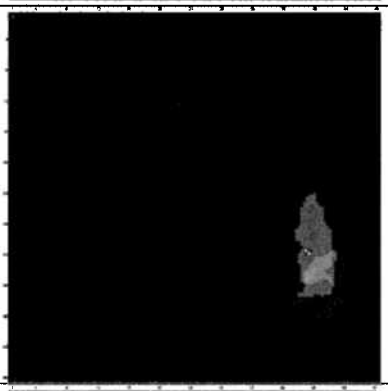
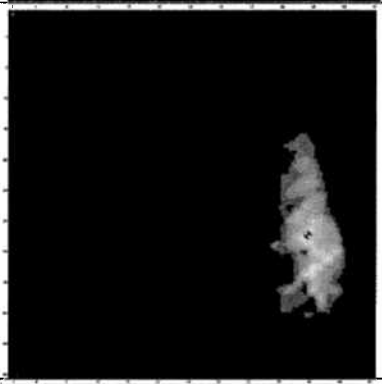
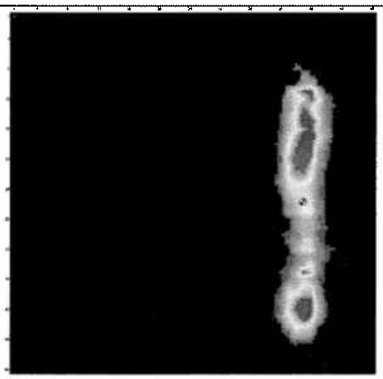
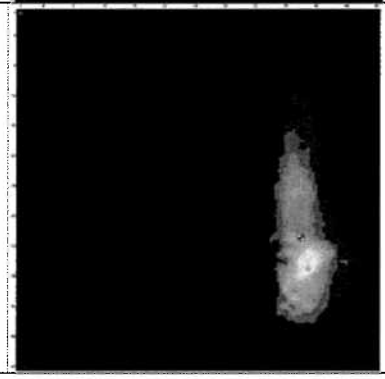
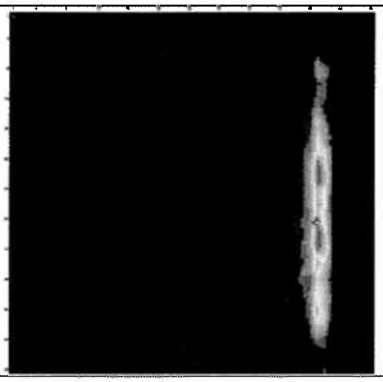
occupant name	ingress	egress
Mr. Fendt normal seating position, narrow parking spot		
Mr. Johann seat ahead		
Mr. Richter normal seating position		
Mr. Reindl, seat ahead		

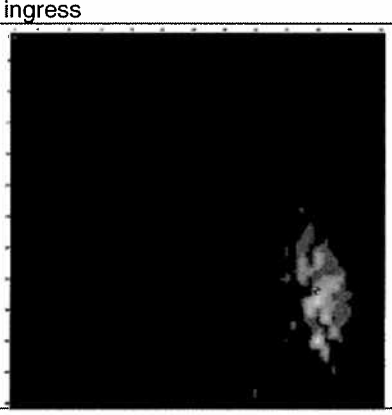
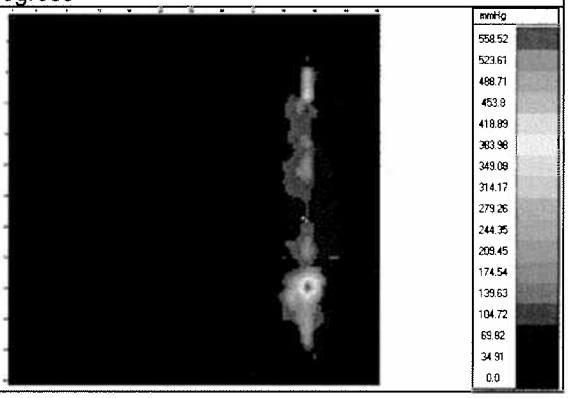


3.2 female occupants

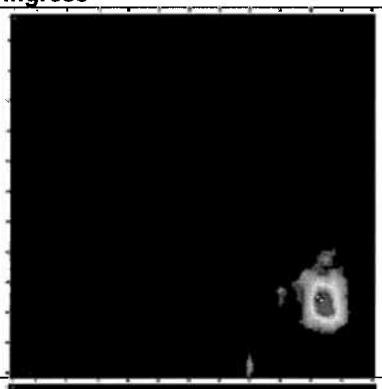
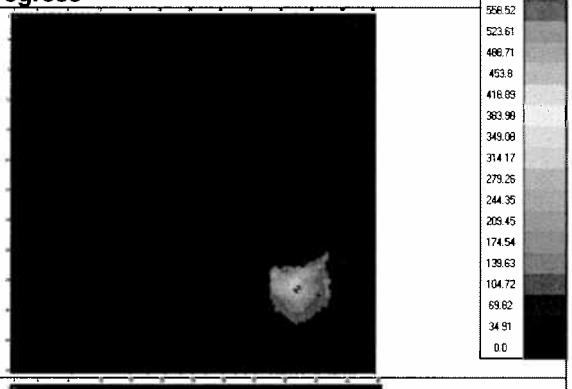
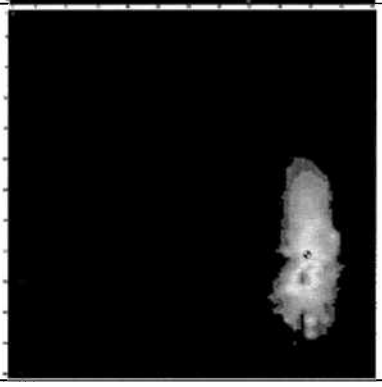
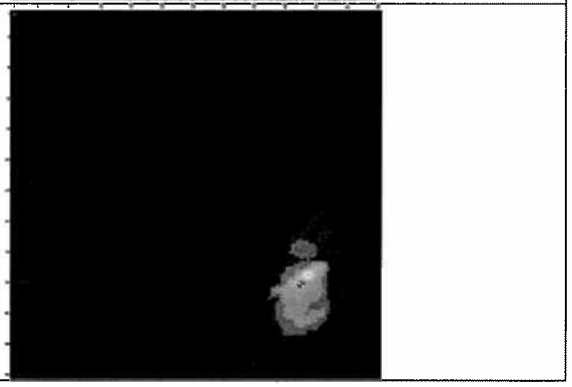
occupant name	ingress	egress
Adyie, wearing trousers, normal seating position		
Dolly, wearing a skirt, seat ahead		
Katharina, narrow parking spot		
Monika, wearing a skirt, narrow parking spot		

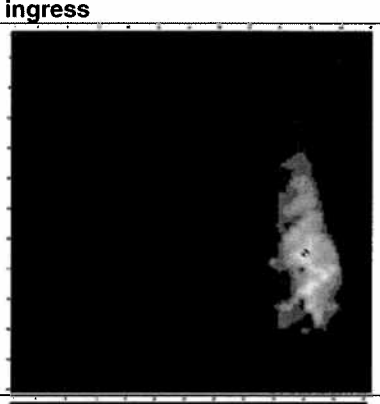
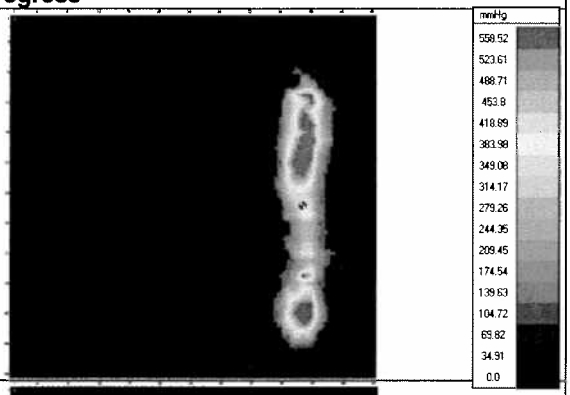
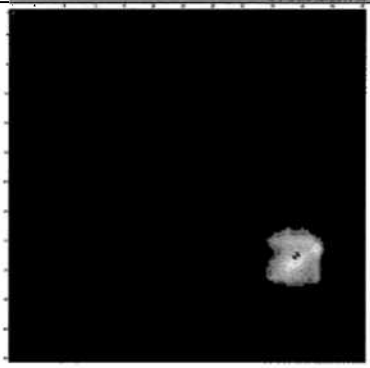
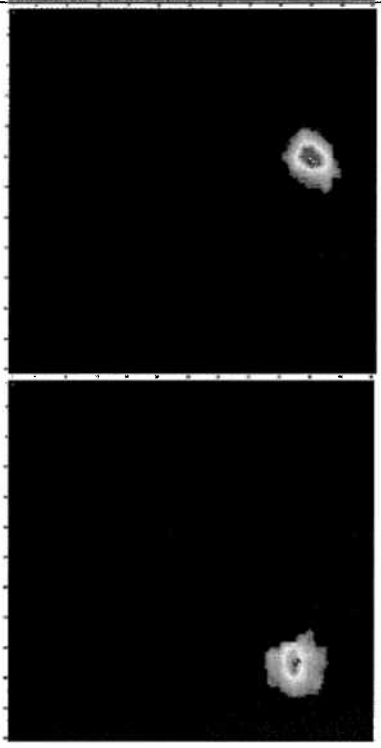


occupant name	ingress	egress
Monika Hermann		
Sabine Niklas		
Sylvia Summerer		
Sylvia Summerer, wearing a skirt		

occupant name	ingress	egress
Sylvia Summerer, seat extremely far ahead		

3.3 pressure profile of seat test robot

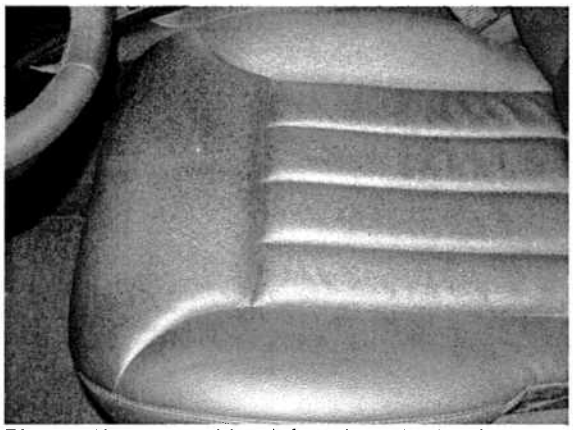
"occupant" name	**ingress**	**egress**
seat test robot, male pressure distribution		
For comparison the worst case pressure profile of Mr. Johann seat ahead,		

"occupant" name	ingress	egress
Sylvia Summerer		
seat test robot female pressure distribution		

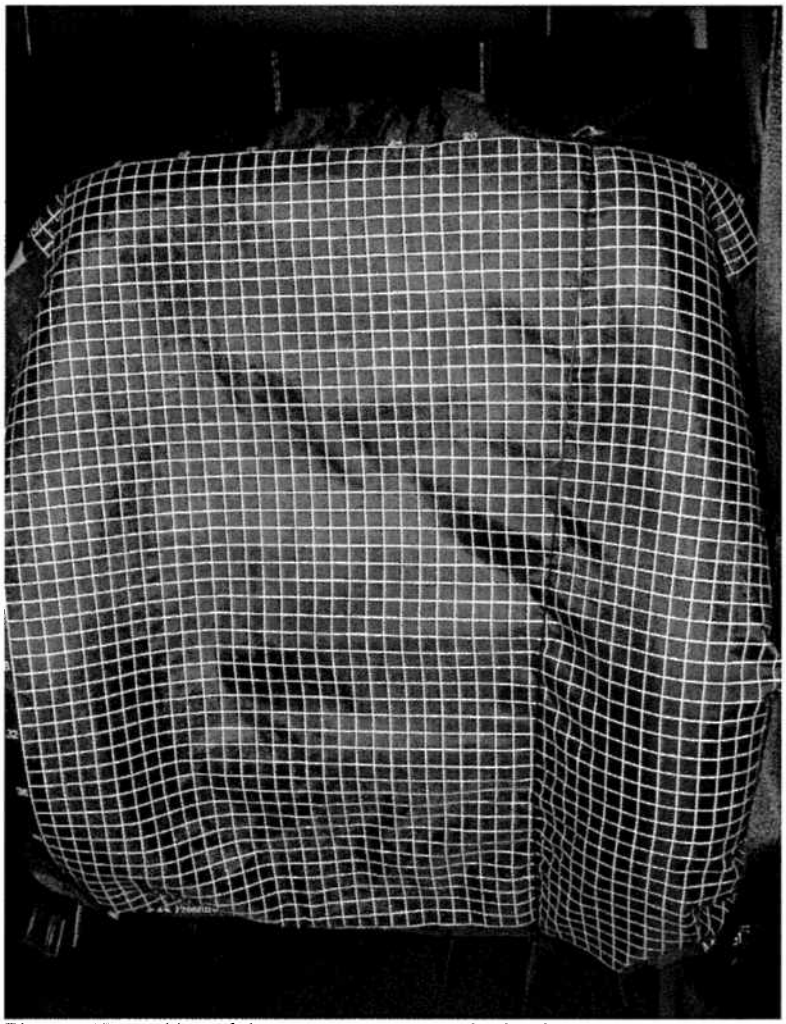
4 Photo documentation

Picture #1: used car for pressure mappings

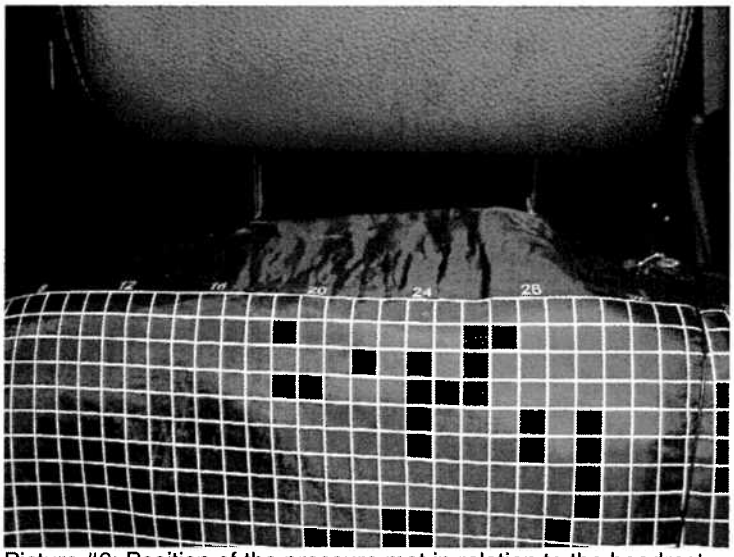

Picture #2: ingress/egress environment


Picture #3: seat cushion (after about 25.000 km operational performance)

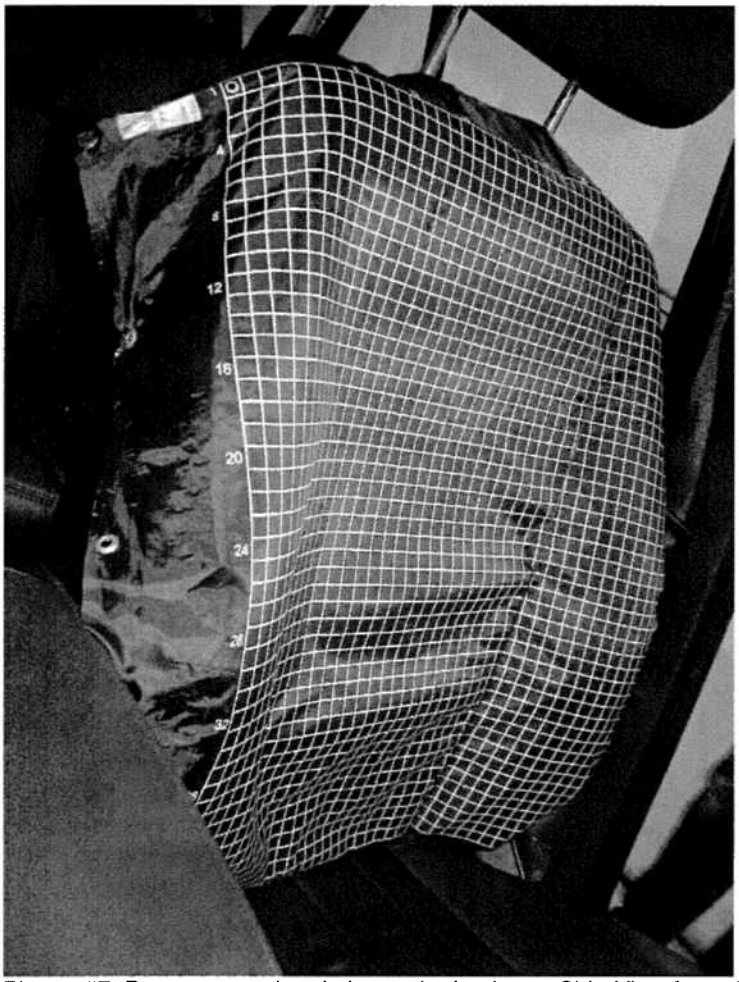
Picture #4: vehicle identification number of the used car



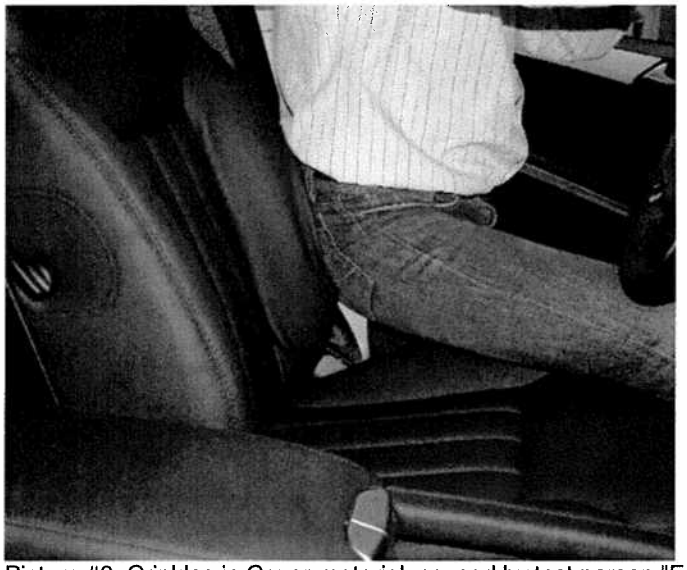
Picture #5: position of the pressure mat on the backrest



Picture #6: Position of the pressure mat in relation to the headrest



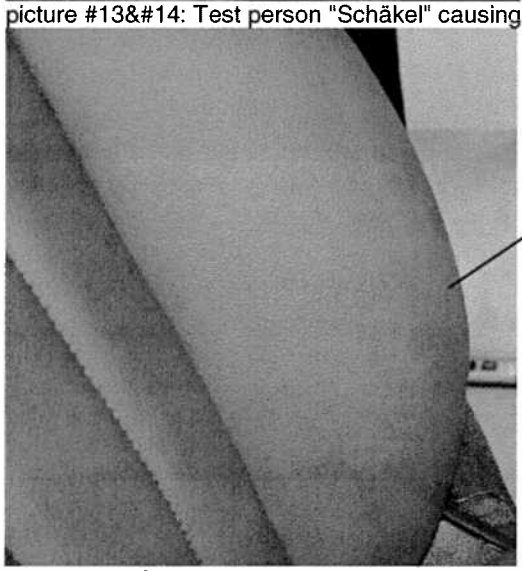
Picture #7: Pressure mat in relation to the backrest; Side-View from the passenger seat



Picture #8: Crinkles in Cover-material, caused by test person "Fendt" during ingress

Picture #9 to #12: egress sequence of test person "Fendt"

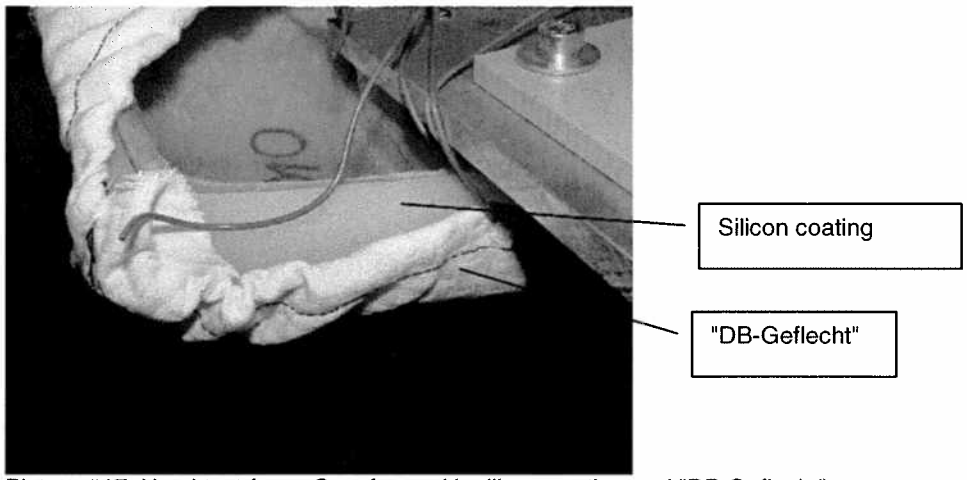
picture #13&#14: Test person "Schäkel" causing crinkles of cover material during ingress



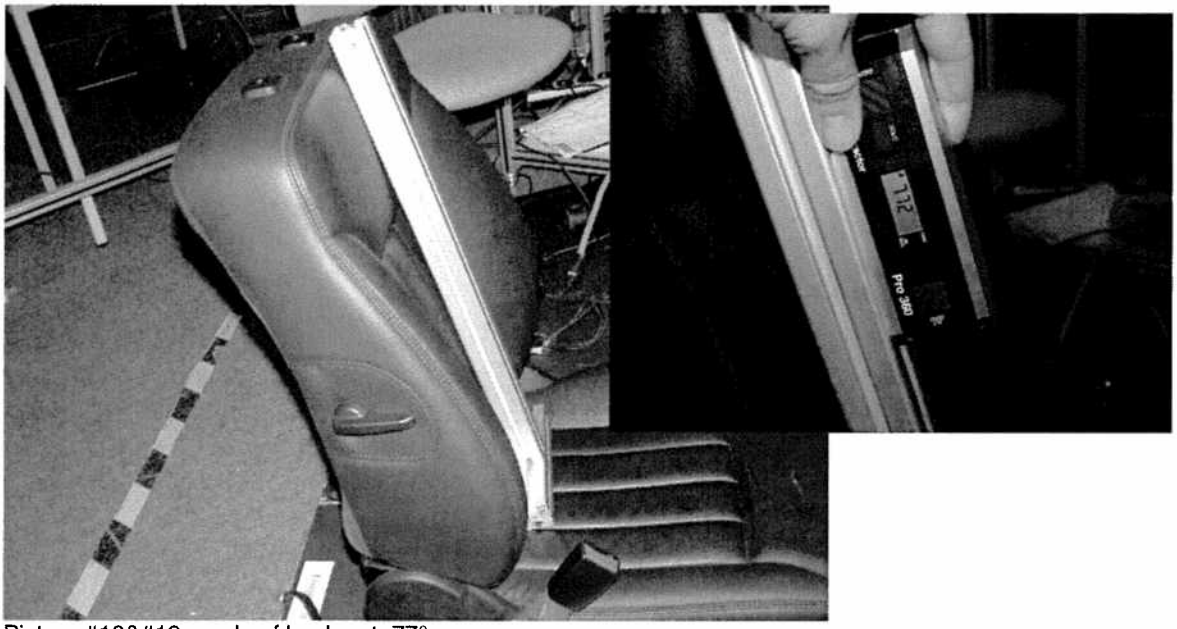
Crinkles after the ingress/egress series with test persons

picture #15: Crinkles caused by test persons

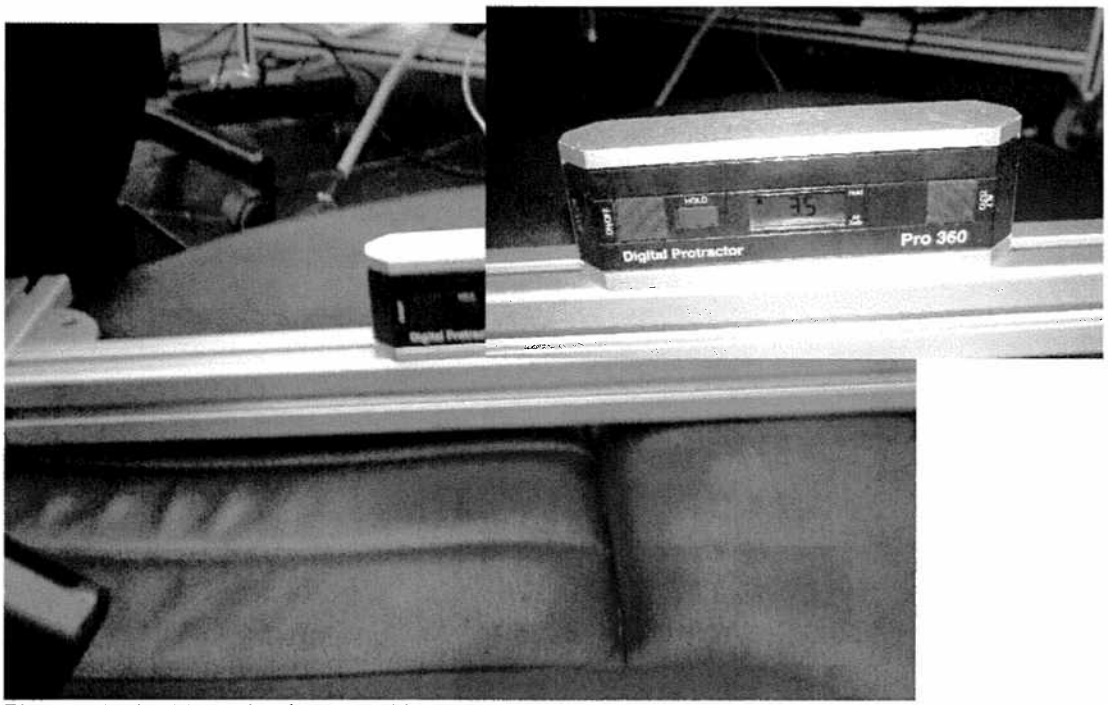
Picture #16: Base position as per W.E.T. WI 40-0001593 001



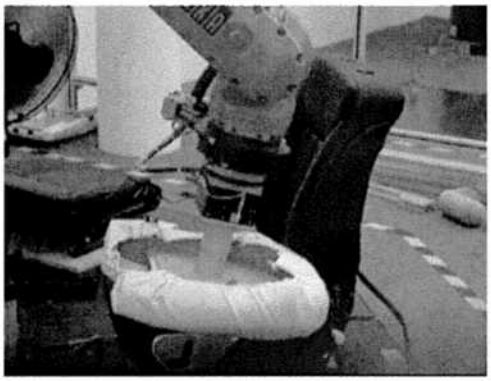
Picture #17: Used test form: Occuform with silicon coating and "DB Geflecht"

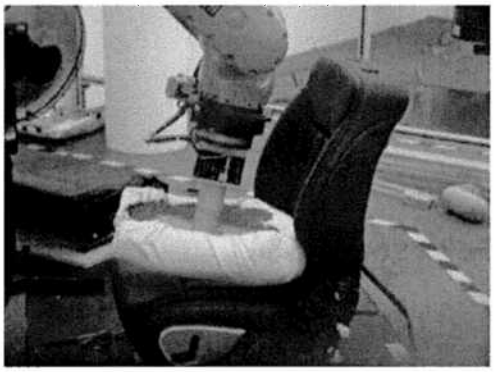


Picture #18&#19: angle of backrest: 77°

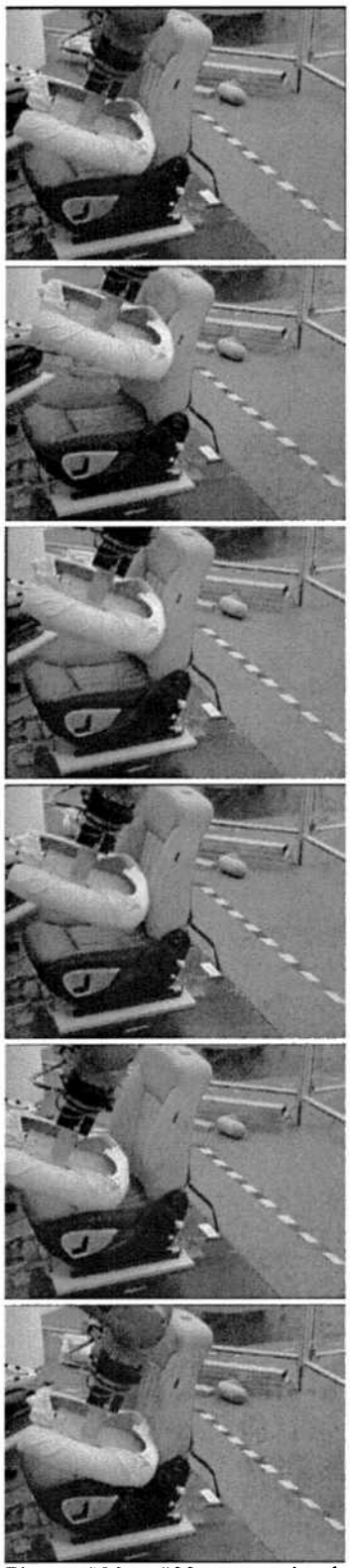


Picture #20 & #21: angle of seat cushion





Picture #24 to #27: one cycle of mechanical durability test (male)



Picture #28 to #33: one cycle of mechanical durability test (female)

W.E.T. Automotive Systems AG
Rudolf-Diesel-Str. 12
D-85235 Odelzhausen

VERSUCHSBERICHT / Test Report Nr. / No.: 08170

Name:	Christian Fendt	**Auftraggeber / Requested by:**	Jens Schumacher (VP2)
Datum / Date of report:	2007-03-14	**Kundenprogramm / Customer Program Name:**	M-Class BR 164

Aufgabe / Purpose (incl. remarks & deviations):

Based on a pressure peak analysis (test report 08116), field-failures of the DC M-Class heater (backrest) should be reproduced with a mechanical seat tester. Test on a Carbotex heating element with design level E. Test until failure occurs.
The used driver-seat was delivered by DC and was already in use in a car for about 25.000 km.

Prüfling(e) (mit Eingangsdatum) / sample(s) (&sample received date):

ASH-Back: 11003589E, complete seat received on 2007-02-28

Prüfvorschrift / Specification (section if applicable / version / release date):

None

Zusammenfassung - Ergebnisse / Summary - Results:

As there was no breakage of the electrode visible in the critical area after totally 36300 test cycles (27,452 male and 8,848 female), a new test (m-class bolster) was created, for the purpose to cause extreme crinkles. After further two days testing (additionally 6,389 cycles of m-class bolster), the seat test was stopped. The x-ray analysis showed that the electrode was broken at 3 different positions, but the breakage was above the critical area.

Datum / Date

freigegeben durch / approved by Sylvia Summerer (test lab manager)

Die Prüfergebnisse gelten nur für die getesteten Prüflinge. The test results apply only to the tested parts.

Index

1 Verwendete Prüfmittel / Equipment used (incl. calibration information):

Seat test robot #2, force cell: PM022018-0, calibrated due 2007-02

Occuform (small) covered with silicon and "DB-Geflecht"

Multimeter for monitoring of current: 051115-O, calibrated due 2008-01

X-ray equipment for radiography: location of Equipment at phoenix x-ray, munich

For calibration check numbers, used for IR measurements, see adequate pages

2 mechanical durability tests

Test name and internal number	*time for one cycle (nominal / actual)*	*force F_x min/max*	*no. of cycles*	*Start of test*	*End of test*
seat specific test based on pressure mappings, see test report 08116 internal no. 0120.dat (representing male occupant) and 0121.dat (representing female occupant)*	male cycle: 11.5s female cycle: 8.5s	see diagram see diagram	male: 27,452 female: 8,848 together 36,300 cycles	2007-03-02	2007-03-07
M-class bolster internal no. 0122.dat	25s	(0...200)N	6,389	2007-03-07	2007-03-09

Power supply during the mechanical durability tests: 13.5V (3min) / 8.1V (7min) / monitoring current
* The male and female profile were performed in a loop: 1200 cycles male profile and afterwards 400 cycles female profile

After 22,965 test cycles (i.e. 17,317 male-cycles and 5,648 female-cycles) the test was interrupted for IR pictures. It was notified, that there was a hot spot near the critical area (where the field failures occurred). After that, an x-ray analysis was done. In the critical area, no electrode breakage was found, but in the contact area one electrode-wire was broken.

Then the seat test (female/male-cycles) was proceeded until 36,300 cycles (8,848 female and 27,452 male cycles) were reached. After that the test was stopped and another IR picture was created. As there was no big variation in the IR compared to the one before, another test was created (m-class-bolster).
The test m-class-bolster was developed in view of creating heavy crinkles in the back bolster, disregarding the pressure mappings before.
After another two days testing (further 6,389 cycles of m-class-bolster test), the tester was stopped in accordance with Mr. Schumacher.

Thereafter the heating element was x-rayed again. At three positions the electrode was broken. But the failure was above the critical area (where the field failures occurred).

3 IR Pictures

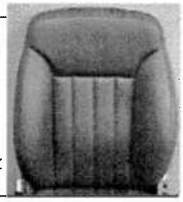
Customer	DC
Object	M-Class-back

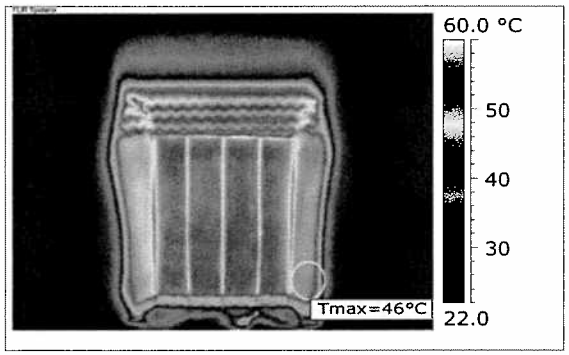
Tester	Fendt	Date	#1: 02.03.2007 #2: 05.03.2007 #3: 07.03.2007 #4: 09.03.2007			PM-No.: / cal. to
Order No.	08170	Heating element assembled		Voltage	13.5 V	031072-O / 2007-03
Epsi-Factor	0.98	Picture for documentation		Current	see below	021051-O / 2007-08
Range	-40 - 120°C	Heat up without test person		Clima te		041095-O / 2007-10
Zoom	1.0	Distance approx.	1.5 m			991031-O / 2007-09

Comment:

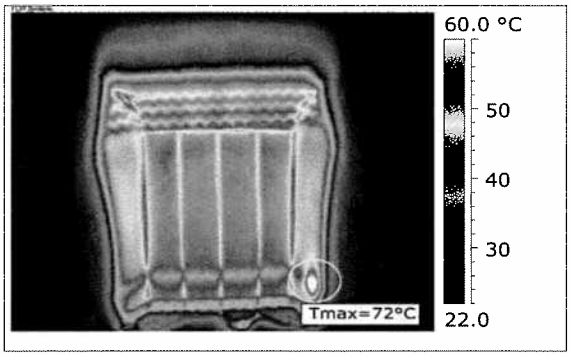
	W.E.T.-No.
ASH-cushion:	11003589E

IR #1: before test
IR #2: after 22,965 test cycles, i.e. 17,317 (male) & 5,648 (female) test cycles
IR #3: after 36,300 test cycles, i.e. 27,452 (male) & 8,848 (female) test cycles
IR #4: after 36,300 test cycles, i.e. 27,452 (male) & 8,848 (female) test cycles and additionally m-class bolster test

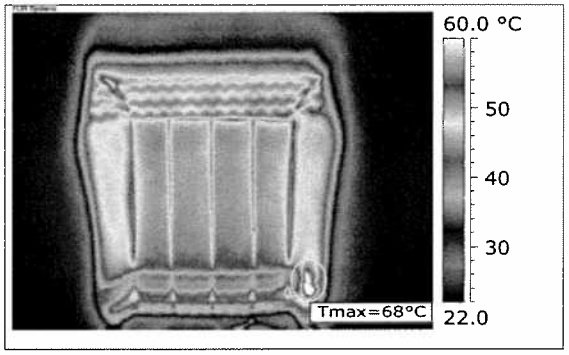




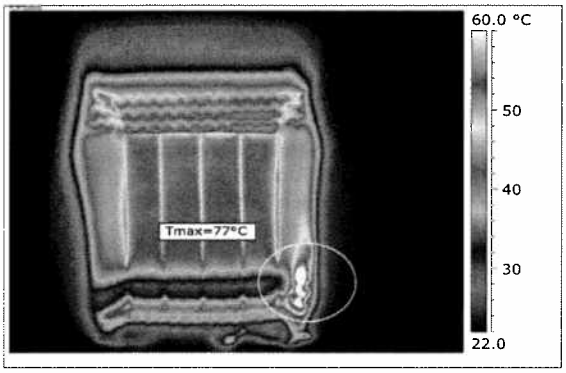
IR #1: I (10min)=6.08A; (23°C/32%)



IR #2: I (10min) =5.98A; (22°C/28%)



IR #3: I (10min)=5,88A; (23°C/31%)



IR #4: I (10m in)=5,58A; (23°C/30%)

Thermo picture with infrared thermo graphic system ThermaCAM PM695 PAL PM Nr.: 021062-O, calibrated to 2007-12

4 X-ray after 17,317 (male) & 5,648 (female) test cycles

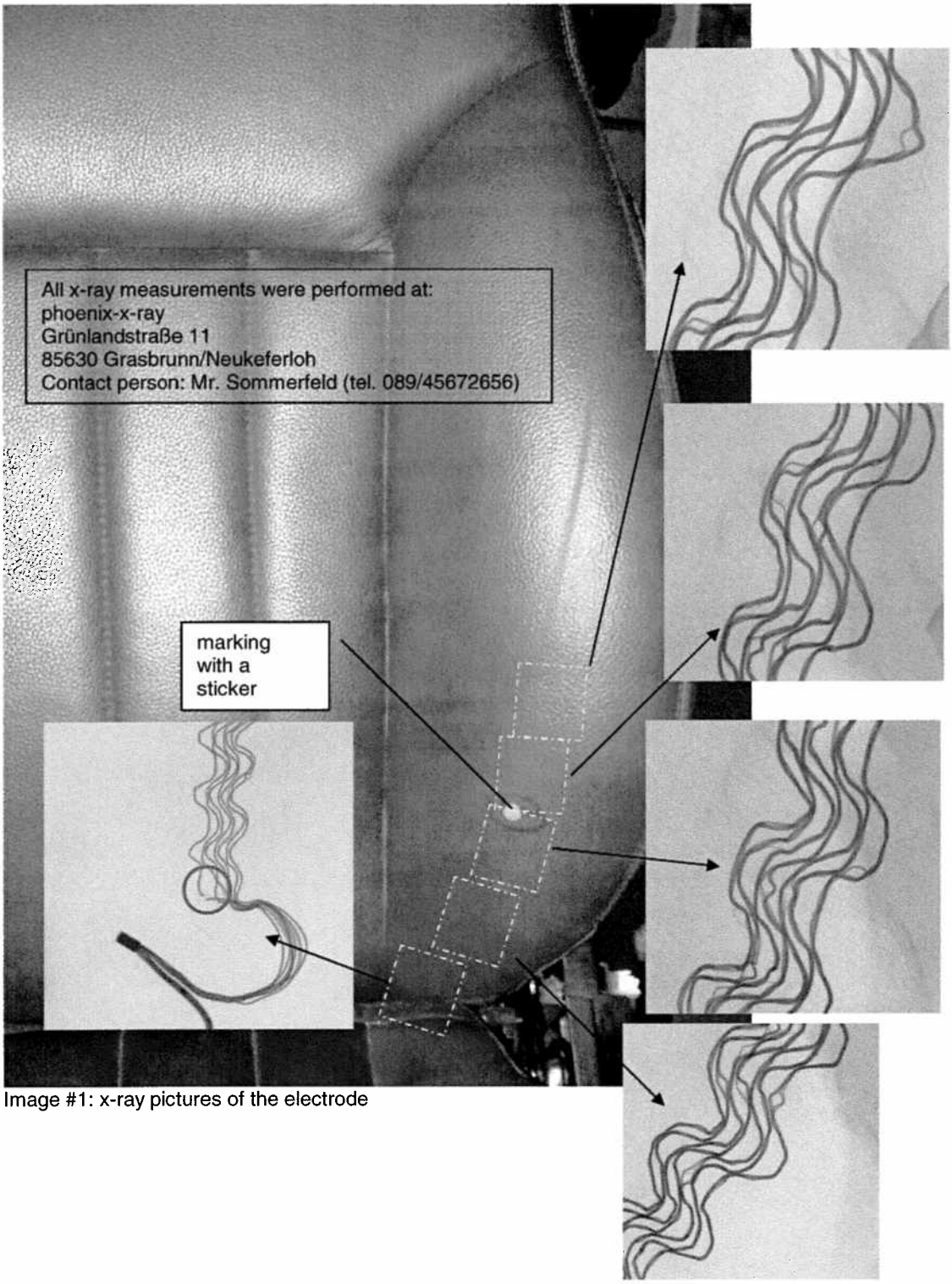


Image #1: x-ray pictures of the electrode

5 X-ray after 27,452 (male) & 8,848 (female) test cycles and additionally 6,389 m-class bolster cycles

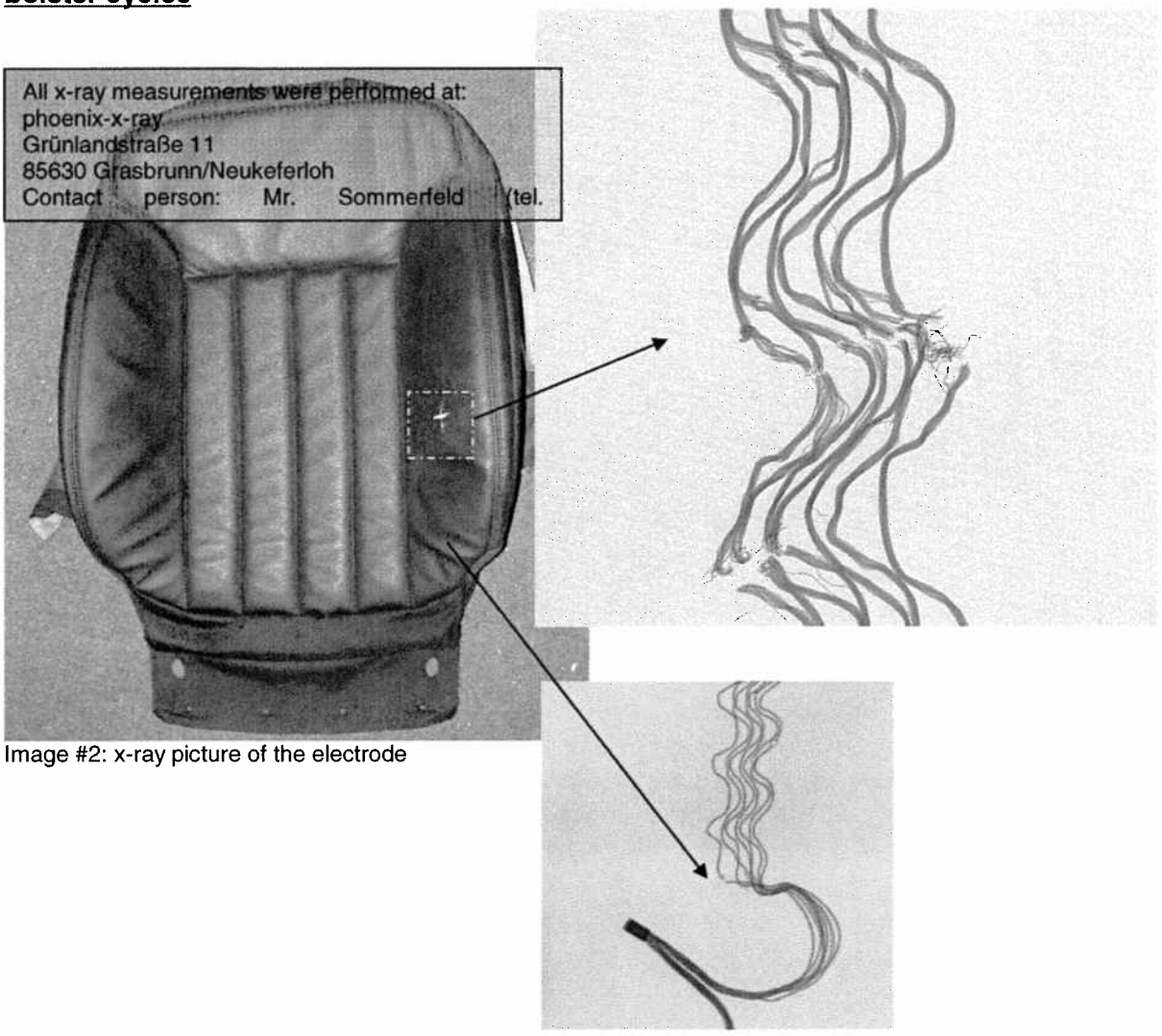


Image #2: x-ray picture of the electrode

6 Test Setup

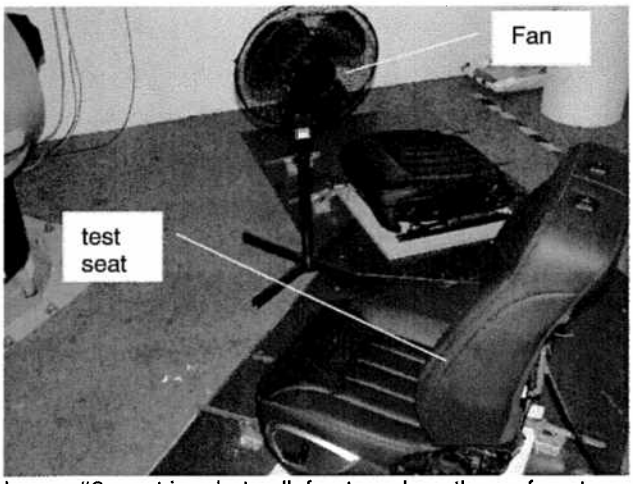


Image #3: seat in robot cell; fan to reduce the surface temperature of vinyl-material)

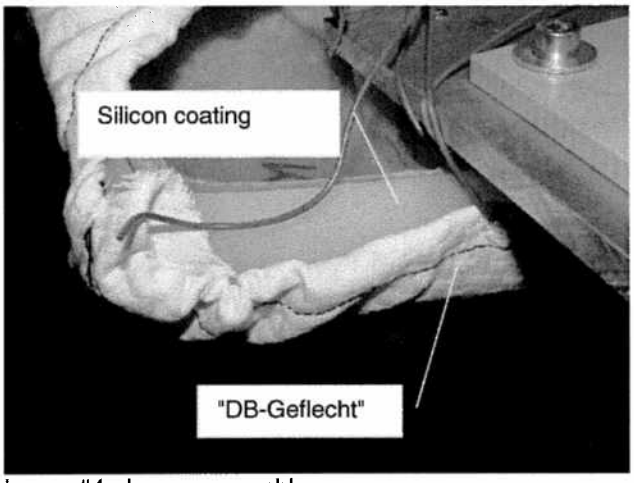


Image #4: dummy assembly

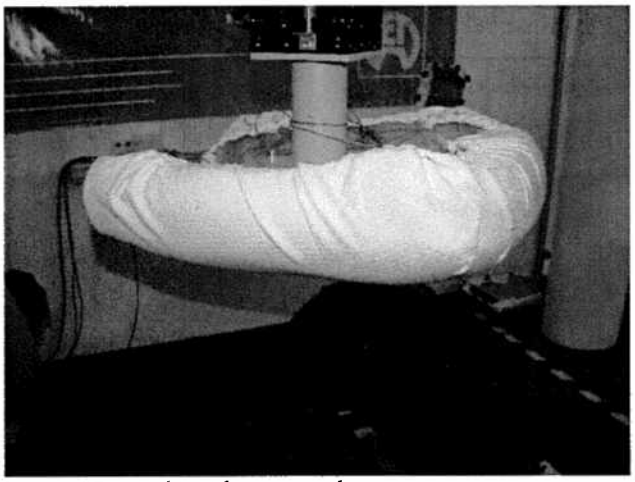


Image #5: used test form: occuform

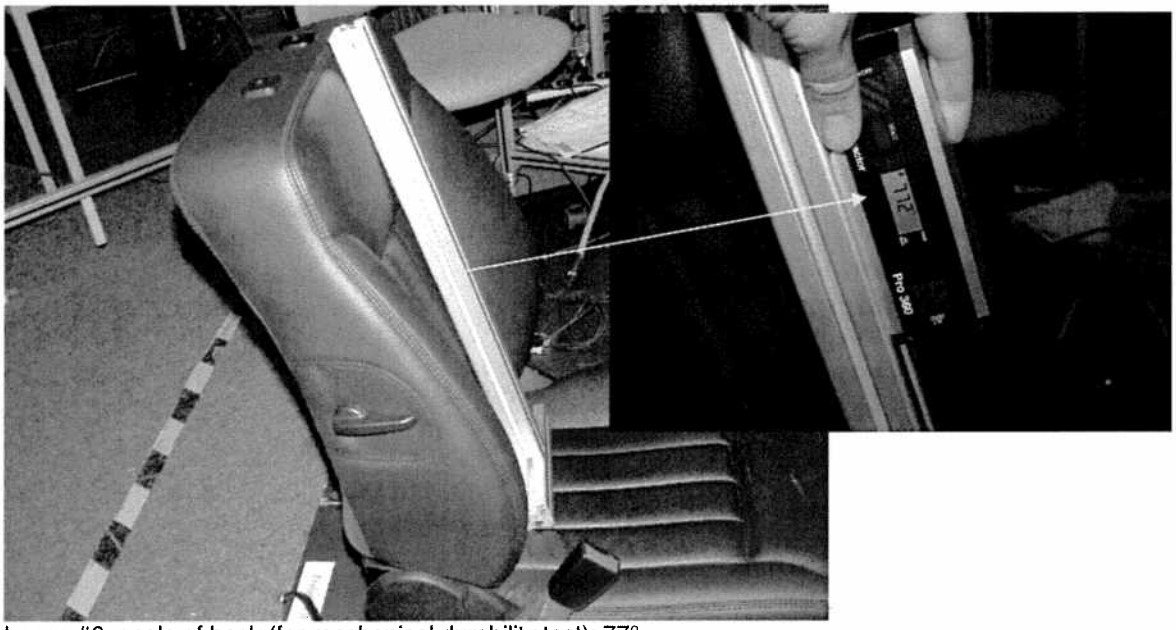


Image #6: angle of back (for mechanical durability test): 77°

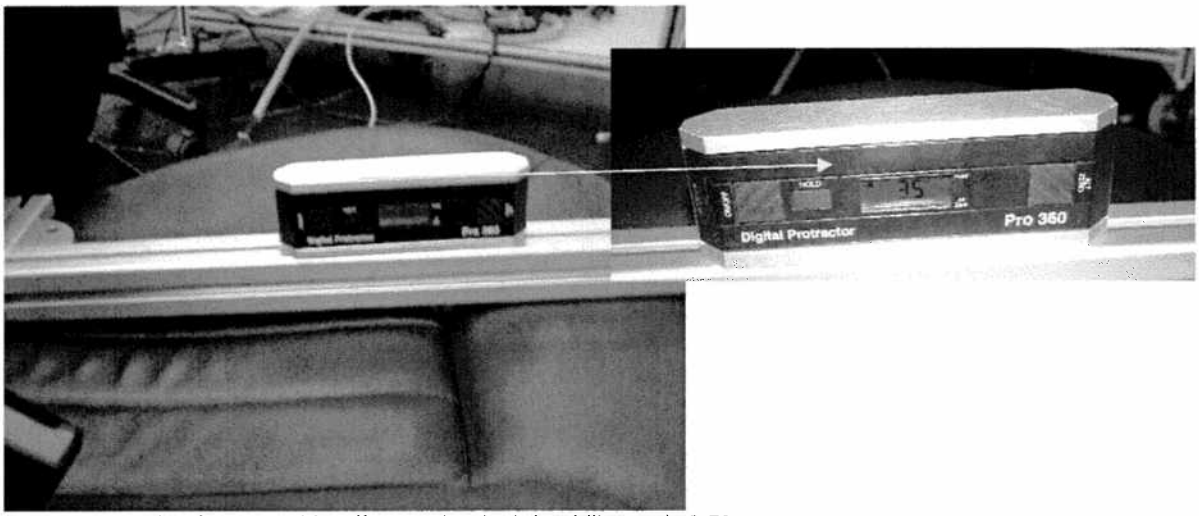


Image #7: angle of seat cushion (for mechanical durability test): 3.5°

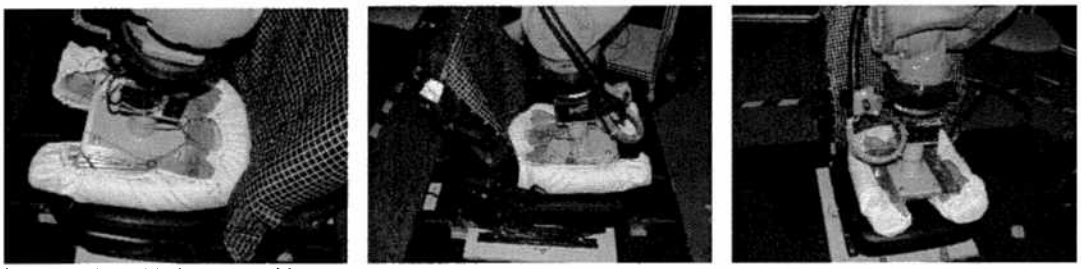


Image #8 to 10: base position

7 Sequence of the mechanical durability test m-class-bolster

Image #11: Touching and pressing against the seat

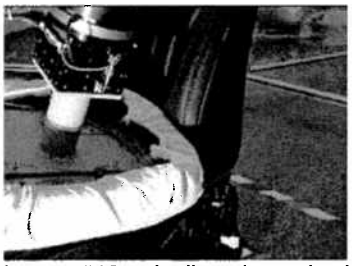


Image #12: wiggling down the bolster for 5 times around the angle + / - 20° and sliding down simultane ously for 55mm

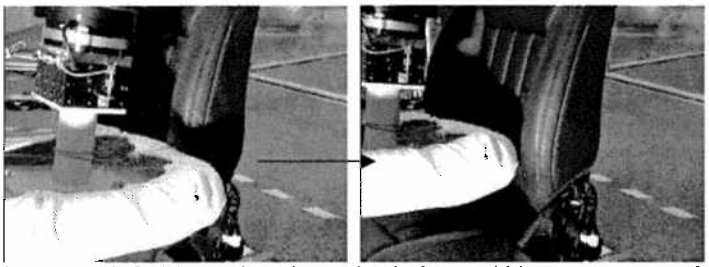


Image #13 & 14: turning down the bolster within a movement from right side to the middle of the seat (similar to ingress)

Image #15: pressing against the bolster during a sidewards movment (similar to egress)

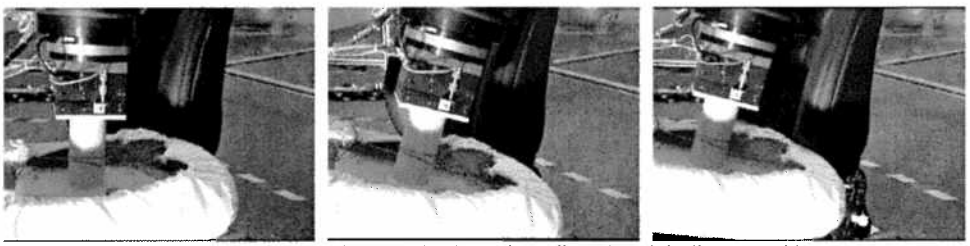
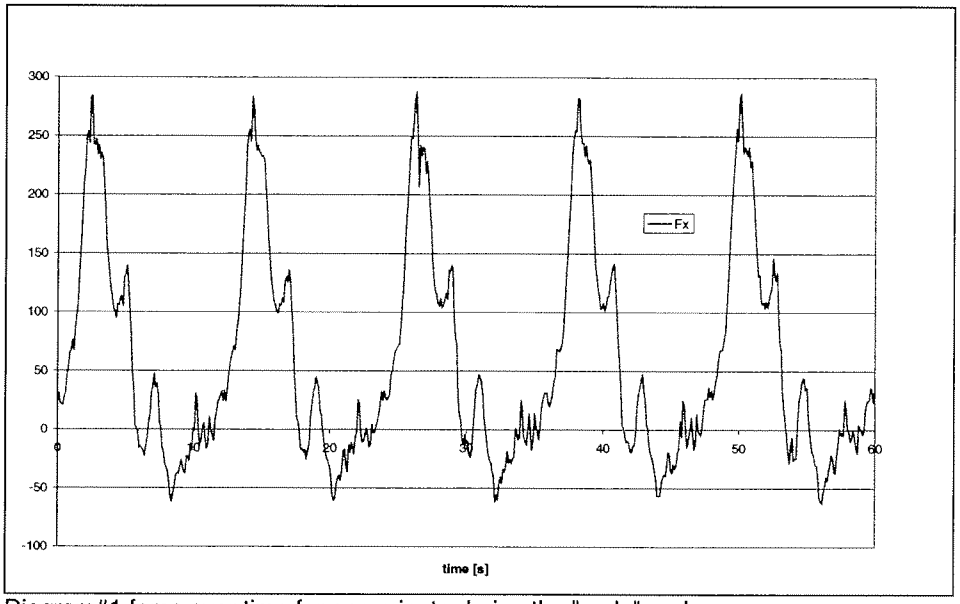
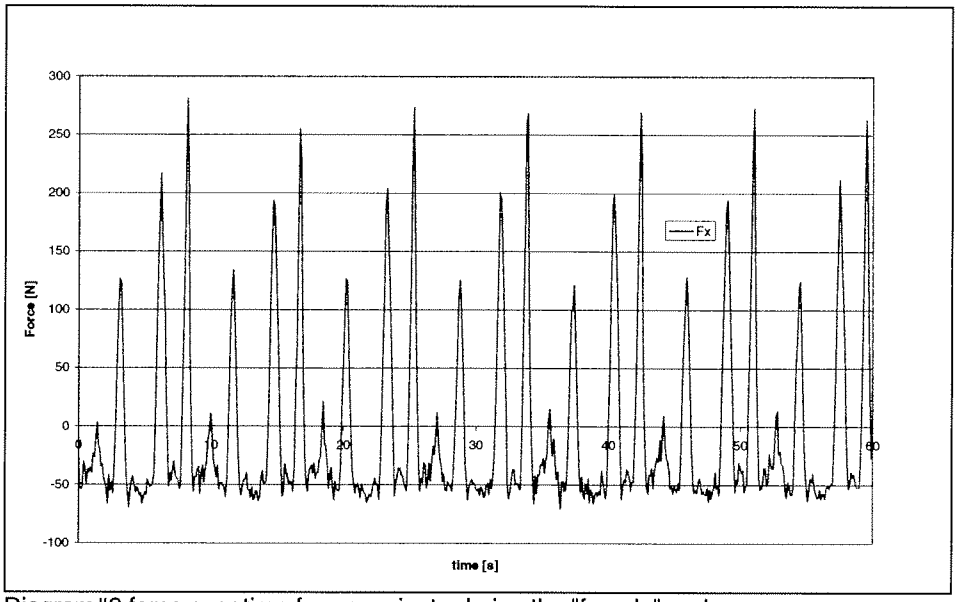


Image #16 to #18: pressing the bolster in the other direction (similar to exit)

8 Diagrams



Diagram#1 force over time for one minute during the "male" cycle



Diagram#2 force over time for one minute during the "female" cycle

W.E.T. Automotive Systems AG
Rudolf-Diesel-Str. 12
D-85235 Odelzhausen

VERSUCHSBERICHT / Test Report Nr. / No.: 08278

Name:	Christian Fendt	**Auftraggeber / Requested by:**	Jens Schumacher (VP2)
Datum / Date of report:	2007-03-23	**Kundenprogramm / Customer Program Name:**	M-Class BR 164

Aufgabe / Purpose (incl. remarks & deviations):

To run the mechanical load profile (male and female, based on a pressure distribution analysis, see test report 08116) in a complete seat, equipped with a carbotex heating element with design level **F** (11003589F).

Prüfling(e) (mit Eingangsdatum) / sample(s) (&sample received date):

ASH-Back: 11003589F, complete seat received on CW 8/9

Prüfvorschrift / Specification (section if applicable / version / release date):

None, for testing process test report 08116

Zusammenfassung - Ergebnisse / Summary - Results:

The electrode of the back bolster was x-rayed after 30,304 cycles (23,102 male-cycles and 7,202 female-cycles): one electrode string was already broken; another one slightly ripped.
Subsequently the test was continued and after a total number of 44,709 cycles stopped.
After test the heating element was opened. A little heat mark was visible on the fleece of the heating element, caused by rubbed off carbon fibres (no further damage of the electrode was visible).
The heater was still working (just slight differences in the resistance).

Datum / Date

freigegeben durch / approved by Sylvia Summerer (test lab manager)

Die Prüfergebnisse gelten nur für die getesteten Prüflinge. The test results apply only to the tested parts.

Index

1 Verwendete Prüfmittel / Equipment used (incl. calibration information):

Seat test robot #2, force cell: PM022018-0, calibrated due 2007-02

Occuform (small) covered with silicon and "DB-Geflecht"

Multimeter for monitoring of current: 051115-O, calibrated due 2008-01

X-ray equipment for radiography: location of Equipment at phoenix x-ray, munich

For calibration check numbers, used for IR measurements, see adequate pages

2 mechanical durability tests

Test name and internal number	*time for one cycle (nominal / actual)*	*force F_x min/max*	*no. of cycles*	*Start of test*	*End of test*
seat specific test based on pressure mappings, see test report 08116 internal no. 0120.dat (representing male occupant) and 0121.dat (representing female occupant)*	male cycle: 11.5s female cycle: 8.5s	For force diagram see test report 08170	male: 34,295 female: 10,414 together 44,709 cycles	2007-03-09	2007-03-15

Power supply during the mechanical durability tests: 13.5V (3min) / 8.1V (7min) / monitoring current
* The male and female profile were performed in a loop: 1200 cycles male profile and afterwards 400 cycles female profile.
Test setup identically to test report 08170 (i.e. backrest angle=77°; angle of seat cushion=3.5°; same base position as in test report 08170, also see photo documentation of test report 08170).

An IR picture after 30,304 cycles (23,102 male-cycles and 7,202 female-cycles) was made. A hot spot (Tmax=78°C) was visible at the lower part of the backrest-bolster. That's why the electrode of the back bolster was x-rayed: one electrode string was already broken; another one slightly ripped.
Subsequently the test was continued and after a total number of 44,709 cycles stopped. Another IR picture was created. The temperature at the hot spot was higher (Tmax=83°C) than in the IR picture before.

After this the seat was opened. In the contact area of the test form the Carbotex filaments were rubbed off, that's why the resistance and thus the temperature increased (so that a little heat mark occurred in the fleece material).
The analysis of the electrode showed (44,709 cycles), that no further breakage occurred in comparison to the x-ray analysis (30,304 cycles) before.

3 IR Pictures

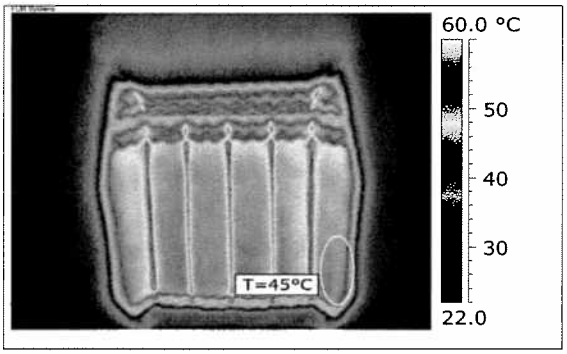
Customer	DC/JCI
Object	M-Class backrest, level F

Tester	Fendt					PM-No.: / cal. to
Order No.	08278	Heating element assembled		Voltage	13.5 V	031072-O / 2007-03
Epsi-Factor	0.98					021051-O / 2007-08
Range	-40 - 120°C					041095-O / 2007-10
Zoom	1.0	Distance approx.	1,5 m	IR after 10min		991031-O / 2007-09

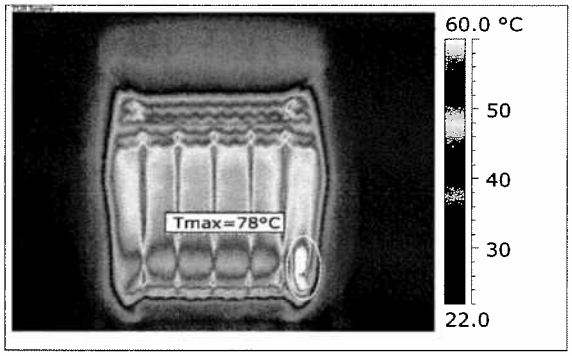
Comment:

	W.E.T.-No.
ASH-back:	11003589F

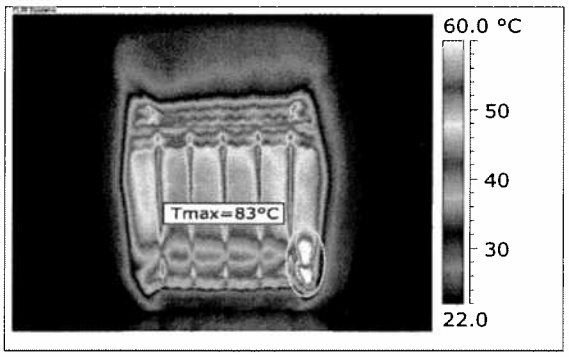
IR#1: before tests; I=5,1A; 24°C/32%; 2007-03-09
IR#2: after 30,304 cycles; I=5,0A; 23°C/28%; 2007-0 3-13
IR#3: after 44,709 cycles; I=5,0A; 23°C/35%; 2007-0 3-15



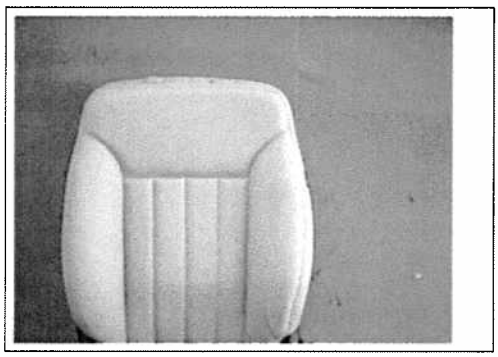
IR#1



IR#2



IR#3



Thermo picture with infrared thermo graphic system ThermaCAM PM695 PAL PM Nr.: 021062-O, calibrated to 2007-12

4 X-ray after 23,102 (male) & 7,202 (female) test cycles

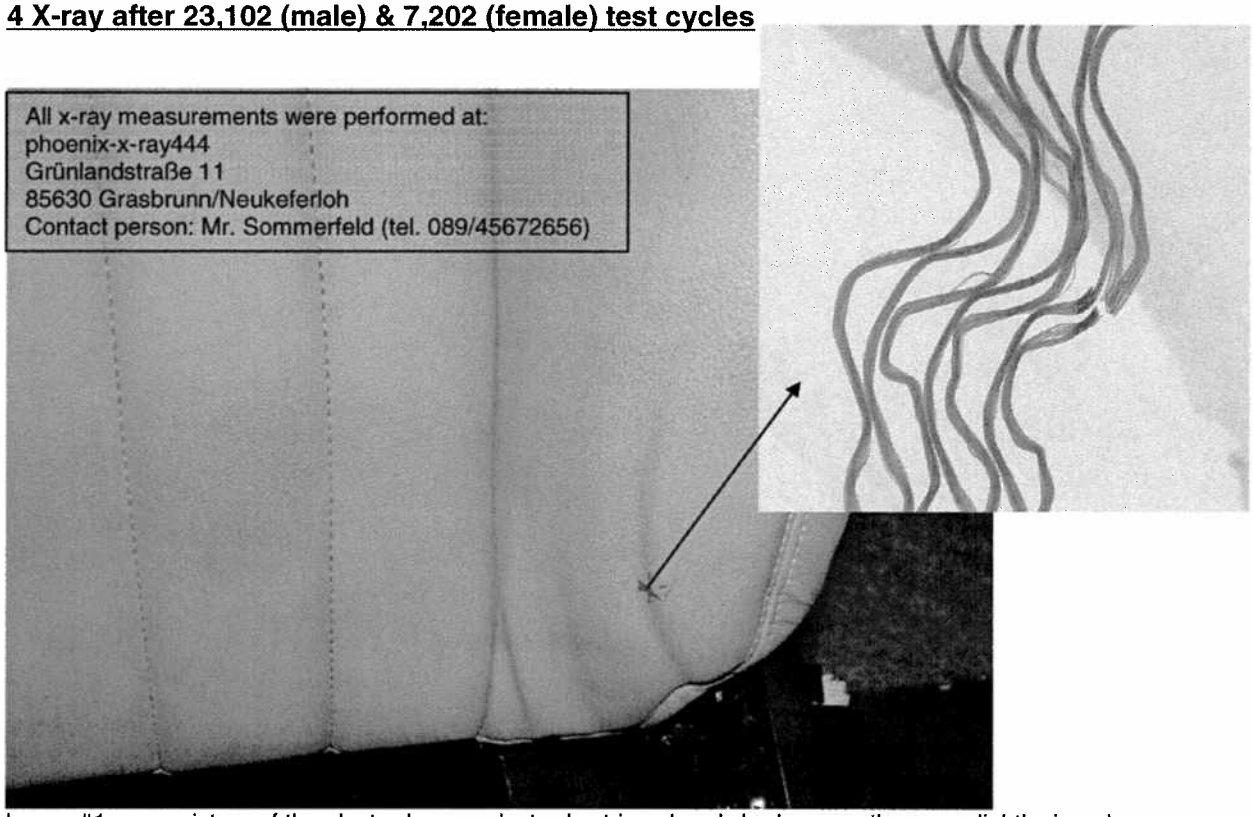


Image #1: x-ray picture of the electrode; one electrode string already broken; another one slightly ripped

5 Photo-documentation

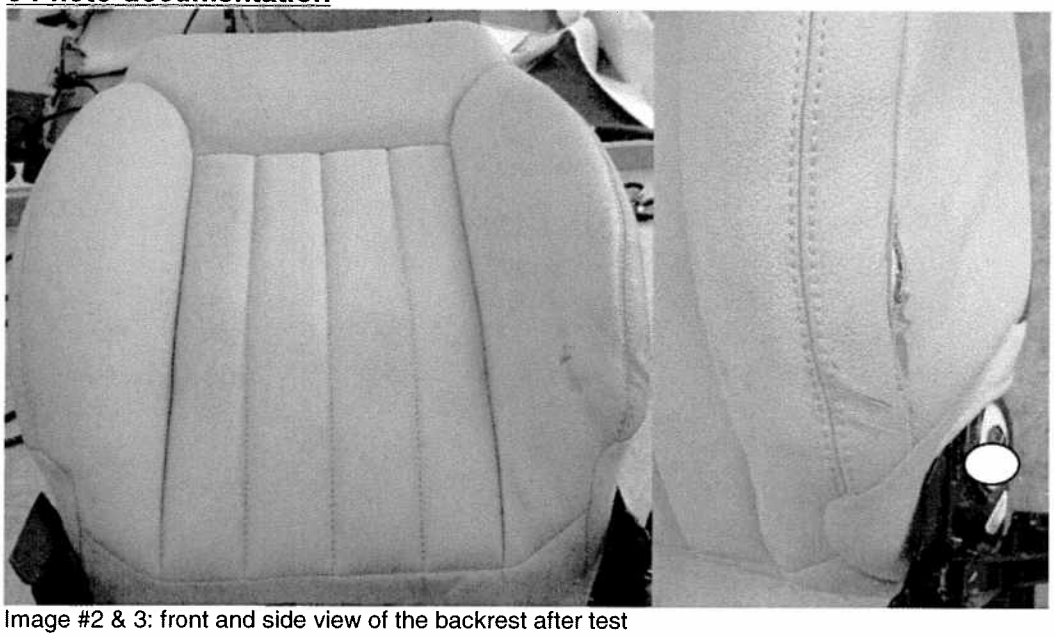


Image #2 & 3: front and side view of the backrest after test

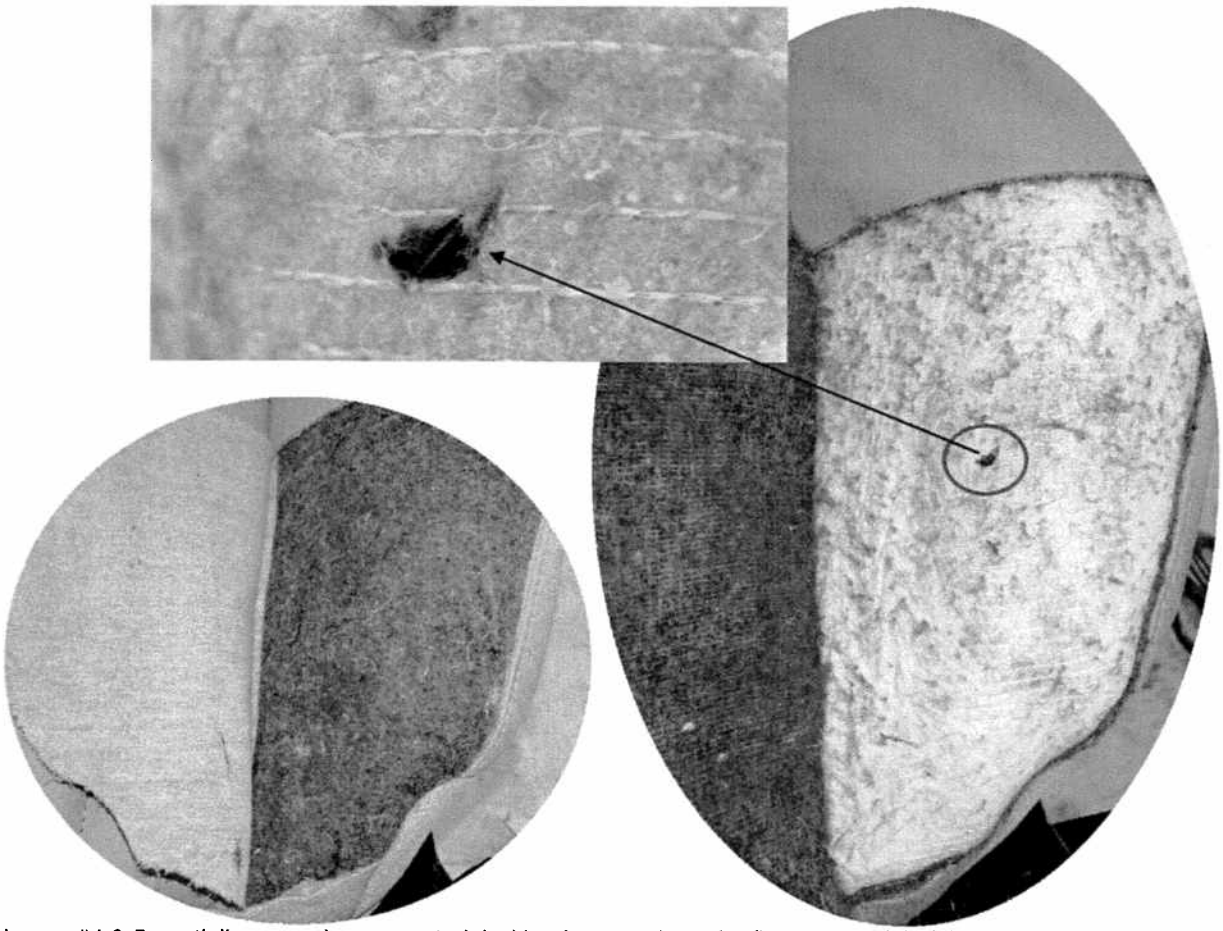


Image #4 & 5: partially opened cover material with a heat mark on the fleece material of the heating element

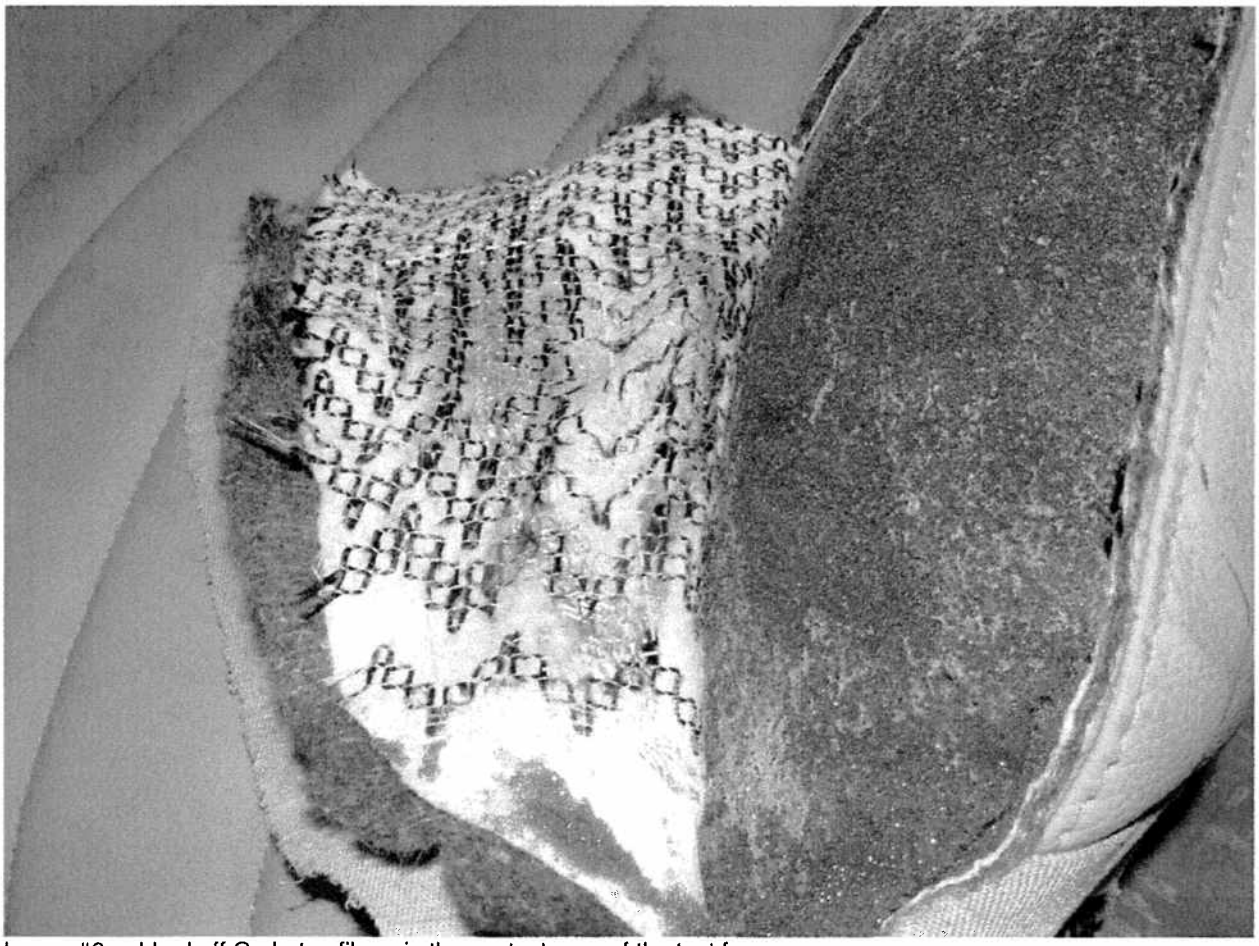


Image #6: rubbed off Carbotex fibres in the contact area of the test form.

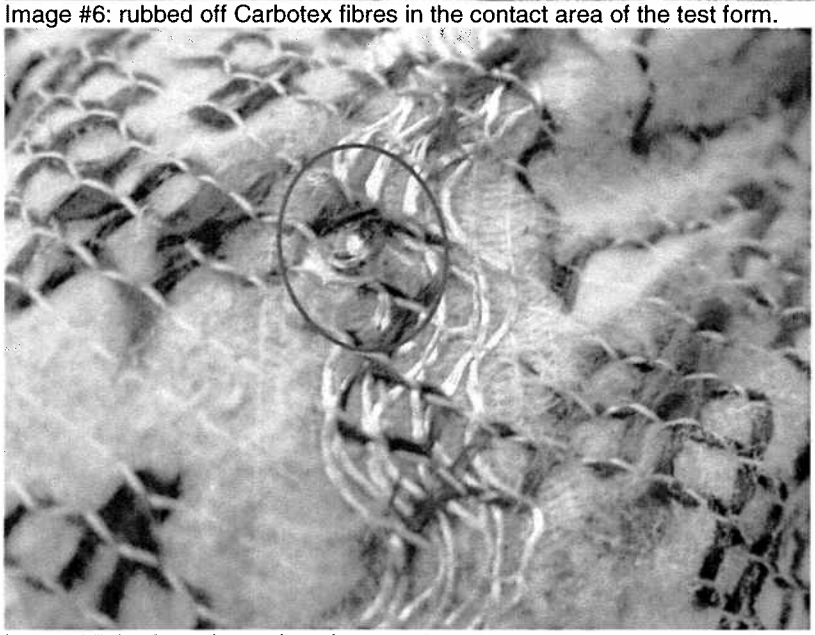


Image #7: broken electrode string

W.E.T. Automotive Systems AG
Rudolf-Diesel-Str. 12
D-85235 Odelzhausen

VERSUCHSBERICHT / Test Report Nr. / No.: 08171

Name:	Christian Fendt	**Auftraggeber / Requested by:**	Jens Schumacher (VP2)
Datum / Date of report:	2007-04-25	**Kundenprogramm / Customer Program Name:**	M-Class BR 164-CTXU

Aufgabe / Purpose (incl. remarks & deviations):

To run the mechanical load profile (male and female, based on a pressure distribution analysis, see test report 08116) in a complete seat, equipped with a carbotex ultra heating element.

Prüfling(e) (mit Eingangsdatum) / sample(s) (&sample received date):

ASH-Back: 41003589I, complete seat; date of receipt 2007-02-27

Prüfvorschrift / Specification (section if applicable / version / release date):

None, for testing process test report 08116

Zusammenfassung - Ergebnisse / Summary - Results:

Totally 40,065 cycles were performed. Regarding the thermo pictures no irregularities were noticeable. After test the back heater-electrode was x-rayed. At 8 different positions the Cu-electrode wires were broken. The Pa-wire was not damaged at all.

Datum / Date

freigegeben durch / approved by Sylvia Summerer (test lab manager)

Die Prüfergebnisse gelten nur für die getesteten Prüflinge. The test results apply only to the tested parts.

Index

1 Verwendete Prüfmittel / Equipment used (incl. calibration information):

Seat test robot #7, force cell: PM022015-0, calibrated due 2007-06

Occuform (small) covered with silicon and "DB-Geflecht"

X-ray equipment for radiography: location of Equipment at phoenix x-ray, munich

For calibration check numbers, used for IR measurements, see adequate pages

2 mechanical durability tests

Test name and internal number	*time for one cycle (nominal / actual)*	*force F_x min/max*	*no. of cycles*	*Start of test*	*End of test*
seat specific test based on pressure mappings, see test report 08116 internal no. 0120.dat (representing male occupant) and 0121.dat (representing female occupant)*	male cycle: 11.5s female cycle: 8.5s	For force diagram see test report 08170	male: 30,041 female: 10,024 together 40,065 cycles	2007-04-10	2007-04-16

Power supply during the mechanical durability tests: 13.5V (3min) / 8.1V (7min) / monitoring current
* The male and female profile were performed in a loop: 1200 cycles male profile and afterwards 400 cycles female profile.
Test setup identically to test report 08170 (i.e. backrest angle=77°; angle of seat cushion=3.5°; same base position as in test report 08170, also see photo documentation of test report 08170).

Totally 40,065 cycles were performed. Regarding the thermo pictures no irregularities were noticeable. After test the back heater-electrode was x-rayed. At 8 different positions the Cu-electrode wires were broken. The Pa-wire was not damaged at all.

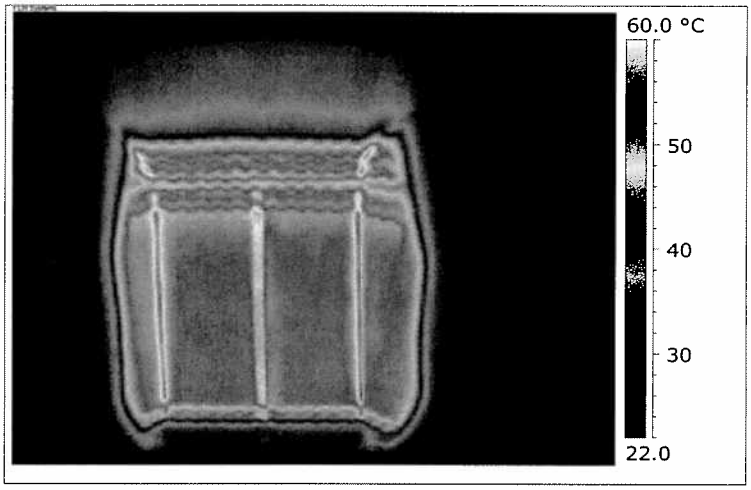
3 IR Pictures

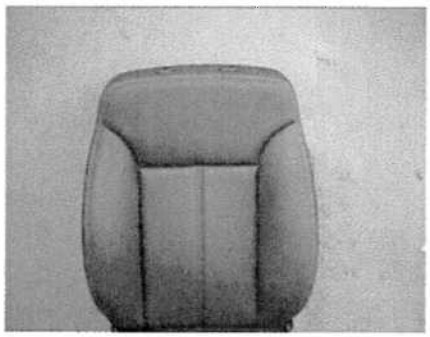
Customer	DC / JCI
Object	M-Klasse BR 164

Tester	Fendt	Date: before test after test	10.04.2007 17.04.2007	PM-Nr.: / cal. to before test	PM-Nr.: / cal. to after test
Order No.	08171	Voltage	13.5 V	011023-O / 2007-10	
Epsi-Factor	0.98	Current before/after test	5.09 A /5,11A	021051-O / 2007-08	021051-O / 2007-08
Range	-40 - 120°C	Climate: before test after test	21 °C / 30 % 24°C / 31%	041095-O / 2007-10	041095-O / 2007-10
Zoom	1.0	Heat up time	10 min	032022-O / 2007-12	991031-O / 2007-09
Distance approx.	2 m	Heat up without test person			

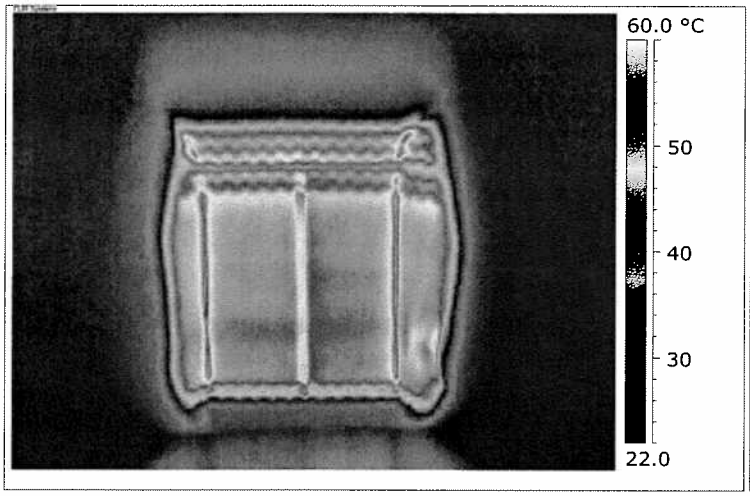
Comment:

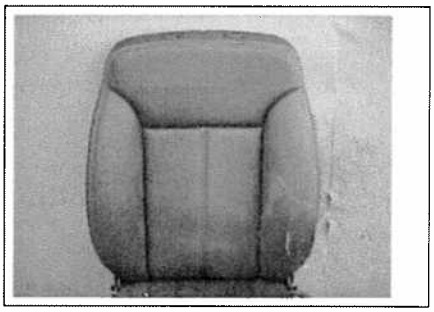
	W.E.T.-No.	received on:
ASH-back:	41003589I	2007-04-04





Before test





After test

Thermo picture with infrared thermo graphic system ThermaCAM PM695 PAL PM Nr.: 021062-O, calibrated to 2007-12

4 X-ray after 30,041 (male) & 10,024 (female) test cycles

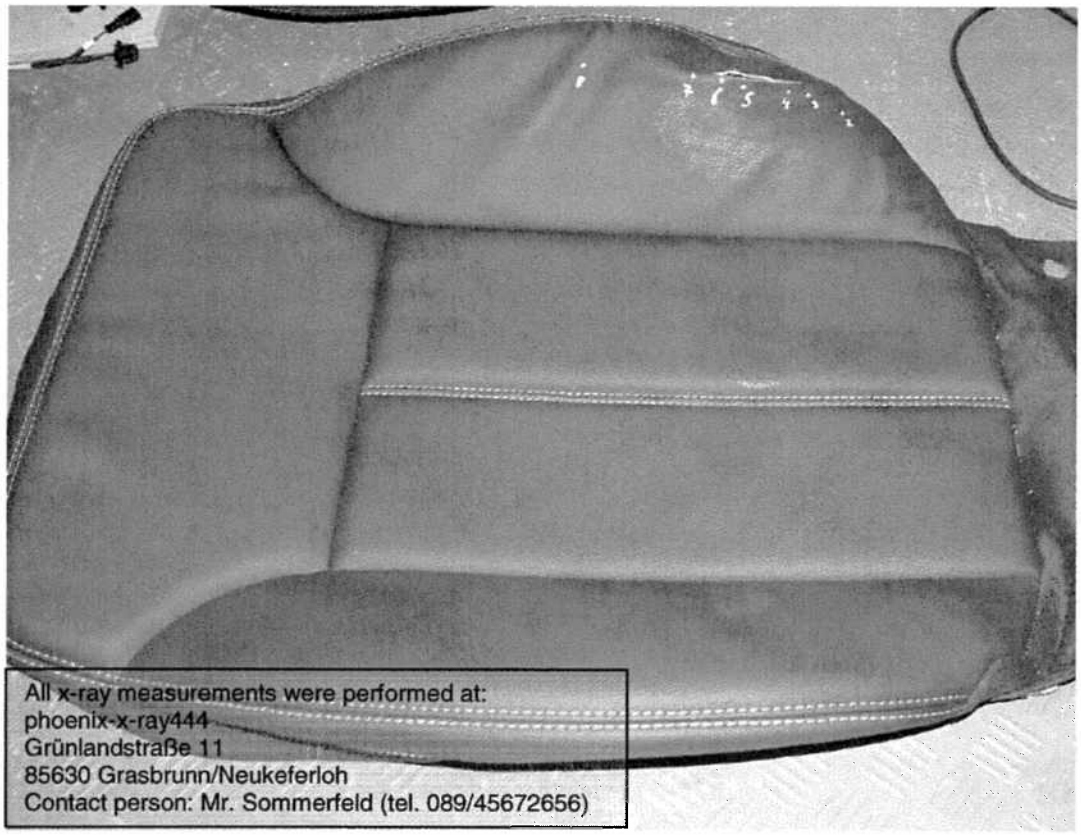
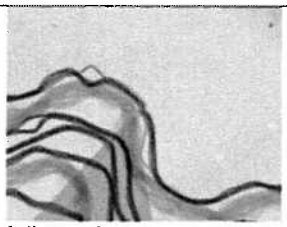
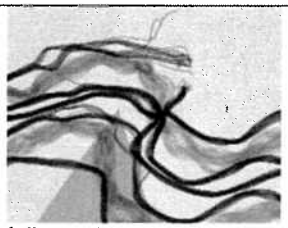


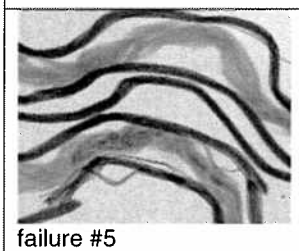
Image 1: seat cover with markings of the failure positions


failure #1

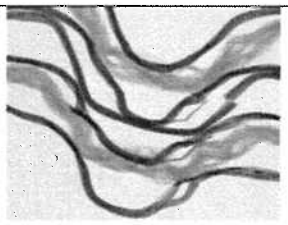

failure #2

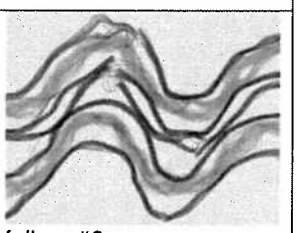

failure #3


failure #4


failure #5


failure #6


failure #7


failure #8

W.E.T. Automotive Systems AG
Rudolf-Diesel-Str. 12
D-85235 Odelzhausen

VERSUCHSBERICHT / Test Report Nr. / No.: 08168

Name:	Jürgen Haller	**Auftraggeber / Requested by:**	Jens Schumacher (Program Management)
Datum / Date of report:	2007-02-23	**Kundenprogramm / Customer Program Name:**	W164 M-Class

Aufgabe / Purpose (incl. remarks & deviations):

Analyse and photo documentation of two DC M-Class (W164) vinyl back trims, with an overheating area on the lower area of the bolster (egress side)

Prüfling(e) (mit Eingangsdatum) / sample(s) (&sample received date):

W.E.T.-No.:	production date:	received for test on:
11003589E (part #2)	2005-12-21	2007-02-08
11003589E (part #3)	2005-11-22	2007-02-08

Zusammenfassung - Ergebnisse / Summary - Results:

The failure area is on the same position by comparison of both covers.
On the part #2:
- attrition on the cover is visible in the region of the failure
- the failure has a dimension of approx. 4 x 2cm on the A surface, inside the failure along the bus bar is damaged approx. 10cm
- the broken bus bar filaments (electrodes) are visible
- 6 electrodes are broken on the same position
- 1 electrode is broken 3cm higher

On the part #3:
- cover and heater were opened before arrival at W.E.T.
- a minimal fold is visible across to the failure position
- the failure has a dimension of approx. 1 x 1cm on the A surface, inside the heater is damaged within an area of approx. 2 x 2.5cm
- all 7 electrodes are broken in one line

The effect occurs, when high current is running through carbon fibres because of completely broken electrodes (bypassing the damaged spot).

For more details see pictures on the following pages.

Datum / Date

freigegeben durch / approved by Sylvia Summerer (test lab manager)

Die Prüfergebnisse gelten nur für die getesteten Prüflinge. The test results apply only to the tested parts.

Photo documentation part #2

Fig 1: numbering of part

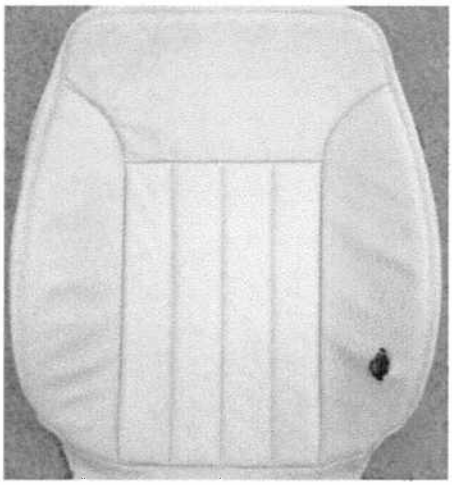


Fig 2: general view

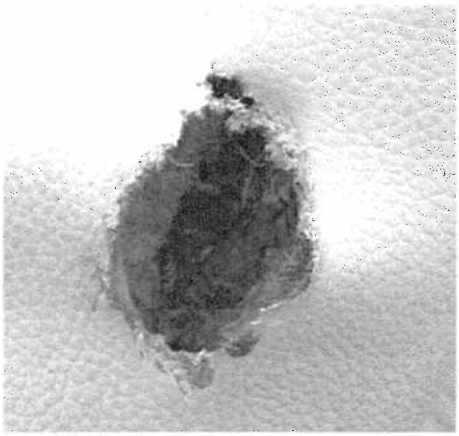


Fig 3: the failure area

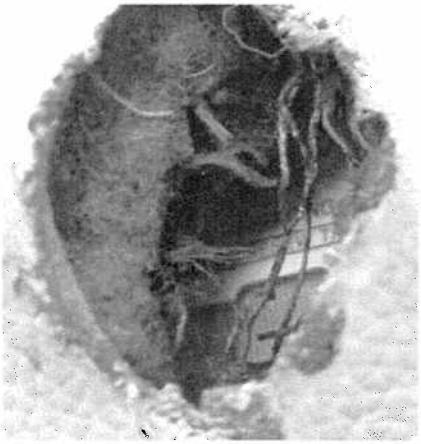


Fig 4: the bus bar filaments are visible

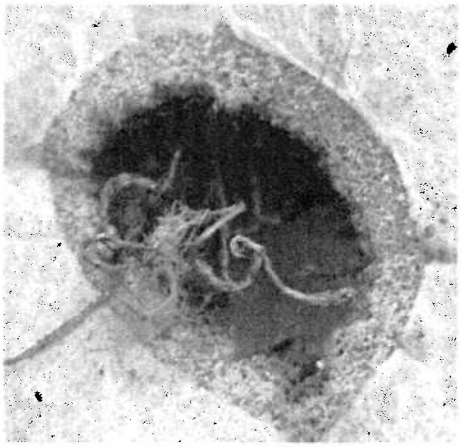


Fig 5: back side of the heating element

Fig 6: label of the cover

Fig 7: label of the heater

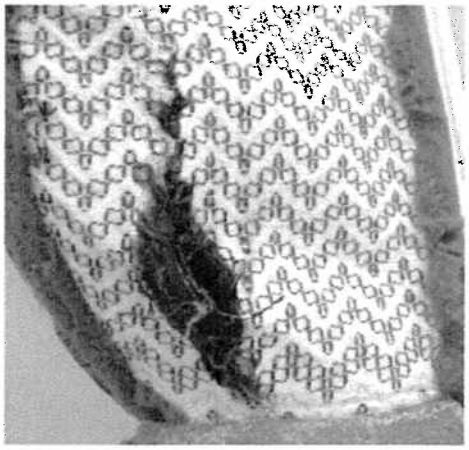


Fig 8: foam of the heater dismantled

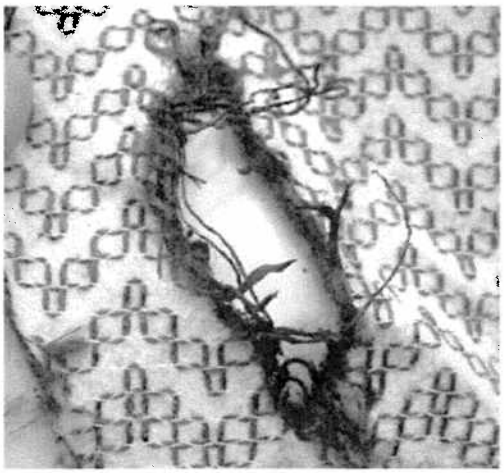


Fig 9: picture with paper under the heater

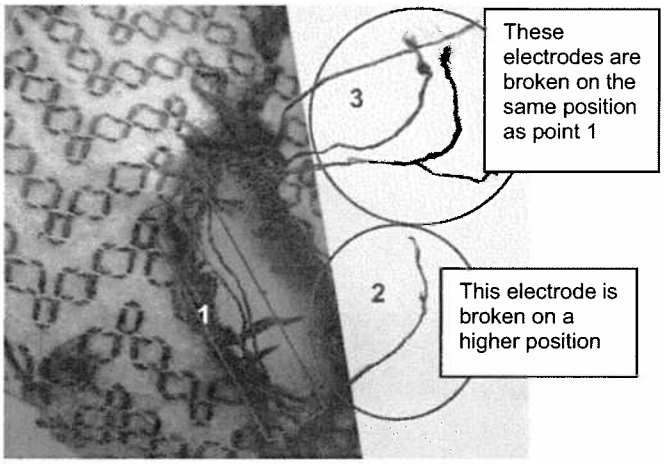


Fig 10: the broken electrodes

Fig 11: detail point 1 (from fig. 10); electrode looks at the first view unbroken

Fig 12: under the carbon the point of rupture was visible

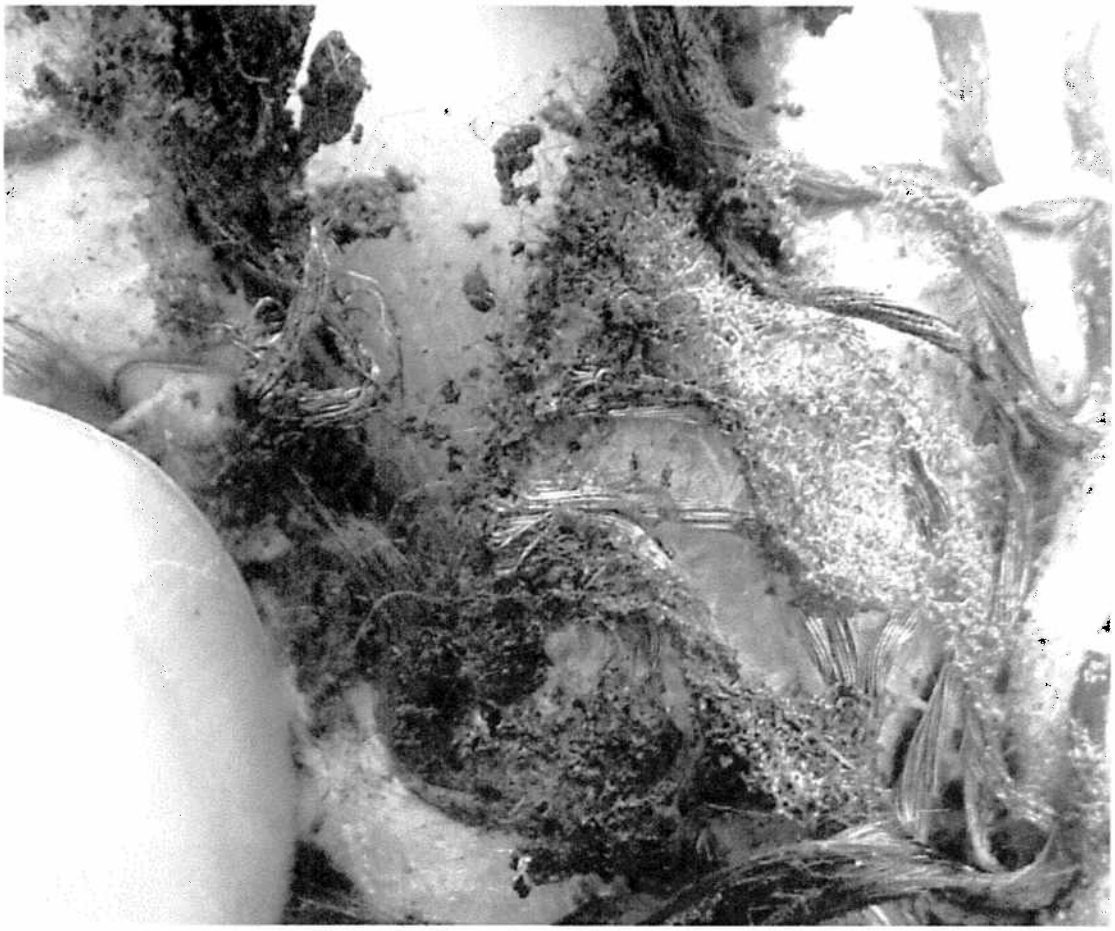


Fig 13: detail of the broken electrodes

Photo documentation part #3

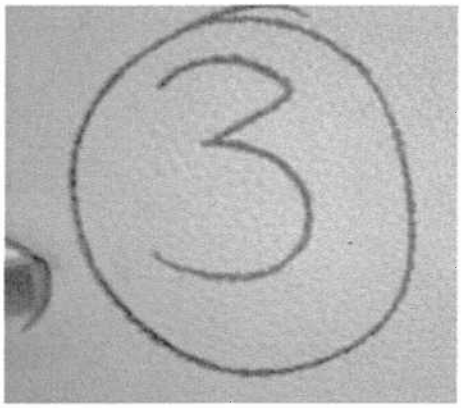


Fig 14: numbering of part

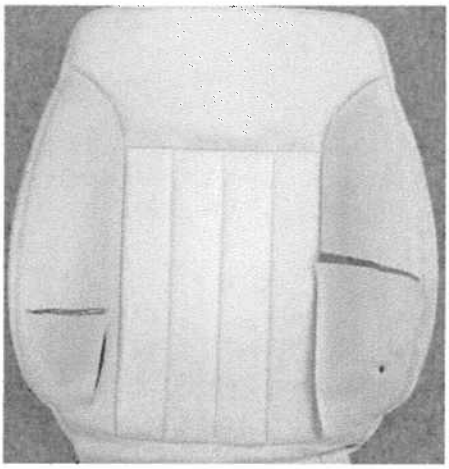


Fig 15: general view

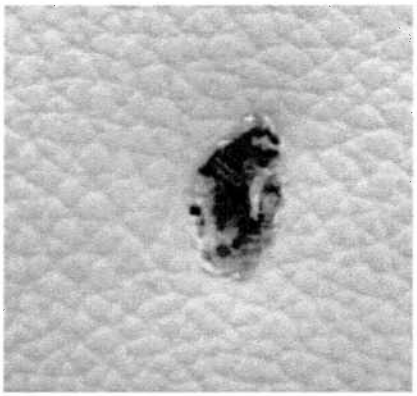


Fig 16: the failure area

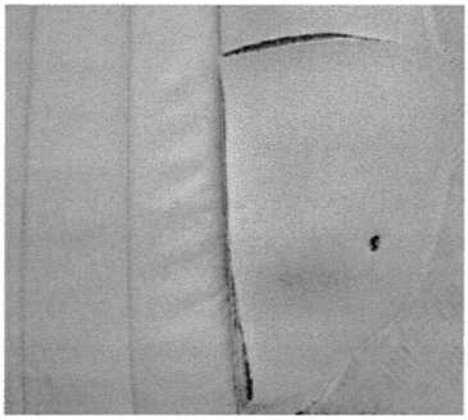


Fig 17: cover was opened before arrived at W.E.T.

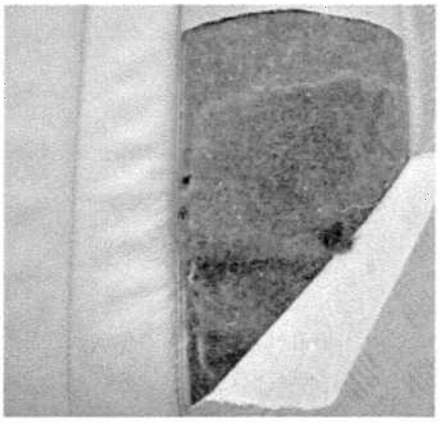


Fig 18: cover opened

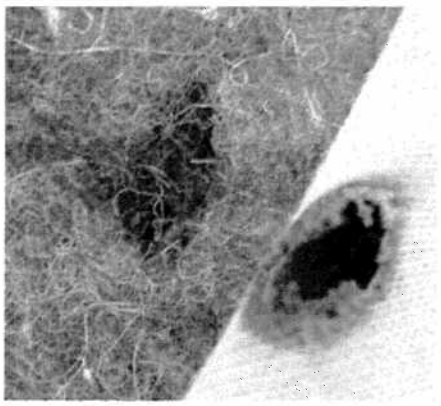


Fig 19: detail

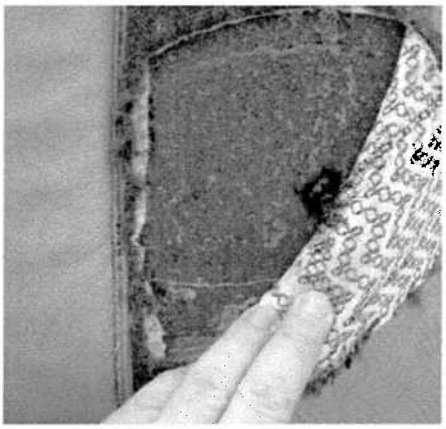


Fig 20: heater opened

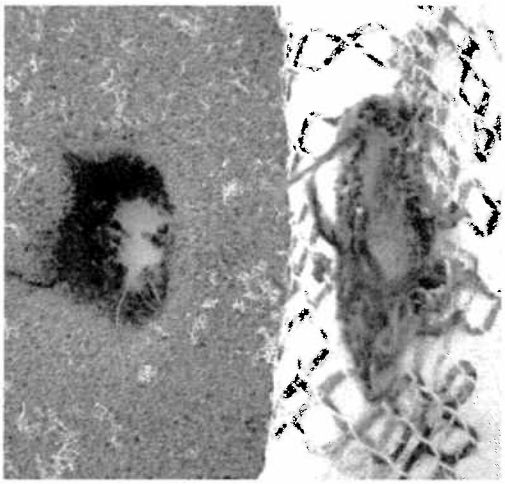


Fig 21: detail

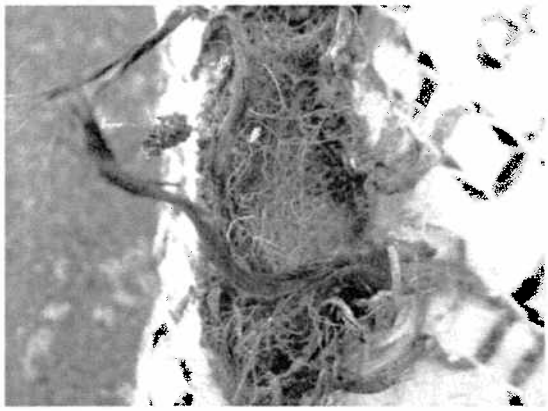


Fig 22: broken area

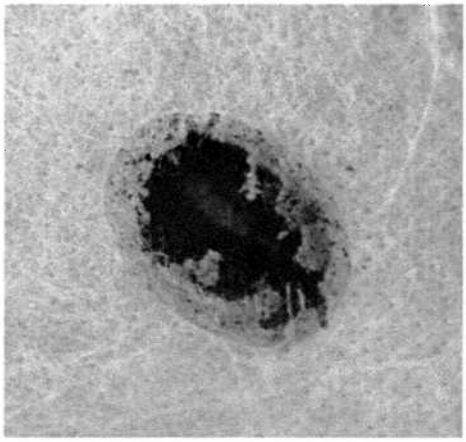


Fig 23: back side of the heating element

Fig 24: label of the heater

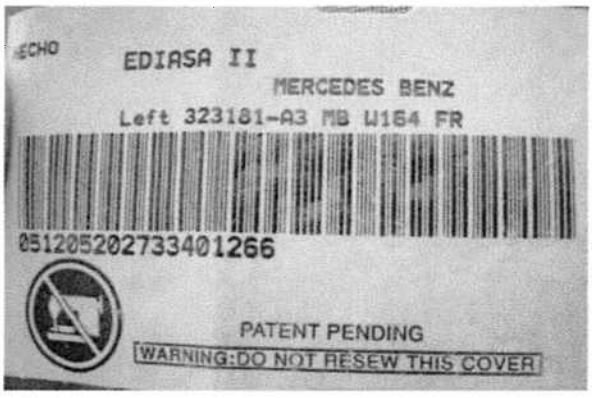


Fig 25: label of the cover

Fig 26: detail of the broken electrodes

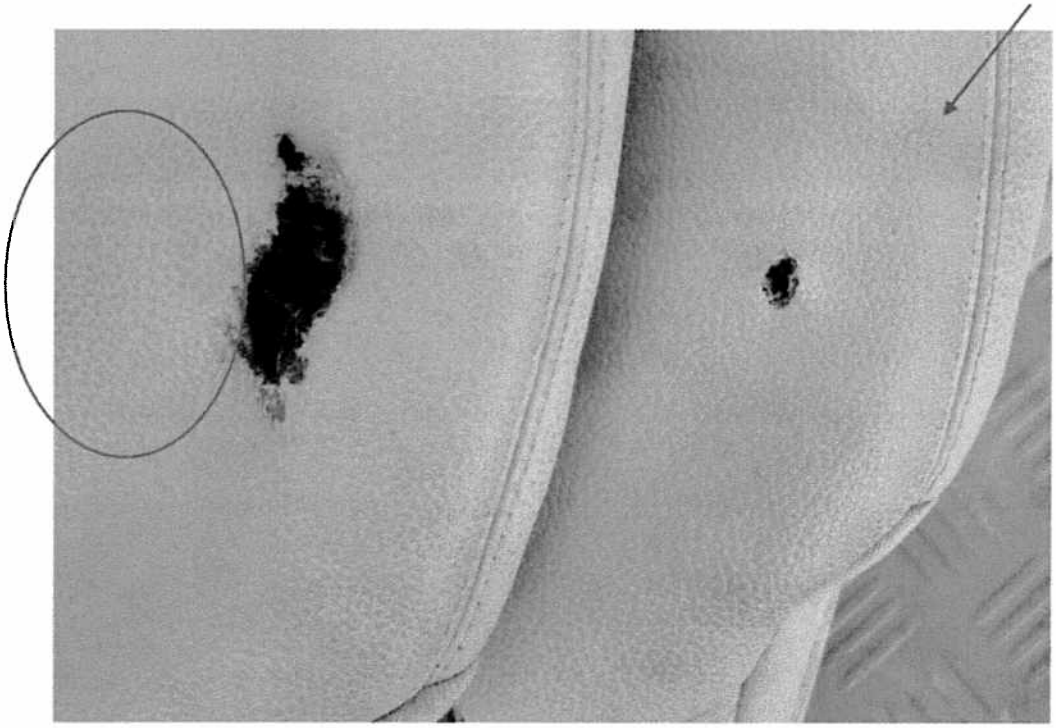


Fig 27: both covers by comparison. The break area is on the same position.
along the arrow a minimal fold is visible.
on the left cover (circle) an attrition is visible.

W.E.T. Automotive Systems AG
Rudolf-Diesel-Str. 12
D-85235 Odelzhausen

VERSUCHSBERICHT / Test Report Nr. / No.: 08279

Name:	Josef Armbruster	**Auftraggeber / Requested by:**	Jens Schumacher (VP2)
Datum / Date of report:	2007-03-22	**Kundenprogramm / Customer Program Name:**	M-class

Aufgabe / Purpose (incl. remarks & deviations):

Examination of rejected parts of the M-class seat (JCI) W164:
Examination of left side of the back rest electrode near by the hot spot.
Determination of:

- Thickness of silver layer on copper filaments
- Diameter of single filaments
- Oxygen content of copper core

W.E.T. no. of electrode: 11003963A

The examination was carried out by an external test laboratory (company Trevira in Bobingen).

Prüfling(e) (mit Eingangsdatum) / sample(s) (& date of receipt):
Date of receipt: 2007-02-27

Prüfvorschrift / Specification (section if applicable / version / release date):

Zusammenfassung - Ergebnisse / Summary - Results:

- The silver layer thickness of 1,2 µm was calculated on the basis of the mass ratio of Ag / Cu.
- The diameter of the single filament is 80 µm.
- No oxygen content was determined in the copper core.

Datum / Date freigegeben durch / approved by

Die Prüfergebnisse gelten nur für die getesteten Prüflinge. The test results apply only to the tested parts.

Trevira
THE FIBRE COMPANY

Zentrales Labor für
Prozesskontrolle, Analytik und
Präparationsentwicklung

Prüfbericht

Inspection Report

vom 20.03.2007

W.E.T. Automotive Systems AG
Herr
Weiß M.

Rudolf-Diesel-Strasse 12

85235 Odelzhausen

Trevira GmbH
Dr. J. Gerum
Tel.: (08234) 82-1806
Fax: (08234) 82-2175
86397 Bobingen
Johannes.Gerum@trevira.com

Thema Bestimmung der Schichtdicke eines Cu / Ag-Monofils

Auftragsnummer 07030081 **Eingangsdatum** 14.03.2007

Subject: Determination of layer thickness of a Cu / Ag monofilament
Order no. 07030081
Date of receipt March 14, 2007

Probenbezeichnung	Sample designation		Monofil (Cu-Monofil, Ag beschichtet)	Monofilament (Cu-monofilament, coated with Ag)
Probennummer	Sample no.		1	
Kupfer Cu	Copper Cu	%	NC_ICP_001	99.60
Silber Ag	Silver Ag	%	NC_ICP_001	7.07
REM-Analyse	SEM analysis			erledigt (done)
EDX-Analyse	X-ray spectroscopy			
Hauptbestand	Main constituents			Cu
Nebenbestand	Secondary constituents			Ag

Der Ag - Anteil von Probe Nr. 1 (Cu-Monofil Ag beschichtet) beträgt ca. 7 %.

Welcher der beiden Elementgehalte eine Sollwertabweichung aufweist wurde nicht geprüft.

Aus den Masseverhältnissen von Ag / Cu errechnet sich eine Schichtdicke für Ag von d = 1,2 mym

Anlage: REM / EDX - Analyse Textiles Prüfwesen (Nr. 139_07, 14.03.2007, R.Hörmann)

The Ag content of sample no. 1 (Cu-monofilament coated with Ag) is approx. 7 %.
It was not tested which of the two element contents deviates from the desired value.
The silver layer thickness of d = 1,2 mym was calculated on the basis of the mass ratio of Ag / Cu.

Enclosure: SEM / X-ray spectroscopy

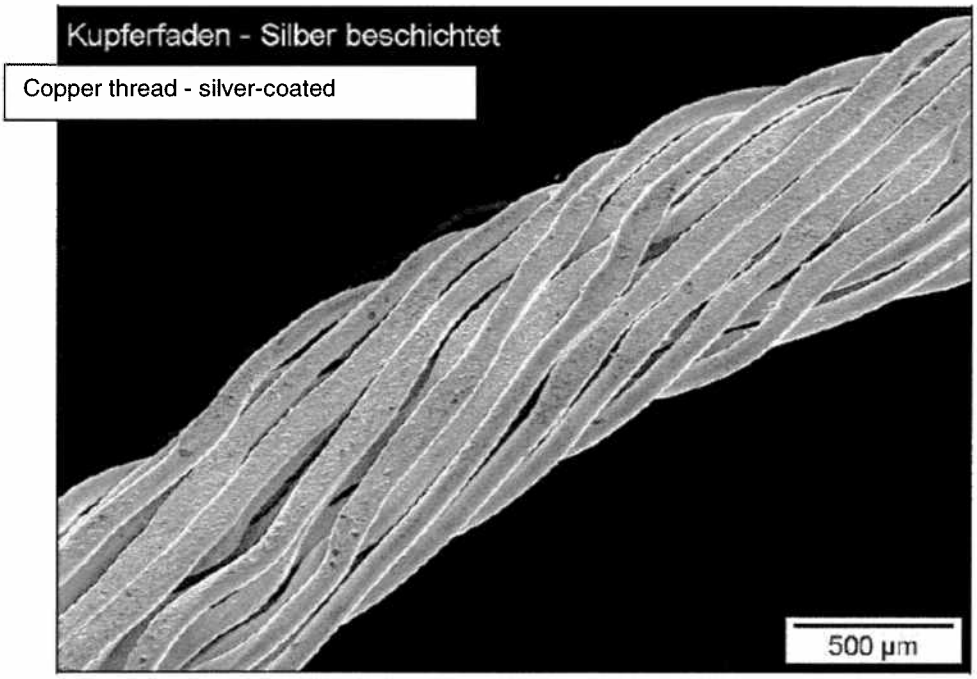
Fachlich geprüft:

Trevira THE FIBRE COMPANY	**Laborbefund**	
Werk Bobingen **Forschung &** **Produktentwicklung** Anwendungs- und Verfahrenstechnisches Textiles Prüfwesen MCTL Mikroskopie	Auftraggeber: Michael Weiß **W.E.T. Automotive** **Systems AG** Rudolf-Diesel-Str. 12 85235 Odelzhausen Auftragsnummer: **07030081**	Eingang: 14.03.2007 Erledigung: 15.03.2007 Bearbeiter: Ruth Hörmann Mik-Nr.: 139_07 ID 607 Verteiler: Michael Bösch Gabriele Scholz Dr. Johannes Gerum Alexander Kube

- 1 -

Wir erhielten von Ihnen einen **silberfarbenen Multifilamentfaden** zur mikroskopischen Untersuchung. Es handelt sich um einen silberbeschichteteten Kupferfaden.
Gefragt waren die Dicke der einzelnen Filamente, die Schichtdicke der Silberbeschichtung und der Sauerstoffgehalt des Kupferkerns.
Wir untersuchten das Muster per Rasterelektronenmikroskop, EDX-Analyse und Schlifftechnik.

Es handelt sich um einen *Multifilamentfaden mit 20 runden Einzelkapillaren mit einem Einzelfilamentdurchmesser von ca. 80µm und einer Silberbeschichtung die nur wenige Nanometer misst, also eher aufgedampft wie beschichtet ist. Der Kern weist keinen Sauerstoffanteil auf.* Es ist im Längsbild deutlich zu sehen, dass der Faden bereits verarbeitet war, der Faden ist einseitig stark abgeplattet und die einzelnen Filamente beschädigt.



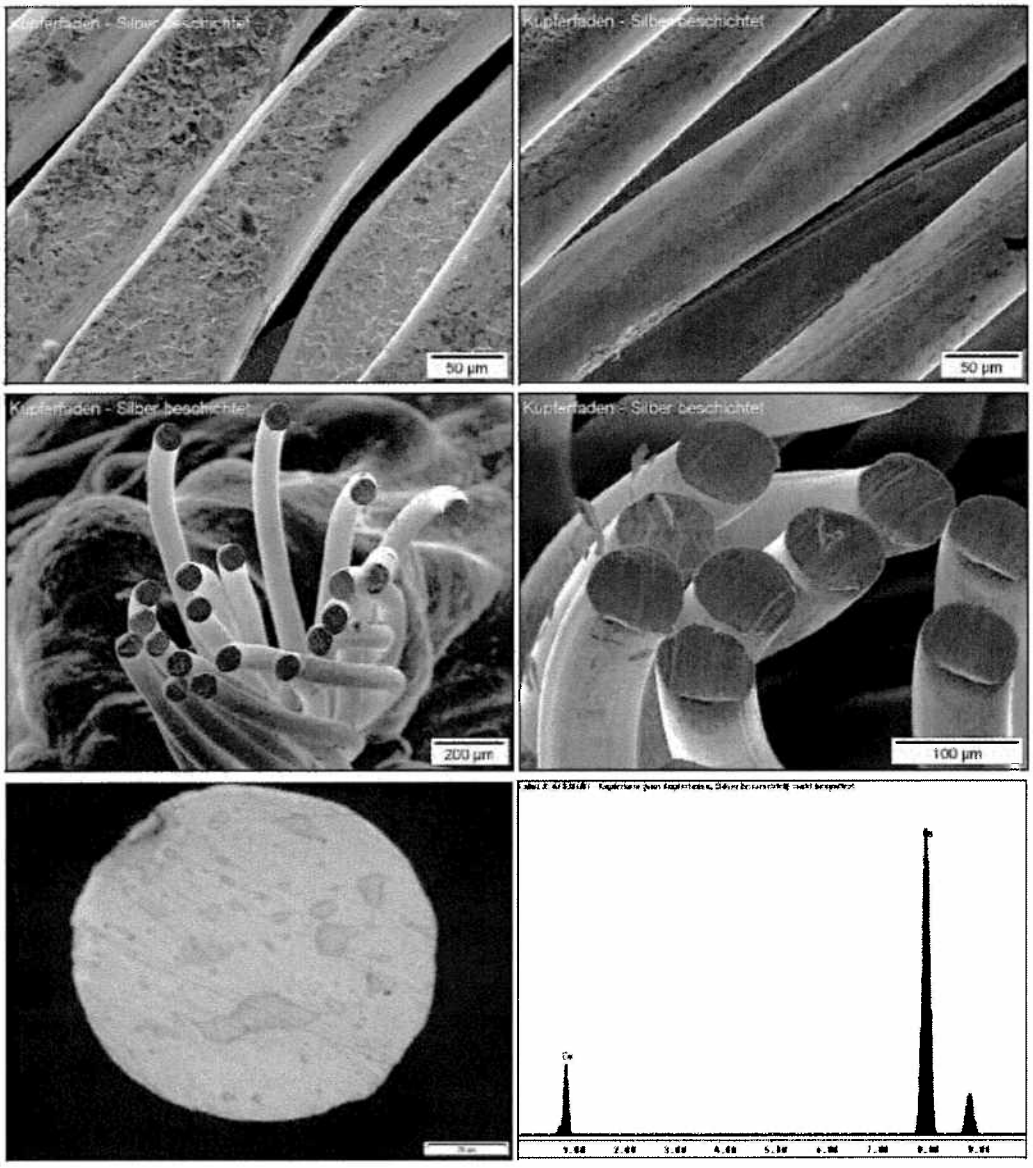
Laboratory report:

We received a **silver-colored multifilament thread** for microscopic analysis. The thread is a silver-coated copper-thread.
The task was to determine the thickness of the single filaments, the thickness of the silver layer, and the oxygen content of the copper core.
We examined the sample by means of scanning electron microscope, X-ray spectroscopy, and micrograph test.

The thread is a *multifilament thread with 20 round individual filaments with a diameter of the single filaments of approx 80 µm and a silver coating of only a few nanometers; thus it is more likely vaporized and let condense than coated. The core shows no oxygen content.* The longitudinal view shows clearly that the thread was already processed; on one side the thread is heavily flattened and the single filaments are damaged.

Trevira
THE FIBRE COMPANY

Laborbefund



mit freundlichen Grüßen

IfW Essen

Institut für Werkstoffuntersuchungen

IfW Essen GmbH
Institut für Werkstoffuntersuchungen
Münchener Straße 100 45145 Essen

Amtsgericht Essen HRB Nr. 12790
Geschäftsführer: Dr. Heinz Domke,
Ilse Marie Lichtenauer, Dr. Martin Silomon

Tel.: +49 (0)201 7494040
Fax: +49 (0)201 7494041
eMail: info@ifw-essen.de

Untersuchungsergebnisse

Auftragsnummer: 3527 21.03.2007

Sitzheizungslitze W164,
Best.-Nr. 45116444

Zusammenfassung

Geometrische Daten und Widerstand entsprechen der Spezifikation.

Die Werte spezifischer Widerstand bzw. spezifische Leitfähigkeit entsprechen denjenigen für reines Cu.

Anmerkungen zum Gewebe: Zum Teil sind die Litzen durchstochen, Beschädigungen sind damit nicht ausgeschlossen. Gelegentlich berühren sich die dicht nebeneinander verlegten Litzen; dies muss bei der elektrischen Beschaltung berücksichtigt werden.

Bearbeiter: Dr. Martin Silomon .....

Auftraggeber: Stephan Witte, Johnson Controls GmbH, Burscheid

1 Problemstellung

Dem IfW wurden mehrere Abschnitte aus einem Gewebe für Sitzheizung übergeben.

Bezeichnung des Teiles:	Litze versilbert, W.E.T. ZNr. 21007263A (13.05.02), 0,08mm²
Werkstoff:	DIN 1787 – E-Cu58 F21 (2.0065), aktuelle Bez. Cu-ETP/Cu-FRHC versilbert min. 1,02µm nach ASTM B 298
Spezifikation:	• Konstruktion 20 x Einzeldraht mit Durchmesser (0,07 +/- 0,003)mm • Leiterwiderstand 200 – 250 Ω/km

Die Litzen sollten gegen die Angaben im Erstmusterprüfbericht LEONI vom 7.6.2002, zu Lieferschein Nr. 7065936 / 22.4.02, geprüft werden.

Cu-ETP ist ein durch elektrolytische Raffination hergestelltes, sauerstoffhaltiges (zähgepoltes) Kupfer, das eine sehr hohe Leitfähigkeit für Wärme und Elektrizität (im weichen Zustand min. 57 m Ω^{-1} / mm^2) aufweist.

Zur Überprüfung von Durchmesser und Schichtdicke des Ag-Überzuges sollte ein Schliff angefertigt werden.

2 Durchgeführte Untersuchungen

Aus dem beigestellten Probenmaterial wurde die Probe DC BR 164 (WET Nr. 11003589C, Herstell-Datum: 26-Nov-04, Probenentnahmedatum: 06. Mrz 07) ausgewählt. Einzelne Litzen wurden durch Auftrennen des Gewebes frei präpariert, um Beschädigungen des Drahts zu vermeiden.

2.1 Sichtprüfung

Die Litzen sind zum Teil durchstochen. Gelegentlich berühren sich die dicht nebeneinander verlegten Litzen.

2.2 Metallographische Untersuchung

Der Litzendurchmesser wurde aus drei Einzelwerten am Querschliff, vgl. **Bild 1** (71,72; 71,86; 72,12 µm) zu 71,9 µm bestimmt. Das ist in Übereinstimmung mit den Vorgaben (70±3µm) als auch mit den Meßwerten aus dem Erstmusterprüfbericht (70-72µm).

Die Meßwerte an den Schrägschliffen, vgl. **Bilder 2, 3**, sowie die Auswertung der Ag-Schichtdicke sind im folgenden tabelliert:

Abmessungen [µm]	Ader 1	Ader 2
kleiner Halbmesser	71,2	71,8
kleiner / großer Halbmesser	0,273	0,291
Ag Schichtdicke links	1,38	1,21
Ag Schichtdicke rechts	1,26	1,17

Auch diese Werte sind in Übereinstimmung mit den Vorgaben min. 1,02µm), etwas höher als der (geringfügig zu geringe?) Meßwert im Erstmusterprüfbericht (1,01µm).

2.3 Mechanische Eigenschaften

Die Überprüfung des Werkstoffzustandes F21 wäre über die Vickershärte (tabelliert sind 55HV?) zulässig. Die Überprüfung wurde nicht angefordert.

2.4 Leitfähigkeit

Aus den Ist-Werten

Litze: 20 Einzeldrähte

Durchmesser 71,9 µm (**Bild 1**, Einzelwerte: 71,72; 71,86; 72,12 µm),

die Spannungsmessung wurde mit einem PREMA 8017 bei 10 mA externem Strom aus einem KNICK 3000 (4-Punkt-Messung) an Drahtabschnitten von 170 mm Länge vorgenommen, ergab sich ein.

mittlerer Widerstand von 0,0386 mΩ (Einzelwerte: 38,7; 38,9; 38,1 mΩ)

was einem Leiterwiderstand von 227 Ω/km entspricht (Erstmusterprüfbericht: 213,4 – 219,3 Ω/km).

Aus Widerstand, Drahtlänge und Querschnitt ergibt sich ein

spezifischer Widerstand $1{,}75 * 10^{-8}$ Ωm, bzw. eine

spezifische Leitfähigkeit $57{,}1 * 10^{6}$ $(\Omega m)^{-1}$ (entsprechend dem Soll im weichen Zustand von min. 57 m Ω^{-1} / mm^2).

3 Befund

Es liegen keine Abweichungen von Spezifikation und Erstmusterprüfbericht vor.

ISIT 2007_limi_005421

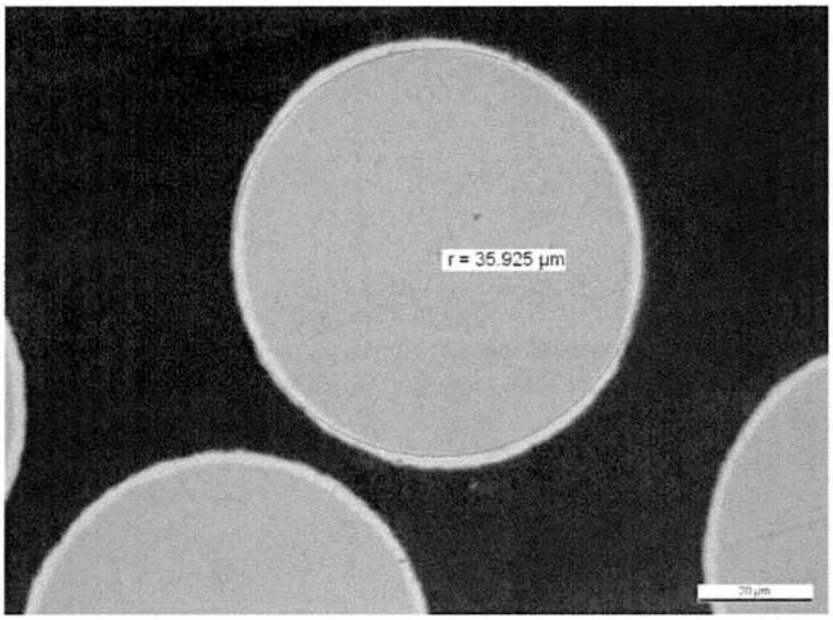


Bild 1: Übersicht Einzelader im Querschliff, Durchmesser D = 71,8µm

ISIT 2007_limi_005428

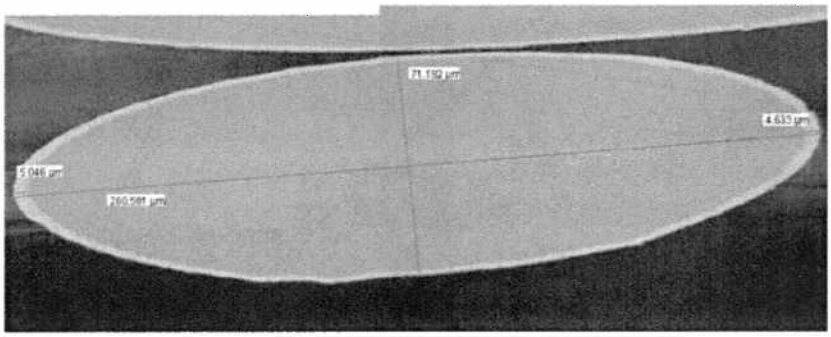


Bild 2: Übersicht Ader 1 im Schrägschliff zur Bestimmung der Dicke des Ag-Überzuges, Auswertung s. Tabelle

ISIT 2007_limi_005428

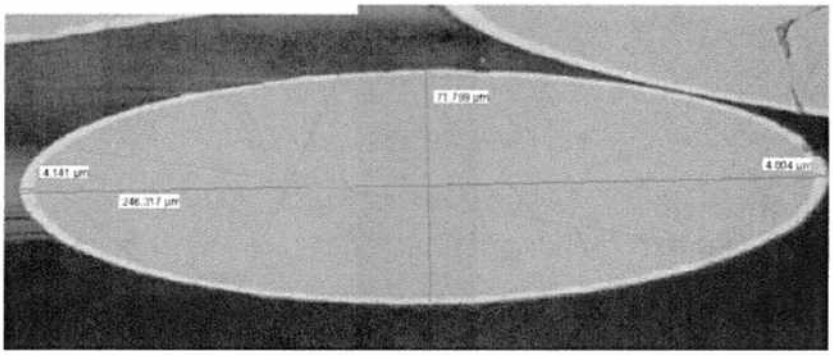


Bild 3: Übersicht Ader 2 im Schrägschliff zur Bestimmung der Dicke des Ag-Überzuges, Auswertung s. Tabelle

IfW Essen

Institut für Werkstoffuntersuchungen

IfW Essen GmbH
Institut für Werkstoffuntersuchungen
Münchener Str. 100 45145 Essen

Lower District Court Essen HRB No. 12790
Managing Director: Dr. Heinz Domke,
Ilse Marie Lichtenauer, Dr. Martin Silomon

Tel.: +49-20-1-7494040
Fax: +49-20-1-7494041
Email: info@ifw-essen.de

Inspection Results

Order number: 3527 21.03.2007

Seat heater strand W164,
Order no. 45116444

Summary

Geometric data and resistance comply with the specification.

The values for specific resistance or specific conductance comply with those for pure copper.

Comments on fabric: Some of the strands have been pierced, which in turn means that damage cannot be completely ruled out. The strands that are routed close to one another sometimes make contact with each other; this factor has to be taken into consideration for the electrical wiring.

Processed by: Dr. Martin Silomon .....

Client: Stephan Witte, Johnson Controls GmbH, Burscheid

1 Problem

IfW was provided with several sections of seat heater fabric.

Part designation:	Silver-plated strand, WET no. 21007263A (13.05.02), 0.08 mm^2
Material:	DIN 1787 – E-Cu58 F21 (2.0065), current designation Cu-ETP/Cu-FRHC
	Silver-plated min. 1.02 µm as per ASTM B 298
Specification:	• Design 20 x single wire with diameter (0.07 +/- 0.003) mm
	• Conductor resistance 200 – 250 Ω/km

The strands should be checked against the details listed in the LEONI initial sample inspection report dated 7.6.2002, for delivery note no. 7065936/22.4.02.

Cu-ETP is an oxygenic (tough-pitch) copper, made through electrolytic refining, which exhibits an extremely high conductivity for heat and electricity (when soft min. 57 $m\Omega^{-1}/mm^2$) .

A ground section should be made in order to check the diameter and layer thickness of the Ag coating.

2 Conducted inspections

A sample DC BR 164 (WET no. 11003589C, manufacturing date: November 26, 2004, sampling date: March 6, 2007) was selected from the material provided. Individual strands were randomly prepared by separating the fabric to avoid any damage to the wire.

2.1 Visual inspection

Some of the strands have been pierced. The strands routed close to one another sometimes make contact with each other.

2.2 Metallographic inspection

The strand diameter was determined from three individual values on the ground cross-section, cf. **picture 1** (71.72; 71.86; 72.12 µm) at 71.9 µm. This complies with the specifications (70±3 µm) and the measured values from the initial sample inspection report (70-72 µm).

The measured values at the inclined ground sections, cf. **pictures 2, 3**, and the evaluation of the Ag layer thickness are listed in the following table:

Dimensions [µm]	Lead 1	Lead 2
Small radius	71.2	71.8
Small/large radius	0.273	0.291
Ag layer thickness on left	1.38	1.21
Ag layer thickness on right	1.26	1.17

These values too comply with the specifications (min. 1.02 µm), slightly higher than the (slightly too small?) measured value in the initial sample inspection report (1.01 µm).

2.3 Mechanical properties

The material condition F21 could have been inspected using the Vickers hardness (55HV listed in table?). The inspection was not requested.

2.4 Conductivity

From actual values

strand: 20 single leads

diameter 71.9 µm (**picture 1**, single values: 71.72; 71.86; 72.12 µm),

the voltage measurement was made using a PREMA 8017 with 10 mA external current from a KNICK 3000 (4-point measurement) at wire sections of 170 mm in length; this resulted in

a mean resistance of 0.0386 mΩ (single values: 38.7; 38.9; 38.1 mΩ)

which corresponds to a conductor resistance of 227 Ω/km (initial sample inspection report: 213.4 - 219.3 Ω/km).

The resistance, wire length and cross section yield a

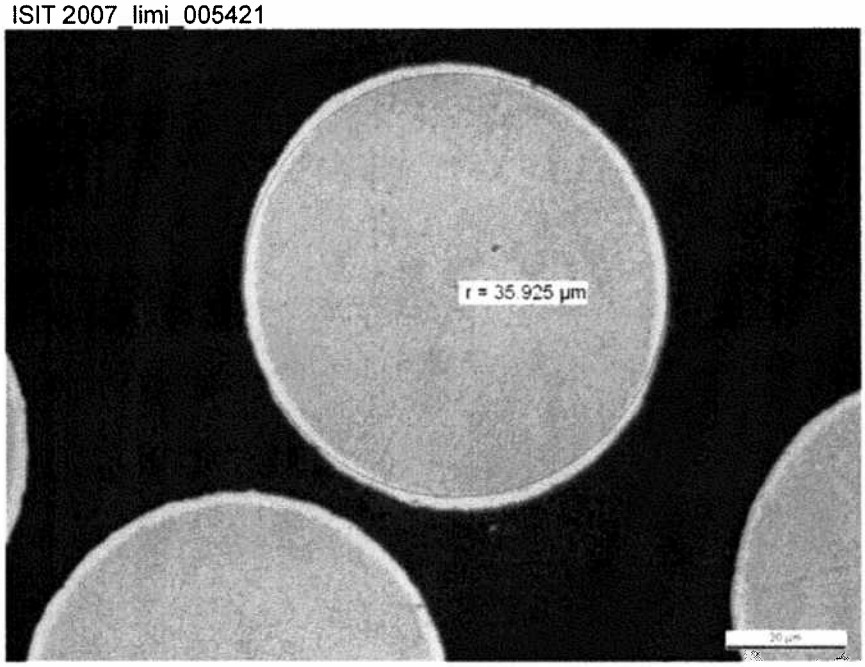
specific resistance of $1.75 * 10^{-8}$ Ωm, or a

specific conductivity of $57.1 * 10^{6}$ $(\Omega m)^{-1}$ (corresponds to specified value when soft of min. 57 m Ω^{-1}/mm^2).

3 Result

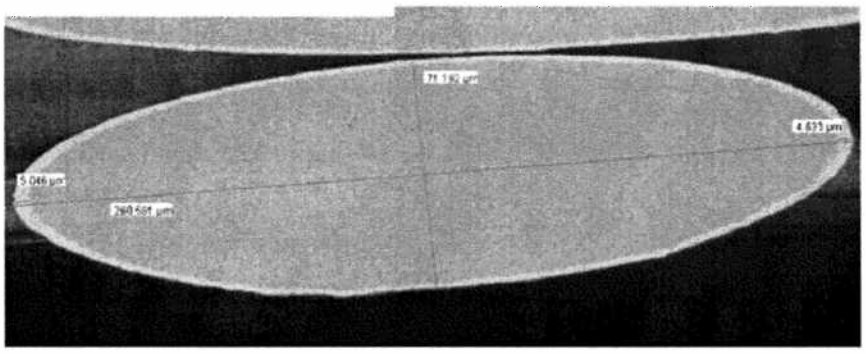
No deviations to the specification and initial sample inspection report were recorded.

ISIT 2007_limi_005421



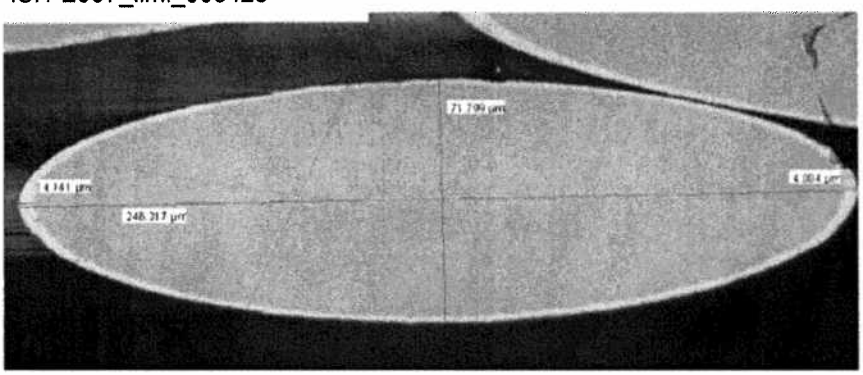
Picture 1: Overview of individual leads in ground cross-section, diameter D = 71.8 µm

ISIT 2007_limi_005428



Picture 2: Overview of lead 1 in inclined ground section for determining thickness of Ag layer,
for evaluation see table

ISIT 2007_limi_005428



Picture 3: Overview of lead 2 in inclined ground section for determining thickness of Ag layer,
for evaluation see table

McAuliffe, Susan R.

From: Adventure Links [info@adventurelinks.net]
Sent: Friday, June 27, 2008 11:27 AM
To: McAuliffe, Susan R.
Subject: Invoice Information
Importance: High

Invoice

Adventure Links

21498 Blue Ridge Mountain Rd.
Paris, VA 20130
Federal ID 54-14-69947
(Keep for Childcare Tax Credit Purposes)

Today's Date : 06/27/2008

Parent:	Susan McAuliffe
Address Ln 1:	1906 Miracle Lane
Address Ln 2 :	
City, State, Zip	Falls Church,VA,22043

Payment Date	Child Name	Camp Code	Charges
27 Jun 2008	Olivia McAuliffe	UA2AO-FC	$40.00
		Total Payments	$40.00
		Amount Due	$0.00

W.E.T. Automotive Systems AG
Rudolf-Diesel-Str. 12
D-85235 Odelzhausen

VERSUCHSBERICHT / Test Report Nr. / No.: 08328

Name:	Josef Armbruster	**Auftraggeber / Requested by:**	Jens Schumacher (Project Manager)
Datum / Date of report:	2007-03-20	**Kundenprogramm / Customer Program Name:**	M-class

Aufgabe / Purpose (incl. remarks & deviations):
Examination of rejected Mercedes parts of M-class seat W164
Measurement of layer thickness on an electrode filament
SEM test on one electrode filament

W.E.T. No. heating element: 11003589E
W.E.T. No. electrode: 11003963A

Prüfling(e) (mit Eingangsdatum) / sample(s) (& date of receipt):
Date of receipt: 2007-02-27

Prüfvorschrift / Specification (section if applicable / version / release date):
W.E.T. WI 40-0001642 000

Zusammenfassung - Ergebnisse / Summary - Results:

- Measurement of layer thickness:

The mean value of the thickness of the silver layer was 1,096 µm. (nominal value 1,02 µm)

- SEM test by Dr. Jürgen Schaeffer

Conclusions about the failure mechanism of the seat heater can not be drawn from the present test material.

Datum / Date freigegeben durch / approved by Sylvia Summerer (test lab manager)

Die Prüfergebnisse gelten nur für die getesteten Prüflinge. The test results apply only to the tested parts.

Inhaltsverzeichnis / table of contents

Equipment used (incl. calibration information):

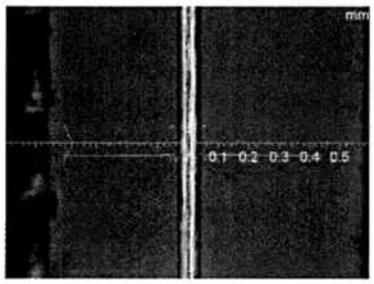
Measurement system	*PM-Nr.*	*Calibrated until*	*Test*
Easy log	041097-O	2007-10	Climate chamber
Device for measurement of thickness of silver layer	051112-O	2007-03	Thickness of silver layer

Measurement of thickness of silver layer

- Test date : 2007-03-06
- Tested by: Josef Armbruster (VE-S3)

Fischerscope® **XRAY XDV-µ**

Product: 64 / 08187 Mercedes **Dir.: Fischer**
Application: 45 / Ag/Cu Ar wire RM



Mean	1.096	µm
Number of readings	50	
No. 1. block	1	
No. last block	1	
Measuring time	60	sec

Measurement was carried out on 10 single filaments of the wire, each at 5 measurement points.
(W.E.T. WI 40-0001642 000 device for measurement of layer thickness)

SEM inspection report
Summary by Dr. Jürgen Schaeffer (VE-A1)
Carried out at the institute Dr. Klingele on March 27, 2007

1. Task

The goal of the SEM inspection was to find the cause of the case of damage Mercedes M-class; the SEM-inspection is part of test report 08187.
In particular following aspects are to be verified with the SEM inspection:

- Layer thickness of silver layer
- Diameter of filament
- Surface quality of silver layer

2. Test sample

Seat heater Mercedes M-class	Carbotex 11003589E
With electrode	11003963A (electrical resistance 0,25 Ohm/m, 20 filaments, diameter 0,07 mm)

Supplied by Josef Armbruster, February 26, 2007

3. Test specification / used test equipment

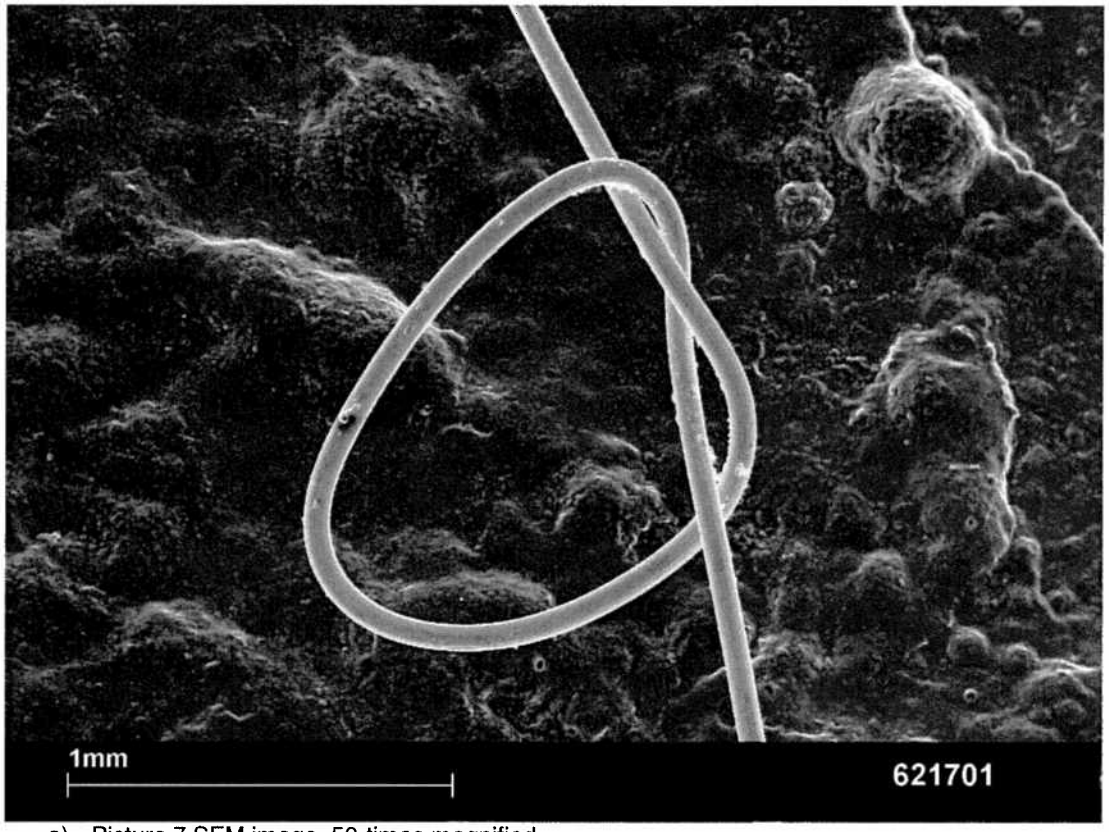
No test specification available / scanning electron microscope

4. Summary

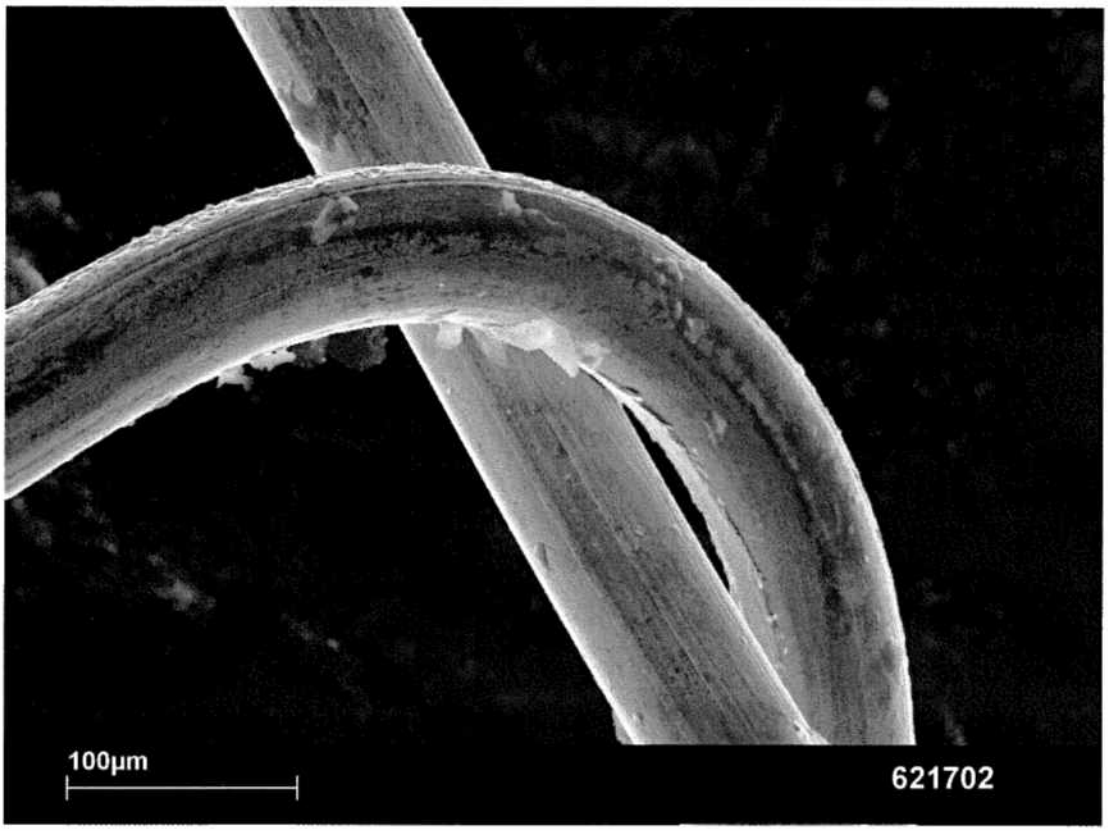
The determined thickness of the silver layer of approx. 0,0015 mm corresponds to the specification of 0,001 mm Ag; the diameter of approx. 0,068 mm corresponds to the specified 0,07 +/- 0,003 mm. The silver surface is even and smooth.
In summary it has to be mentioned that conclusions about the failure mechanism of the seat heater can not be drawn from the present test material.

Test results / SEM images

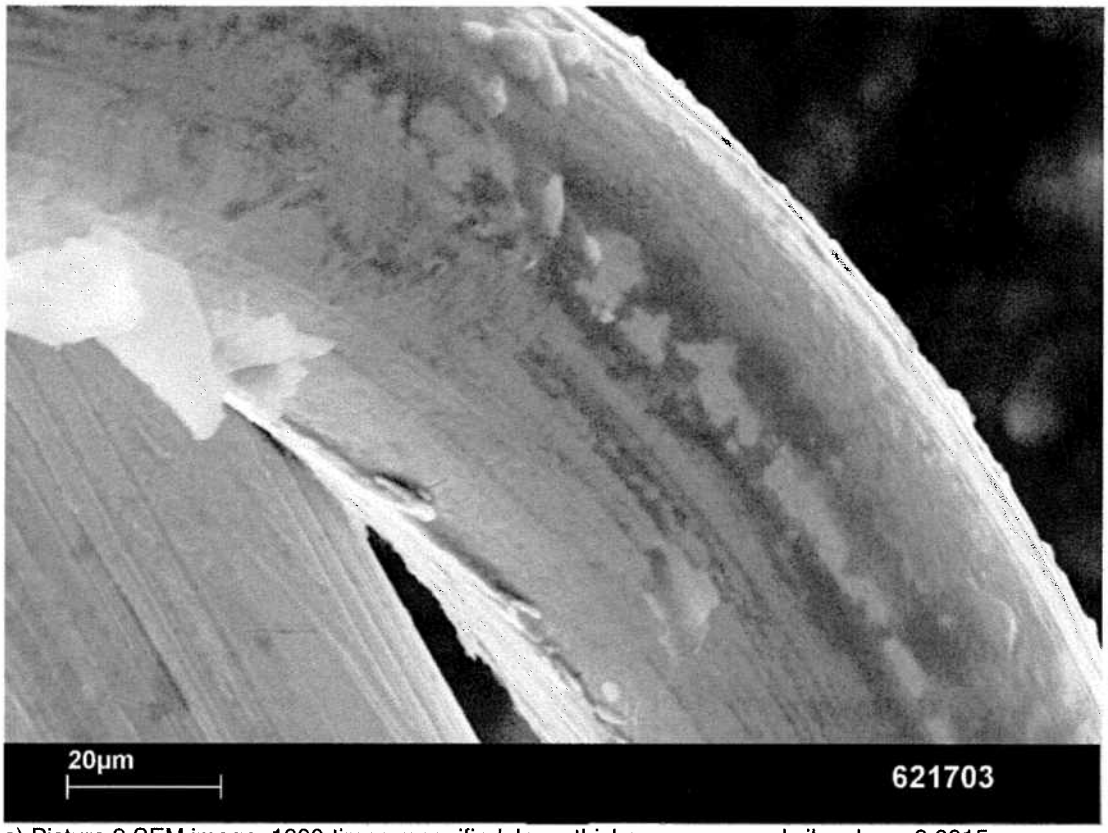
The measurement was started with a piece situated in a distance of approx. 10 - 15 cm to the break area. In order to determine the layer thickness a loop was formed to create the flaking off of the silver layer.



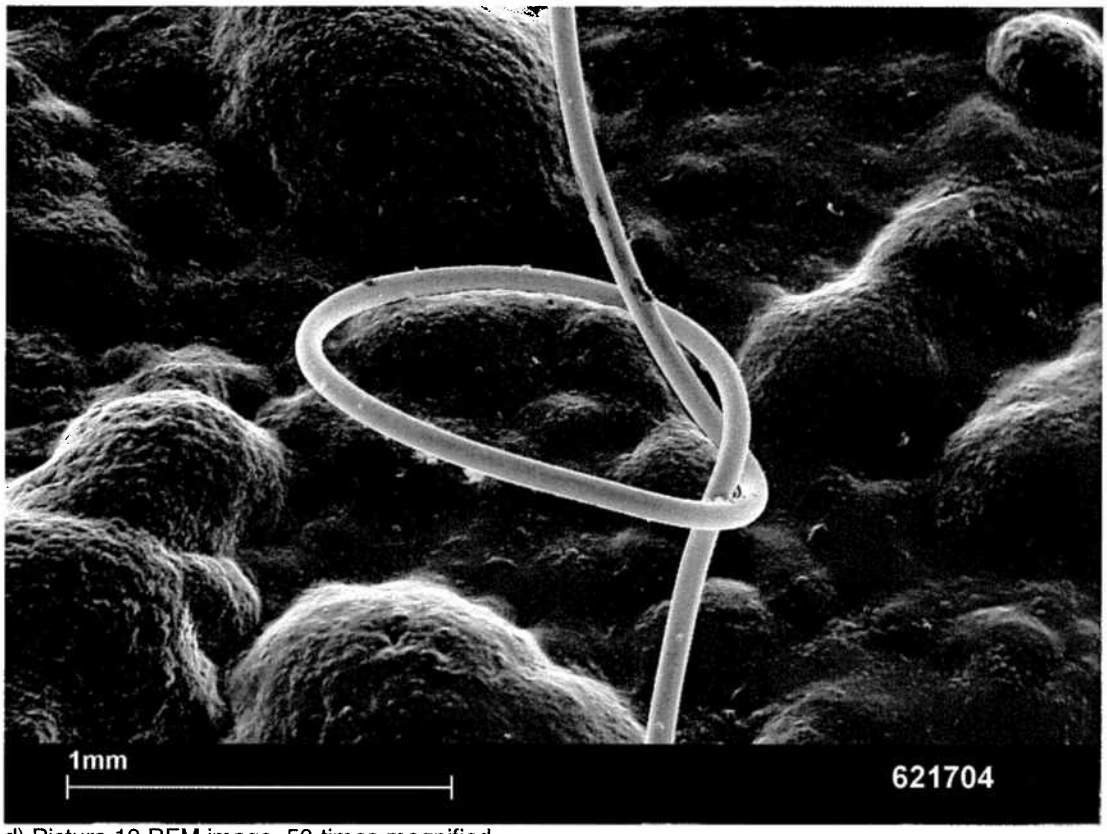
a) Picture 7 SEM image, 50-times magnified



b) Picture 8 SEM image, 300-times magnified, wire thickness 0,068 mm



c) Picture 9 SEM image, 1000-times magnified, layer thickness supposed silver layer 0,0015 mm



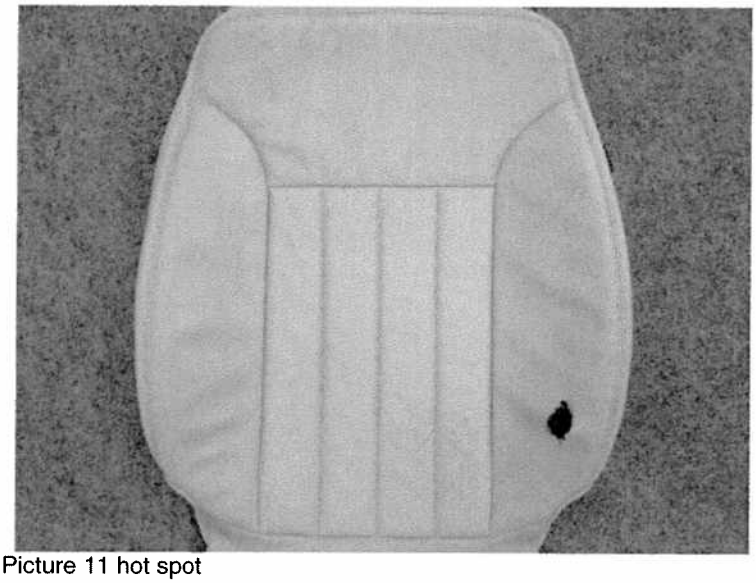
d) Picture 10 REM image, 50-times magnified

The diameter was verified with the SEM image b), approx. 0,068 mm were measured.

The silver layer thickness of approx. 0,0015 mm was determined with the SEM image c). The metals silver and copper were identified with a special microanalysis (X-ray spectroscopy).

The images a), b), and d) show an even, smooth silver layer.

Photo documentation of damaged part



Picture 11 hot spot

Picture 12 detailed picture of hot spot

W.E.T. Automotive Systems AG
Rudolf-Diesel-Str. 12
D-85235 Odelzhausen

Deutscher Akkreditierungs Rat
DAT-P-179/04-00

Die Akkreditierung gilt nur für die in der Urkunde aufgeführten Prüfverfahren. Die akkreditierten Prüfverfahren sind unterstrichen.
The accreditation applies only to the testing methods specified in the document. The accredited testing methods are underlined.

VERSUCHSBERICHT / Test Report Nr. / No.: 08277

Name:	Radovan Djordjevic	**Auftraggeber / Requested by:**	Jens Schumacher(VP-3)
Datum / Date of report:	2007-03-21	**Kundenprogramm / Customer Program Name:**	M-Class

Aufgabe / Purpose (incl. remarks & deviations):

To perform tensile strength test on wire 11003963A: PO# 80041677, 80038267, 80039811, 80040614, 80042897, 80037747 and also on one filament of each wire.

Prüfling(e) (mit Eingangsdatum) / sample(s) (& sample received date):

wire or/and filament	PO#	Delivery date
11003963A	80041677	2005-12-14
11003963A	80038267	2005-09-13
11003963A	80039811	2005-10-24
11003963A	80040614	2005-11-16
11003963A	80042897	2006-01-25
11003963A	80037747	2005-08-31

Date of receipt: 2007-03-12

Prüfvorschrift / Specification (section if applicable / version / release date):

W.E.T. WI 40-0001809 001, DIN 57472 part 623 / VDE 0472 part 623

Zusammenfassung - Ergebnisse / Summary - Results:

- tensile strength test:

Wire: 11003963A	PO#: 80041677 Maximum force is 20.1 N, elongation at F_{max} is 20.4 mm.
Wire: 11003963A	PO#: 80038267 Maximum force is 21.9 N, elongation at F_{max} is 17.2 mm.
Wire: 11003963A	PO#: 80039811 Maximum force is 20.7 N, elongation at F_{max} is 22.3 mm.
Wire: 11003963A	PO#: 80040614 Maximum force is 20.5 N, elongation at F_{max} is 18.8 mm.
Wire: 11003963A	PO#: 80042897 Maximum force is 20.3 N, elongation at F_{max} is 19.7 mm.
Wire: 11003963A	PO#: 80037747 Maximum force is 22.0 N, elongation at F_{max} is 17.7 mm.
filament of: 11003963A	PO#: 80041677 Maximum force is 1.1 N, elongation at F_{max} is 6.7 mm.
filament of: 11003963A	PO#: 80038267 Maximum force is 1.2 N, elongation at F_{max} is 7.9 mm.
filament of: 11003963A	PO#: 80039811 Maximum force is 1.1 N, elongation at F_{max} is 9.2 mm.
filament of: 11003963A	PO# :80040614 Maximum force is 1.2 N, elongation at F_{max} is 9.2 mm.
filament of: 11003963A	PO#: 80042897 Maximum force is 1.1 N, elongation at F_{max} is 13.4 mm.
filament of: 11003963A	PO#: 80037747 Maximum force is 1.2 N, elongation at F_{max} is 8.8 mm.

Datum / Date freigegeben durch / approved by Sylvia Summerer (test lab manager)

Die Prüfergebnisse gelten nur für die getesteten Prüflinge. The test results apply only to the tested parts.

Contents

Verwendete Prüfmittel / Equipment used (incl. calibration information):

Equipment	*PM-No.*	*Calibration due date*	*Test*
Tensile/Pressure device	042026-O	2008-01	Tensile test
Data logger for temp. / hum.	041097-O	2007-10	Tensile test

Testverfahren / Procedure (incl. supporting data, graphs, images, pass/fail criteria, date of test)

1. Test

Tensile strength test according to DIN 57472 part 623 / VDE 0472 part 623 at the wire 11003963: PO# 80041677, 80038267, 80039811, 80040614, 80042897,80037747 and also on one filament of each wire to get more information about their maximum force before breakage and maximum elongation.

Tested by: Radovan Djordjevic (VE-S3)
Test date: 2007-03-19

2. Specifications

DIN 57472 part 623 / VDE 0472 part 623
(Differing to the clamp length described in DIN 57472 part 623 / VDE 0472 part 623 the clamp length was 130 mm)

Clamp length:	130 mm
Clamp device:	Makrolon
Clamp pressure:	5 bar
Test velocity:	100 mm/min
Temperature at test lab:	25°C
Humidity at test lab:	26%

3. Results

W.E.T. No.:	PO#	F_{max} [N]	Elongation at F_{max} [mm]
11003963A	80041677	20.1	20.4
11003963A	80038267	21.9	17.2
11003963A	80039811	20.7	22.3
11003963A	80040614	20.5	18.8
11003963A	80042897	20.3	19.7
11003963A	80037747	22.0	17.7

W.E.T. No.:	PO#	F_{max} [N]	Elongation at F_{max} [mm]
filament of 11003963A	80041677	1.1	6.7
filament of 11003963A	80038267	1.2	7.9
filament of 11003963A	80039811	1.1	9.2
filament of 11003963A	80040614	1.2	9.2
filament of 11003963A	80042897	1.1	13.4
filament of 11003963A	80037747	1.2	8.8

F_{max} [N]: Maximum force before breakage of the wire
Elongation at F_{max} [mm]: Elongation of the wire before breakage

As a result of the set-up of the machine, the test was performed until the wire broke.

Protocols see annex 2.

ANNEX

ANNEX 1: photo documentation

Fig. 1: wire in tensile strength test

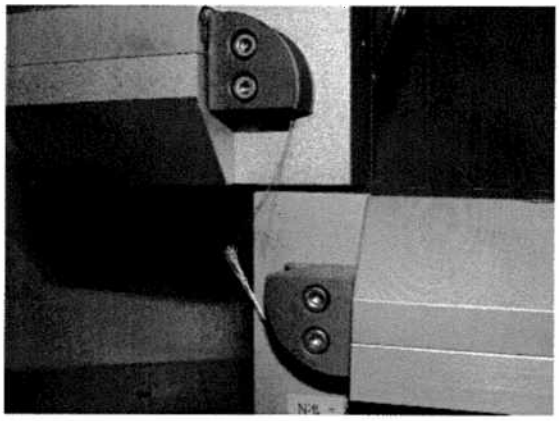


Fig. 2: wire after test

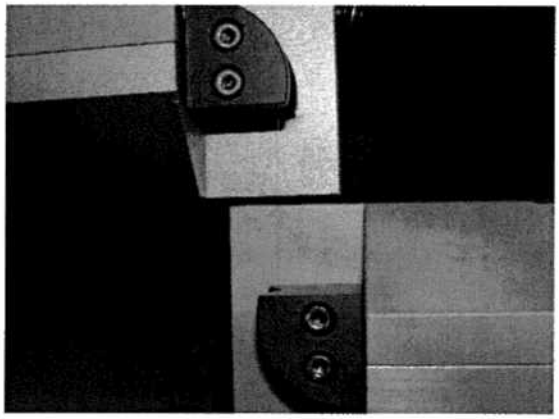


Fig. 3: filament in tensile strength test

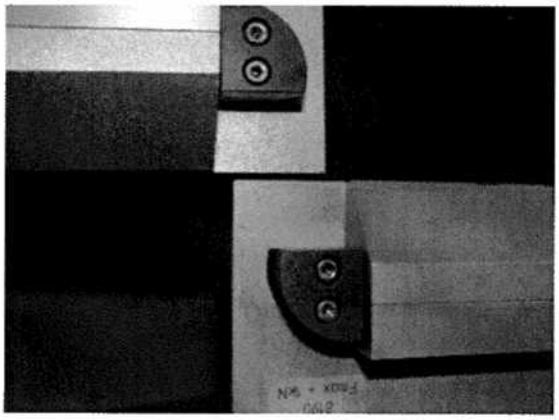


Fig. 4: filament after test

ANNEX 2: Zwick protocol
wire: 11003963A PO#: 80041677

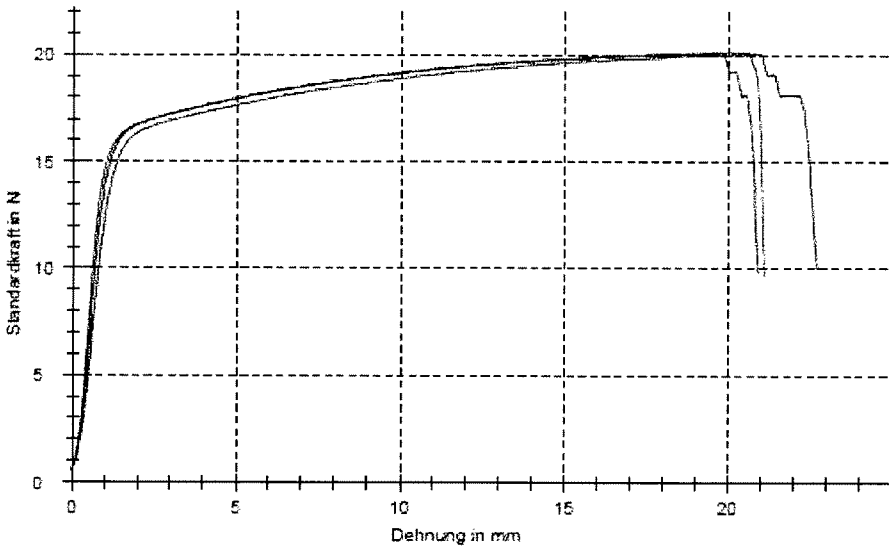
Parametertabelle:

Lieferant	: 80041677		Prüfgeschwindigkeit	: 100	mm/min
Werkstoff	: Elektrode		Einspannlänge	: 130	mm
W.E.T. Nr.:	: 11003963A		Vorkraft	: 0,5	N
Prüfer	: Djordjevic		Raumtemperatur	: 25	°C
Spannbackentyp	: Makrolon		Relative Feuchte	: 26	%
Einspanndruck /-kraft:	5 bar				

Ergebnisse:

Legende	Nr	Unterserie	L0 mm	Fmax N	Weg bei Fmax mm	Weg bei Fmax % %
	1	1	130,42	20,05	20,88	16,01
	2		130,45	20,13	20,55	15,75
	3		130,36	20,12	19,79	15,18

Seriengrafik:



Statistik:

Unterserie #1 n = 3	L0 mm	Fmax N	Weg bei Fmax mm	Weg bei Fmax % %
x̄	130,41	20,10	20,41	15,65
s	0,05	0,04	0,56	0,42
v	0,04	0,20	2,73	2,70

wire: 11003963A PO#: 80038267

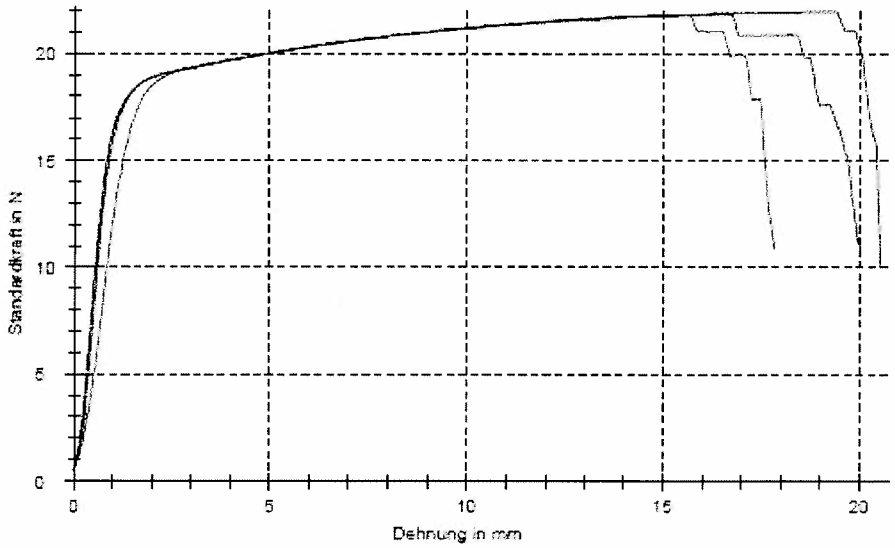
Parametertabelle:

Lieferant	: 80038267	Prüfgeschwindigkeit	: 100	mm/min
Werkstoff	: Elektrode	Einspannlänge	: 130	mm
W.E.T. Nr.:	: 11003963A	Vorkraft	: 0,5	N
Prüfer	: Djordjevic	Raumtemperatur	: 22	°C
Spannbackentyp	: Makrolon	Relative Feuchte	: 32	%
Einspanndruck /-kraft:	5 bar			

Ergebnisse:

Legende	Nr	Unterserie	L0 mm	Fmax N	Weg bei Fmax mm	Weg bei Fmax % %
	1	1	130,45	21,88	16,73	12,82
	2		130,36	21,86	15,61	11,98
	3		130,37	21,96	19,24	14,76

Seriengrafik:



Statistik:

Unterserie #1 n = 3	L0 mm	Fmax N	Weg bei Fmax mm	Weg bei Fmax % %
x̄	130,40	21,90	17,20	13,19
s	0,05	0,05	1,86	1,43
v	0,04	0,24	10,81	10,83

wire: 11003963A PO#: 80039811

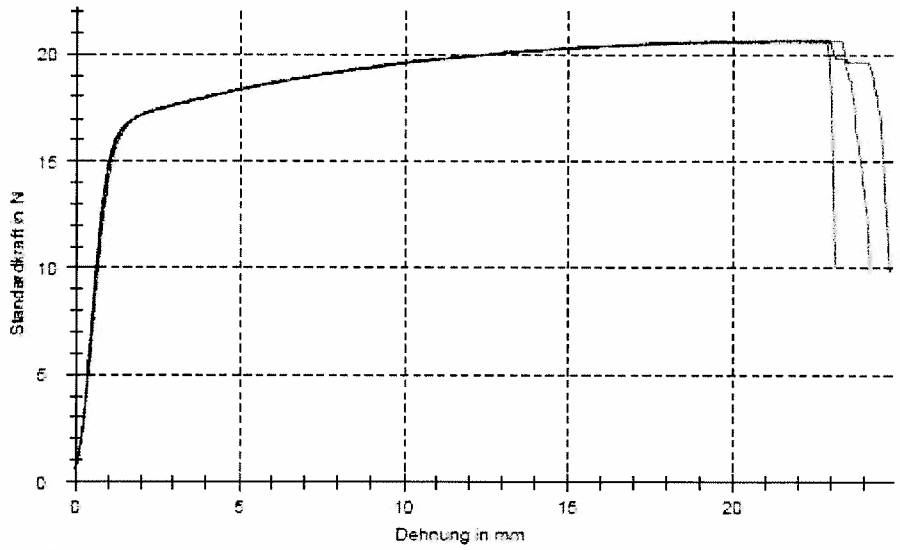
Parametertabelle:

Lieferant	: 80039811	Prüfgeschwindigkeit	: 100	mm/min
Werkstoff	: Elektrode	Einspannlänge	: 130	mm
W.E.T. Nr.:	: 11003963A	Vorkraft	: 0,5	N
Prüfer	: Djordjevic	Raumtemperatur	: 22	°C
Spannbackentyp	: Makrolon	Relative Feuchte	: 32	%
Einspanndruck /-kraft:	5 bar			

Ergebnisse:

Legende	Nr	Unterserie	L0 mm	Fmax N	Weg bei Fmax mm	Weg bei Fmax % %
	1	1	130,42	20,64	21,86	16,76
	2		130,30	20,69	22,39	17,19
	3		130,36	20,65	22,64	17,37

Seriengrafik:



Statistik:

Unterserie #1 n = 3	L0 mm	Fmax N	Weg bei Fmax mm	Weg bei Fmax % %
x̄	130,36	20,66	22,30	17,11
s	0,06	0,03	0,40	0,31
v	0,05	0,13	1,80	1,83

wire: 11003963A PO#: 80040614

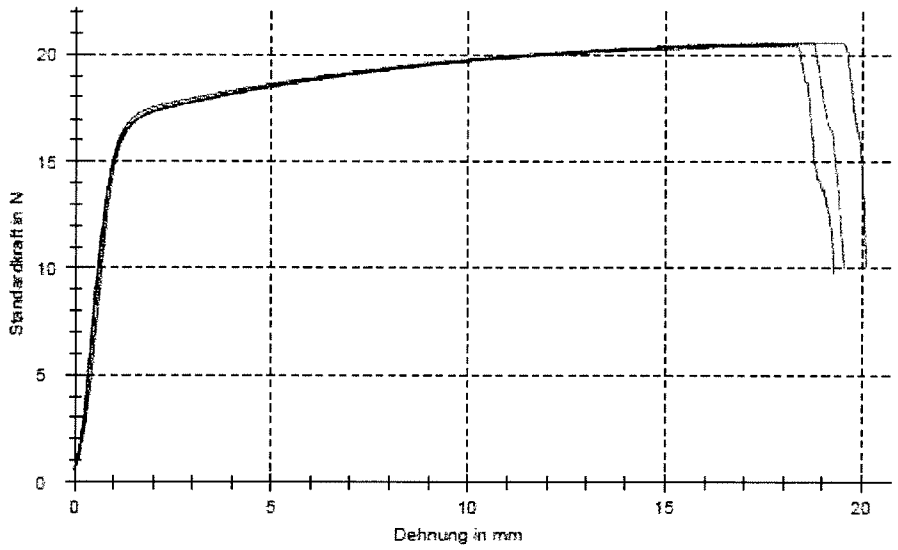
Parametertabelle:

Lieferant	: 80040614	Prüfgeschwindigkeit	: 100	mm/min
Werkstoff	: Elektrode	Einspannlänge	: 130	mm
W.E.T. Nr.:	: 11003963A	Vorkraft	: 0,5	N
Prüfer	: Djordjevic	Raumtemperatur	: 22	°C
Spannbackentyp	: Makrolon	Relative Feuchte	: 32	%
Einspanndruck /-kraft:	5 bar			

Ergebnisse:

Legende	Nr	Unterserie	L0 mm	Fmax N	Weg bei Fmax mm	Weg bei Fmax % %
	1	1	130,50	20,46	18,16	13,92
	2		130,42	20,56	18,60	14,26
	3		130,38	20,57	19,51	14,96

Seriengrafik:



Statistik:

Unterserie #1 n = 3	L0 mm	Fmax N	Weg bei Fmax mm	Weg bei Fmax % %
x	130,44	20,53	18,76	14,38
s	0,06	0,06	0,69	0,53
v	0,05	0,30	3,67	3,71

wire: 11003963A PO#: 80042897

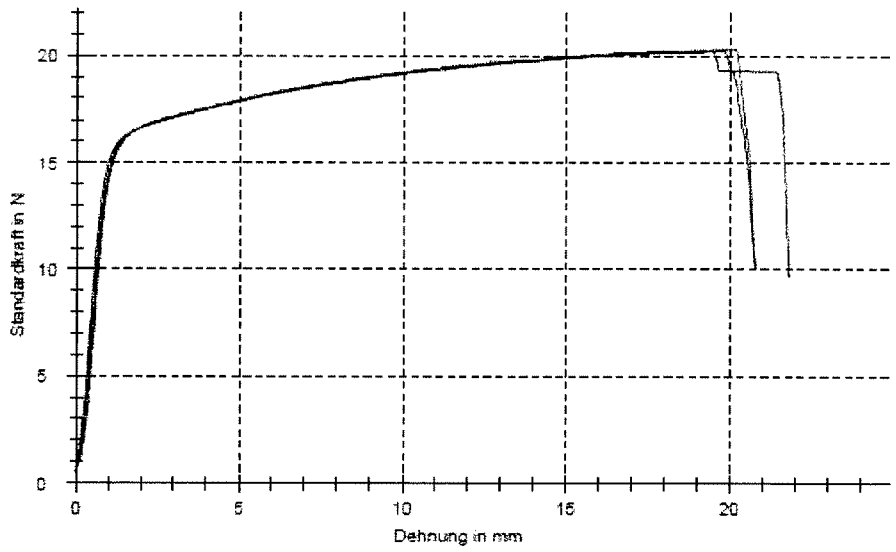
Parametertabelle:

Lieferant	: 80042897	Prüfgeschwindigkeit	: 100	mm/min
Werkstoff	: Elektrode	Einspannlänge	: 130	mm
W.E.T. Nr.:	: 11003963A	Vorkraft	: 0,5	N
Prüfer	: Djordjevic	Raumtemperatur	: 25	°C
Spannbackentyp	: Makrolon	Relative Feuchte	: 26	%
Einspanndruck /-kraft:	5 bar			

Ergebnisse:

Legende	Nr	Unterserie	L0 mm	Fmax N	Weg bei Fmax mm	Weg bei Fmax % %
	1	1	130,42	20,22	19,86	15,23
	2		130,40	20,32	19,91	15,27
	3		130,33	20,24	19,35	14,84

Seriengrafik:



Statistik:

Unterserie #1 n = 3	L0 mm	Fmax N	Weg bei Fmax mm	Weg bei Fmax % %
x̄	130,38	20,26	19,71	15,11
s	0,05	0,05	0,31	0,24
v	0,03	0,24	1,59	1,55

wire: 11003963A PO#: 80037747

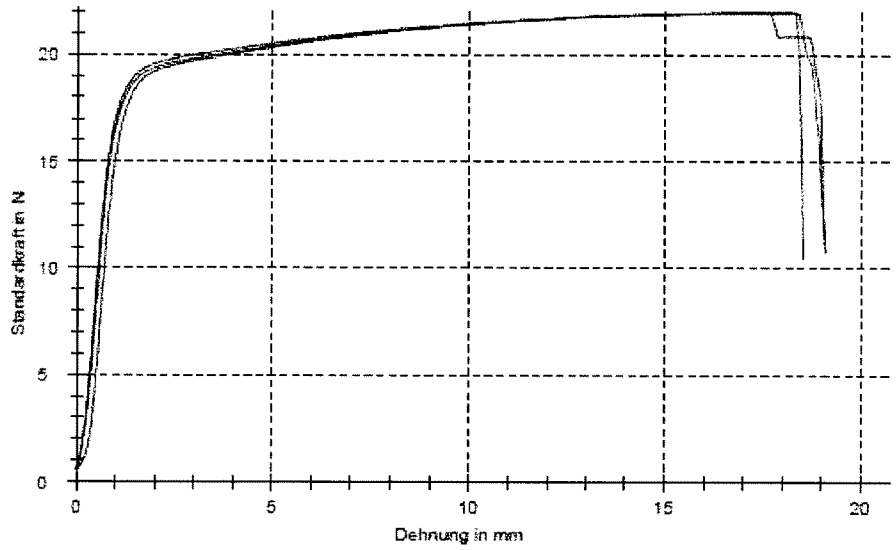
Parametertabelle:

Lieferant	: 80037747	Prüfgeschwindigkeit	: 100 mm/min
Werkstoff	: Elektrode	Einspannlänge	: 130 mm
W.E.T. Nr.:	: 11003963A	Vorkraft	: 0.5 N
Prüfer	: Djordjevic	Raumtemperatur	: 25 °C
Spannbackentyp	: Makrolon	Relative Feuchte	: 26 %
Einspanndruck /-kraft:	5 bar		

Ergebnisse:

Legende	Nr	Unterserie	L0 mm	Fmax N	Weg bei Fmax mm	Weg bei Fmax % %
	1	1	130,41	21,97	17,58	13,48
	2		130,45	21,98	17,86	13,69
	3		130,33	21,97	17,68	13,57

Seriengrafik:



Statistik:

Unterserie #1 n = 3	L0 mm	Fmax N	Weg bei Fmax mm	Weg bei Fmax % %
x	130,39	21,97	17,71	13,58
s	0,06	0,00	0,14	0,11
v	0,05	0,01	0,81	0,79

ANNEX 3: Zwick protocol
filament of: 11003963A PO#: 80041677

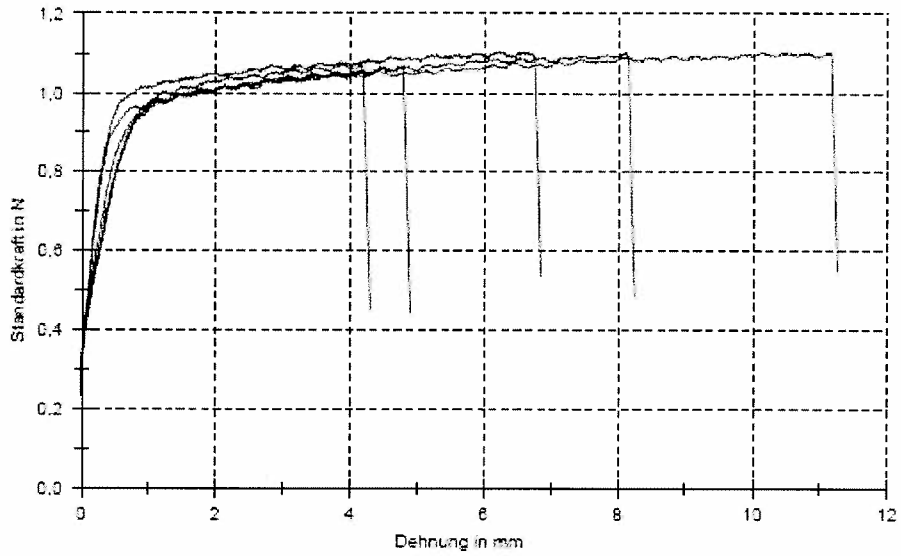
Parametertabelle:

Lieferant	: 80041677	Prüfgeschwindigkeit	: 100 mm/min
Werkstoff	: Elektrode-filamente	Einspannlänge	: 130 mm
W.E.T. Nr.:	: 11003963A	Vorkraft	: 0,2 N
Prüfer	: Djordjevic	Raumtemperatur	: 25 °C
Spannbackentyp	: Makrolon	Relative Feuchte	: 26 %
Einspanndruck /-kraft:	5 bar		

Ergebnisse:

Legende	Nr	Unterserie	L0 mm	Fmax N	Weg bei Fmax mm	Weg bei Fmax % %
	1	1	130,31	1,10	6,23	4,78
	2		130,40	1,10	8,11	6,22
	3		130,42	1,07	4,71	3,61
	4		130,44	1,10	10,15	7,78
	5		130,68	1,07	3,86	2,95

Seriengrafik:



Statistik:

Unterserie #1 n = 5	L0 mm	Fmax N	Weg bei Fmax mm	Weg bei Fmax % %
x	130,45	1,09	6,61	5,07
s	0,14	0,02	2,55	1,96
v	0,11	1,78	38,62	38,65

filament of: 11003963A PO#: 80038267

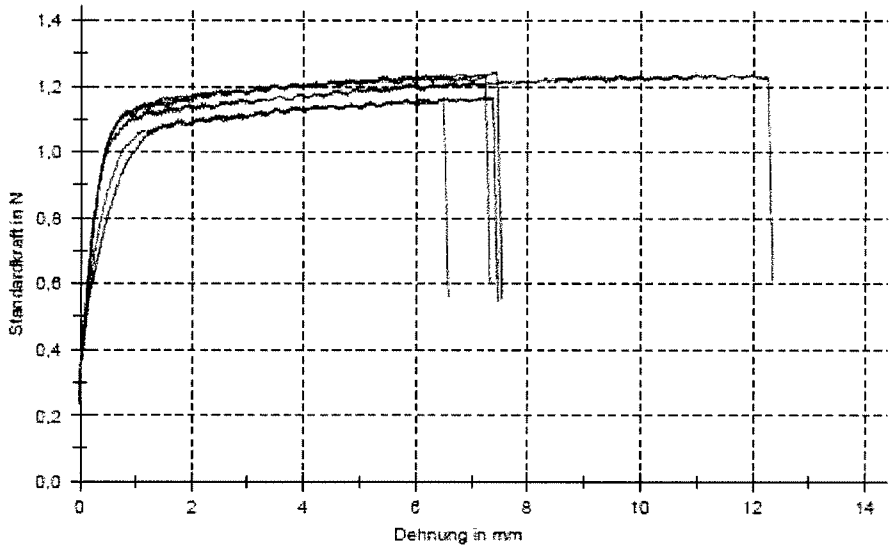
Parametertabelle:

Lieferant	: 80038267	Prüfgeschwindigkeit	: 100 mm/min
Werkstoff	: Elektrode-filamente	Einspannlänge	: 130 mm
W.E.T. Nr.:	: 11003963A	Vorkraft	: 0,2 N
Prüfer	: Djordjevic	Raumtemperatur	: 25 °C
Spannbackentyp	: Makrolon	Relative Feuchte	: 26 %
Einspanndruck /-kraft:	5 bar		

Ergebnisse:

Legende	Nr	Unterserie	L0 mm	Fmax N	Weg bei Fmax mm	Weg bei Fmax % %
	1	1	130,42	1,24	7,43	5,70
	2		130,37	1,23	7,19	5,52
	3		130,37	1,17	7,23	5,55
	4		130,40	1,16	6,46	4,96
	5		130,29	1,24	10,99	8,44

Seriengrafik:



Statistik:

Unterserie #1 n = 5	L0 mm	Fmax N	Weg bei Fmax mm	Weg bei Fmax % %
x̄	130,37	1,21	7,86	6,03
s	0,05	0,04	1,79	1,37
v	0,04	3,32	22,75	22,79

filament of: 11003963A PO#: 80039811

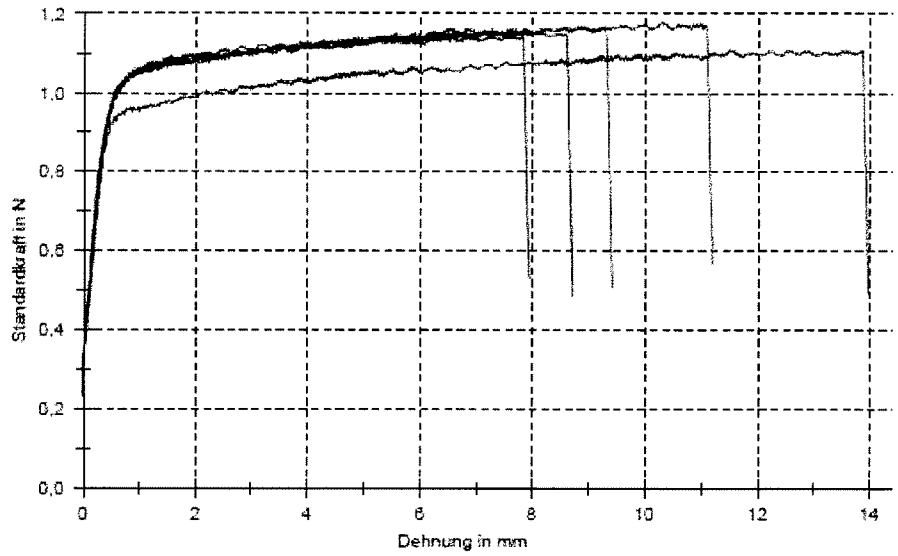
Parametertabelle:

Lieferant	: 80039811	Prüfgeschwindigkeit	: 100 mm/min
Werkstoff	: Elektrode-filamente	Einspannlänge	: 130 mm
W.E.T. Nr.:	: 11003963A	Vorkraft	: 0,2 N
Prüfer	: Djordjevic	Raumtemperatur	: 25 °C
Spannbackentyp	: Makrolon	Relative Feuchte	: 26 %
Einspanndruck /-kraft:	5 bar		

Ergebnisse:

Legende	Nr	Unterserie	L0 mm	Fmax N	Weg bei Fmax mm	Weg bei Fmax % %
	1	1	130,33	1,15	7,26	5,57
	2		130,29	1,18	10,31	7,91
	3		131,15	1,16	8,11	6,19
	4		130,35	1,17	8,81	6,76
	5		130,37	1,11	11,50	8,82

Seriengrafik:



Statistik:

Unterserie #1 n = 5	L0 mm	Fmax N	Weg bei Fmax mm	Weg bei Fmax % %
x̄	130,50	1,15	9,20	7,05
s	0,36	0,03	1,70	1,31
v	0,28	2,41	18,50	18,61

filament of: 11003963A PO#: 80040614

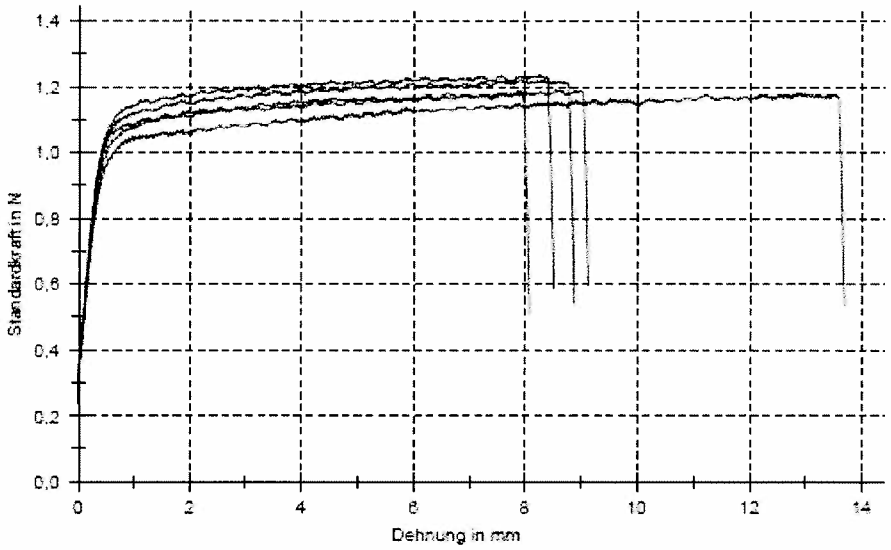
Parametertabelle:

Lieferant	: 80040614	Prüfgeschwindigkeit	: 100 mm/min
Werkstoff	: Elektrode-filamente	Einspannlänge	: 130 mm
W.E.T. Nr.:	: 11003963A	Vorkraft	: 0,2 N
Prüfer	: Djordjevic	Raumtemperatur	: 25 °C
Spannbackentyp	: Makrolon	Relative Feuchte	: 26 %
Einspanndruck /-kraft:	5 bar		

Ergebnisse:

Legende	Nr	Unterserie	L0 mm	Fmax N	Weg bei Fmax mm	Weg bei Fmax % %
	1	1	130,30	1,22	8,30	6,37
	2		130,29	1,19	8,53	6,55
	3		130,34	1,24	8,24	6,32
	4		130,33	1,18	7,86	6,03
	5		130,35	1,18	12,91	9,91

Seriengrafik:



Statistik:

Unterserie #1 n = 5	L0 mm	Fmax N	Weg bei Fmax mm	Weg bei Fmax % %
$\bar{x}$	130,32	1,20	9,17	7,03
s	0,03	0,02	2,11	1,62
v	0,02	2,08	22,98	22,97

filament of: 11003963A PO#: 80042897

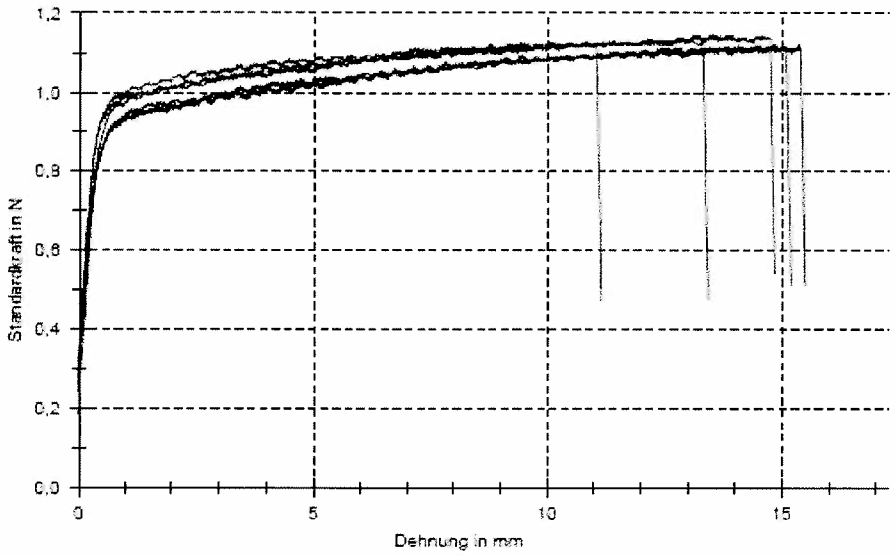
Parametertabelle:

Lieferant	: 80042697	Prüfgeschwindigkeit	: 100	mm/min
Werkstoff	: Elektrode-filamente	Einspannlänge	: 130	mm
W.E.T. Nr.:	: 11003963A	Vorkraft	: 0,2	N
Prüfer	: Djordjevic	Raumtemperatur	: 25	°C
Spannbackentyp	: Makrolon	Relative Feuchte	: 26	%
Einspanndruck /-kraft	: 5 bar			

Ergebnisse:

Legende	Nr	Unterserie	L0 mm	Fmax N	Weg bei Fmax mm	Weg bei Fmax % %
	1	1	130,51	1,12	15,36	11,77
	2		130,40	1,15	13,46	10,32
	3		129,86	1,13	12,78	9,84
	4		130,42	1,13	10,78	8,26
	5		130,44	1,12	14,86	11,39

Seriengrafik:



Statistik:

Unterserie #1 n = 5	L0 mm	Fmax N	Weg bei Fmax mm	Weg bei Fmax % %
x̄	130,33	1,13	13,45	10,32
s	0,26	0,01	1,82	1,39
v	0,20	0,97	13,52	13,45

filament of: 11003963A PO#: 80037747

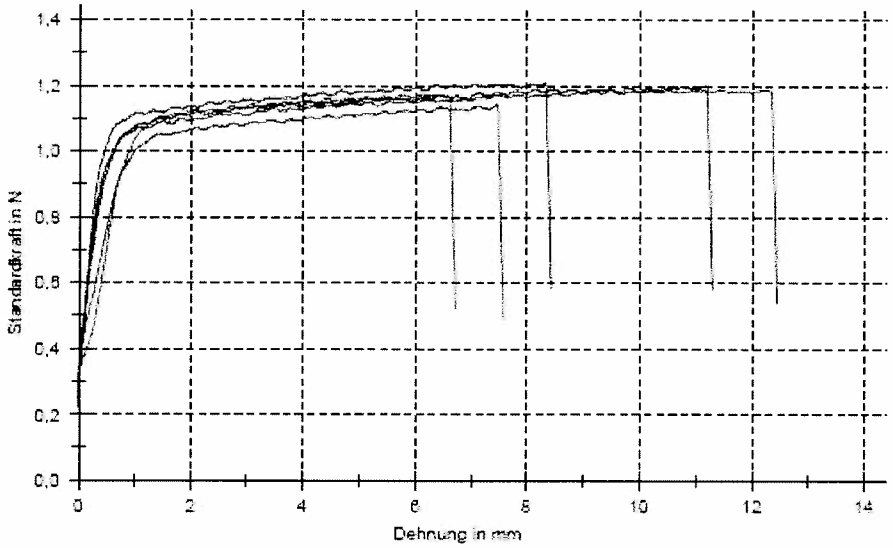
Parametertabelle:

Lieferant	: 80037747	Prüfgeschwindigkeit	: 100 mm/min
Werkstoff	: Elektrode-filamente	Einspannlänge	: 130 mm
W.E.T. Nr.:	: 11003963A	Vorkraft	: 0,2 N
Prüfer	: Djordjevic	Raumtemperatur	: 25 °C
Spannbackentyp	: Makrolon	Relative Feuchte	: 26 %
Einspanndruck /-kraft:	5 bar		

Ergebnisse:

Legende	Nr	Unterserie	L0 mm	Fmax N	Weg bei Fmax mm	Weg bei Fmax % %
	1	1	130,53	1,21	8,31	6,37
	2		130,44	1,14	7,46	5,72
	3		130,43	1,20	11,19	8,58
	4		130,46	1,17	5,74	4,40
	5		130,39	1,19	11,46	8,79

Seriengrafik:



Statistik:

Unterserie #1 n = 5	L0 mm	Fmax N	Weg bei Fmax mm	Weg bei Fmax % %
x̄	130,45	1,18	8,83	6,77
s	0,05	0,03	2,46	1,89
v	0,04	2,23	27,84	27,66

CONTROL PLAN

Number of Characteristics	
Document with special archives	

☐ Pre-Launch ☐ Prototype ☑ Production Control Plan Number: 0870	Key Contact/Phone Oliva Leija (Quality Engineering) 830-774-3512 ext 307	Date (Orig.) 28. Jan 04	Date (Rev.) Feb 09, 2005 / Rev 03
Part Number/Latest Change Level **WET# 11003589E,** **ECL: 001** **Customer # 330131**	Core Team Alejandro Orucias (Quality Engineering), Gerardo Barron (Quality Engineering), Jose Luis Yruegas (Engineering), Gregorio Martinez (Engineering), Carlos Marin (Production).	Customer Engineering Approval/Date (If Req'd.)	
Part Name/Description **FSB RH,LH Basis**	Supplier/Plant Approval/Date	Customer Quality Approval/Date (If Req'd.)	
Supplier/Plant **W.E.T. Sistemas Automotrices S.A de C.V.** Supplier Code	Other Approval/Date (If Req'd.)	Other Approval/Date (If Req'd.)	

Part/ Process Number	Process Name/ Operation Description	Machine, Device, Jig, Tools For Mfg.	Characteristics No	Characteristics Product	Characteristics Process	Special Char. Class	Methods Product/Process Specification/ Tolerance	Methods Evaluation Measurement Technique	Methods Sample Size	Methods Sample Freq.	Methods Control Method	Reaction Plan
1	Receiving Inspection of incomine material											
	a.Carbotex	Multimer		Resistance			Correct resistance according to drawing	Multimeter	According to Ansi ASQC/Z1.4	Every lot	Audit Report	Reject and quarantine
	Flammability	Test lab		Flammability rate of burn		▽	FMVSS302	Flamability test			Audit	Reject and quarantine
		Ruler		Correct Width			Correct Width according to drawing	Ruler	According to Ansi ASQC/Z1.4	Every lot	Audit Report	Reject and quarantine
	b. Foam	Ruler		Dimension of part			Correct dimenison of part according to drawing	Ruler	According to Ansi ASQC/Z1.4	Every lot	Audit Report	Reject and quarantine
	Flammability	Test lab		Flammability rate of burn		▽	FMVSS302	Flamability test			Audit	Reject and quarantine
	c. Tape	Ruler		Correct width and length of the tape			Correct dimenison of part according to drawing	Ruler	According to Ansi ASQC/Z1.4	Every lot	Audit Report	Reject and quarantine
2	Move raw material to storage	Pallet Jack			Raw material integrity		No damage occurs during handling	1st piece visual lot control	1 pc	Every lot	Operator	Dispose and/or quarantine
3	Store raw material.	Fork lift			Shelf Location		Correct Location	Visual	100%	100%	First in - First out	Dispose and/or quarantine
4	Move foam, 2-way tape and carbotex to lamination area	Pallet Jack		Material integrity			No damage occurs during handling	Visual	Every lot	Every transport	Operator	Reject and segregate
5	First off inspection of lamination Calendarin	Pull tester		Bond strength		S/C	Minimum 2.5 Newtons for a 50 mm wide test sample	Pull tester	5 samples	Every lamination program and per machine	In process audit report 80-0000632	Reject and correct set up
					Machine Set Up correct setup		Correct Set up Tape sticking on felt	According to work instruction	1 pc	1st off	Lamination Matrix 80-0001312	Adjust laminator parameters and re-check
				Correct tape location			Correct tape location according to fixture	Fixture	1	First off	Operator	Reject and correct process
6	Laminate carbotex, foam and two way tape	Laminator		Carrier without creases			Smooth, not creases No residues	Visual According to Work Instruction	5 pcs	1st off	In process inspection report - Operator 80-0000714	Reject segregate and correct process
								Visual	100%	Continuous	100% Visual inspetion by operator	Reject segregate and correct process
				Correct tape location			Correct tape	Visual	100%	Continuous	100% Visual inspetion	Reject segregate

CONTROL PLAN

Number of Characteristics	
Document with special archives	

☐ Pre-Launch ☐ Prototype ☑ Production Control Plan Number: 0670	Key Contact/Phone Oliva Leija (Quality Engineering) 830-774-3512 ext 307	Date (Orig.) 28. Jun 04	Date (Rev.) Feb 09, 2005 / Rev 03
Part Number/Latest Change Level **WET# 11003589E,** **ECL: 001** **Customer # 330131**	Core Team Alejandro Orozlas (Quality Engineering), Gerardo Barron (Quality Engineering), Jose Luis Yruegas (Engineering), Gregorio Martinez (Engineering), Carlos Marin (Production).	Customer Engineering Approval/Date (If Req'd.)	
Part Name/Description **FSB RH,LH Basis**	Supplier/Plant Approval/Date	Customer Quality Approval/Date (If Req'd.)	
Supplier/Plant **W.E.T. Sistemas Automotrices S.A de C.V.** Supplier Code	Other Approval/Date (If Req'd.)	Other Approval/Date (If Req'd.)	

Part/ Process Number	Process Name/ Operation Description	Machine, Device, Jig, Tools For Mfg.	Characteristics No	Product	Process	Special Char. Class	Methods: Product/Process Specification/ Tolerance	Evaluation Measurement Technique	Sample Size	Sample Freq.	Control Method	Reaction Plan
				location				Approved Fixture			by operator	and correct process
				No delamination			Material free of delamination	Visual Work Instruction	100%	Continuous	100% Visual Inspection	Reject defective parts segregate them and notify to leader
7	Move spun fab & felt to Calendarin Machine				Material integrity		No damage occurs during handling	Visual	Every lot	Every transport	Operator	Reject and segregate
8	First off inspection of lamination Calendarin	Pull tester		Bond strength		S/C	Minimum 2.5 Newtons for a 50 mm wide test sample	Pull tester	5 samples	Every lamination program and per machine	In process audit report 80-0000632	Reject and correct set up
					Machine Set Up Temp Level 80-85 %		Correct Set up Tape sticking on felt	According to work instruction	1 pc	1st off	Lamination Matrix 80-0001312	Adjust laminator parameters and re-check
9	Laminate carbotex, foam and two way tape	Laminator		Carrier without creases			Smooth, not creases No residues	Visual According to Work Instruction	5 pcs	1st off	In process inspection report - Operator 80-0000714	Reject segregate and correct process
								Visual	100%	Continuous	100% Visual inspetion by operator	Reject segregate and correct process
				No delamination			Material free of delamination	Visual Work Instruction	100%	Continuous	100% Visual Inspection	Reject defective parts segregate them and notify to leader
10	Feed into end feeder roll											
	Attach tracebility tag			Traceability tag			Tag present & filled correctly	Visual	1 Tag	Every pile/lot	Operator	Reject pile / lot and segregate re tag
	Rework				if there isn't rework operation go to next step, otherwise follow non conformance procedure			80-0000988	100%	100%	WI, operator	Quality to release material
11	Move laminated roll to die cut area				Material integrity		No damage occurs during handling	Visual	Every lot	Every transport	Operator	Reject and segregate
12	First off final cut inspection	Cut die			Pattern out line	SC	Pattern out line according to approved template	Approved Template	5 pcs	1st off	In - process report Operator 80-0000715	Dispose, adjust parameters and re-check
					Correct Notches and holes location		Notches and holes location According to approved template	Approved Template	5 pcs	1st off	In - process report Operator 80-0000715	Stop machine, reject material correct process
					Location of Tape		Correct Location of Tape	According to Approved template	5 pcs	1st off	In - process report Operator 80-0000715	Dispose, aligne felt and re-check
					No broken bussbar		No broken bussbar	Visual	5 pieces	2 times per shift	In - process Audit	Reject, segregate and

CONTROL PLAN

Number of Characteristics	
Document with special archives	

☐ Pre-Launch ☐ Prototype ☑ Production Control Plan Number: 0670	Key Contact/Phone Oliva Leija (Quality Engineering) 830-774-3512 ext 307	Date (Orig.) 28. Jun 04	Date (Rev.) Feb 09, 2005 / Rev 03
Part Number/Latest Change Level **WET# 11003589E,** **ECL: 001** **Customer # 330131**	Core Team Alejandro Ornelas (Quality Engineering), Gerardo Barron (Quality Engineering), Jose Luis Yruegas (Engineering), Gregorio Martinez (Engineering), Carlos Marin (Production).	Customer Engineering Approval/Date (If Req'd.)	
Part Name/Description **FSB RH,LH Basis**	Supplier/Plant Approval/Date	Customer Quality Approval/Date (If Req'd.)	
Supplier/Plant **W.E.T. Sistemas Automotrices S.A de C.V.** Supplier Code	Other Approval/Date (If Req'd.)	Other Approval/Date (If Req'd.)	

Part/ Process Number	Process Name/ Operation Description	Machine, Device, Jig, Tools For Mfg.	Characteristics No	Characteristics Product	Characteristics Proces	Special Char. Class	Methods Product/Process Specification/ Tolerance	Methods Evaluation Measurement Technique	Methods Sample Size	Methods Sample Freq.	Methods Control Method	Reaction Plan
					Machine Set up		According to work instruction	Visual	1	shift 1st off	Report 80 0000631 Operator	correct process Reject, segregate and re set up.
13	Cut laminated material to final cut outline. Attach traceability tag.	Cut die		Pattern outline Notches			Pattern out line according to approved template	Visual Approved Template	100% 5 pcs	100% 2 times per shift	100% Visual inspetion by operator In - process Audit Report 80-0000631	Dispose, adjust parts and re-check One defective piece, put on hold production from last checking to the time defective piece was detected and re-inspect 100%
				Correct Notches and holes location			Notches and holes location According to approved template	Approved Template Visual	5 pcs 100%	2 Times Per Shift 100%	In - process Audit Report 80-0000631 100% Visual inspetion by operator	Stop machine, reject material correct process Reject, adjust process
				Location of Tape			Correct Location of tape	Visual Approved Template	100% 5 pcs	100% 2 times per shift	100% Visual inspetion by operator In - process Audit Report	Reject, adjust process Reject, adjust process
		Template		Foam residual			Cut parts free of foam residuals	Visual Template	100%	100%	100% Visual Inspection Removal of residuals by operator w/ template	Reject defective parts segregate them and notify to leader
	Attach traceability tag			Traceability tag			Tag present & filled correctly	Visual	1 Tag	Every pile/lot	Operator	Reject pile / lot and segregate re tag
14	Move die cut material and harness to final assembly			Material integrity			No damage occurs during handling	Visual	Every lot	Every transport	Operator	Reject and segregate
15	Pull buss bar	Needle		Condition of pulling			Correct pulling and twisted without damage	Visual	100%	100%	Operator	Reject and segregate and correct process
				Condition of filaments Location of pulling			No damage or broken filaments Correct location	Visual Visual	100% 100%	10% 10%	Operator Operator	Reject and segregate and correct process
				Pattern Outline		SC	Correct pattern out line according to approved template	Approved template	100%	10%	Operator	Reject and segregate
							Remove residuos from foam	Approved template	100%	10%	Operator	Reject and remove residuos of foam
16	Inspect Crimp	Crimp Machine Micrometer			Height of crimp		Harness wire to bussbar leads.	Visual Micrometer	100% 5 pc	100% 1st off	Operator Crimp heights Records	Reject, segregate and adjust process

CONTROL PLAN

Number of Characteristics

Document with special archives

☐ Pre-Launch ☐ Prototype ☑ Production

Control Plan Number: 0670

Key Contact/Phone: Oliva Leija (Quality Engineering) 830-774-3512 ext 307

Date (Orig.): 28. Jun 04

Date (Rev.): Feb 09, 2005 / Rev 03

Part Number/Latest Change Level: **WET# 11003589E,** **ECL: 001**

Customer # 330131

Core Team: Alejandro Ornelas (Quality Engineering), Gerardo Barron (Quality Engineering), Jose Luis Yroegas (Engineering), Gregorio Martinez (Engineering), Carlos Marin (Production).

Customer Engineering Approval/Date (If Req'd.)

Part Name/Description: **FSB RH,LH Basis**

Supplier/Plant Approval/Date

Customer Quality Approval/Date (If Req'd.)

Supplier/Plant: **W.E.T. Sistemas Automotrices S.A de C.V.**

Supplier Code

Other Approval/Date (If Req'd.)

Other Approval/Date (If Req'd.)

Part/ Process Number	Process Name/ Operation Description	Machine, Device, Jig, Tools For Mfg.	Characteristics No	Characteristics Product	Characteristics Process	Special Char. Class	Methods Product/Process Specification/ Tolerance	Methods Evaluation Measurement Technique	Methods Sample Size	Methods Sample Freq.	Methods Control Method	Reaction Plan
	Cut excess of busabar and wires	Scissors			Crimp leads		Cut must be on leads	Visual	100%	100%	FB-10560-22 Operator	Reject, segregate and
				Condition of Crimp			Crimp surface is uniform, no dents or cracks or bends in crimp, no crimp on insulation	Visual	5 pcs	first off	In-process report- operator 80-0000719	Reject and segregate correct parameters
								Visual	100%	100%	Operator	Reject and adjust parameters
				Wire location			Wire location within staple band	Visual	5pcs	first off	In-process report- operator 80-0000719	Reject and segregate correct parameters
								Visual	100%	100%	Operator	Reject and adjust Parameters
				No wire insulation inside the crimp			No over crimping	Crimp Force Monitor	100%	Continuous	100% automatic control by C.F.M.	Reject and correct process
17	Crimp buss bar to jumpers of harness wires.	Crimp Machine		Height of crimp			Harness wire to bussbar leads.	Visual according to Work Instruction	100%	100%	Operator	Reject, segregate and adjust process
		Micrometer						Micrometer	5 pc	Every hour	Crimp heights Records	Reject, segregate and adjust process
				Condition of Crimp			Crimp surface is uniform, no dents or cracks or bends in crimp, no crimp on insulation	Visual	5 pcs	first off	FB-10560-22 In-process report- operator 80-0000719	
								Visual	100%	100%	Operator	
				Wire location			Wire location within staple band	Visual	5pcs	first off	In-process report- operator 80-0000719	
								Visual	100%	100%	Operator	
				No wire insulation inside the crimp			No over crimping	Crimp Force Monitor	100%	Continuous	100% automatic control by C.F.M.	
	Attach harness cable with hot melt glue to heating element and apply weight block			Hot melt glue location			Correct location according to work instruction	Visual according to work instruction	5 pc	1st off	In process Inspection report - operator 80-0000719	Reject and segregate and adjust process
							Covering wire harness to hold	Visual	100%	100%	Operator	Reject and segregate
		Template		Harness location			Correct location	Template	5 pcs	1st off	In process inspection report - operator 80-0000719	Reject and segregate
		Ruler		Harness length		SC	Correct length	Approved ruler	5 pcs	1st off	In process inspection report - operator 80-0000719	Reject and segregate

CONTROL PLAN

Number of Characteristics	
Document with special archives	

☐ Pre-Launch ☐ Prototype ☑ Production Control Plan Number: 0670	Key Contact/Phone Oliva Leija (Quality Engineering) 830-774-3512 ext 307	Date (Orig.) 28. Jun 04	Date (Rev.) Feb 09, 2005 / Rev 03
Part Number/Latest Change Level **WET# 11003589E,** **ECL: 001**	Core Team Alejandro Ornelas (Quality Engineering), Gerardo Barron (Quality Engineering), Jose Luis Yruegas (Engineering), Gregorio Martinez (Engineering), Carlos Marin (Production).	Customer Engineering Approval/Date (If Req'd.)	
Part Name/Description **FSB RH,LH Basis**	Supplier/Plant Approval/Date	Customer Quality Approval/Date (If Req'd.)	
Supplier/Plant **W.E.T. Sistemas Automotrices S.A de C.V.** Supplier Code	Other Approval/Date (If Req'd.)	Other Approval/Date (If Req'd.)	

Part/ Process Number	Process Name/ Operation Description	Machine, Device, Jig, Tools For Mfg.	Characteristics No	Characteristics Product	Characteristics Proces	Special Char. Class	Methods Product/Process Specification/ Tolerance	Methods Evaluation Measurement Technique	Methods Sample Size	Methods Sample Freq.	Methods Control Method	Reaction Plan
				Correct Harness			According to Master Sample	Visual Master Sample Approved Ruler	100% 5 pc	100% 1st Off	Operator Operator	Reject and segregate Reject and segregate
	Apply harness using glue guides	Template		Correct location of guides			Correct location of glue and harness guides	Following guides on material for correct location	100%	100%	Operator	Reject and correct location
	Apply part identification label to harness tube.	Master Sample		Identification		SC	Correct ID information and correct location Legible correct	According to approved template Approved template	5 pcs 100%	1st off 100%	In process Inspection report - operator 80-0000719 Operator	Reject and segregate One defective pc found put on hold production from last checking to the time defective piece was detected and re-inspect 100%
18	Cut crimp ends and glue leads	Scissors		Crimp leads			Cut must be on leads	Visual	100%	100%	Operator	Reject, segregate and
				Condition of Crimp			Crimp surface is uniform, no dents or cracks or bends in crimp, no crimp on insulation	Visual Visual	5 pcs 100%	first off 100%	In-process report- operator 80-0000719 Operator	Reject and segregate correct parameters Reject and adjust parameters
				No wire insulation inside the crimp			No over crimping	Crimp Force Monitor	100%	Continuous	100% automatic control by C.F.M.	Reject and correct process
	Glue leads and wire			Hot melt glue location			Correct location according to work instruction following guides on material for correct location	Visual according to work instruction	5 pc	1st off	In process Inspection report - operator 80-0000719	Reject and segregate and adjust process
							Covering wire harness to hold	Visual	100%	100%	Operator	Reject and segregate
19	Move parts to Final Inspection			Material integrity			No damage occurs during handling	Visual	Every lot	Every transport	Operator	Reject and segregate
20	Inspect Glue Spot location			Hot melt glue location			Glue spot smooth and covers crimp staple	Visual	100%	100%	Operator	Reject and segregate and adjust process
							Covering wire harness to hold	Visual	100%	100%	Operator	Reject and segregate
	Close Pocket			Wires position			Arrange wires to not to be on edge of part	Visual according to master sample	100%	Continuos	Operator	Identify and segregate rejected pieces. Adjust process
				Flap position			No lifting or peeling, flap match perimeter	Visual	100%	Continuos	Operator	Identify and segregate rejected pieces.
				Contour			No creases	Visual	100%	Continuos	Operator	Identify and segregate rejected pieces.
	Remove Backing two way tape				Correct closing of		According to	Visual according	100%	Continuous	Operator	Reject and segregate

CONTROL PLAN

Number of Characteristics	
Document with special archives	

☐ Pre-Launch ☐ Prototype ☑ Production
Control Plan Number: 0870

Key Contact/Phone: Oliva Leija (Quality Engineering) 830 774-3512 ext 307

Date (Orig.): 28. Jun 04

Date (Rev.): Feb 09, 2005 / Rev 03

Part Number/Latest Change Level: **ECL: 001**

WET# 11003589E, **Customer # 330131**

Core Team: Alejandro Ornelas (Quality Engineering), Gerardo Barron (Quality Engineering), Jose Luis Ynaegas (Engineering), Gregorio Martinez (Engineering), Carlos Marin (Production).

Customer Engineering Approval/Date (If Req'd.)

Part Name/Description: **FSB RH,LH Basis**

Supplier/Plant Approval/Date

Customer Quality Approval/Date (If Req'd.)

Supplier/Plant: **W.E.T. Sistemas Automotrices S.A de C.V.**

Supplier Code

Other Approval/Date (If Req'd.)

Other Approval/Date (If Req'd.)

Part/ Process Number	Process Name/ Operation Description	Machine, Device, Jig, Tools For Mfg.	Characteristics No	Characteristics Product	Characteristics Process	Special Char. Class	Methods Product/Process Specification/ Tolerance	Methods Evaluation Measurement Technique	Methods Sample Size	Methods Sample Freq.	Methods Control Method	Reaction Plan
	to colse pocket				pocket		work instruction	to work instruction				
	Pattern Outline	Iluminate table master sample		Pattern Outline			Correct Outline	Visual According to approval Master Sample	5 pieces 100%	First Off 100%	In process inspection report 80-0000719	Reject and segregate Reject and segregate
				Appereance			According to Approved Master Sample	According to Approved Master Sample	100%	100%	Operator	Reject and segregate
				Part ID			ID label present and with the correct information	Visual Master Sample	100%	100%	Operator	Reject, segregate, 100% inspect and correct as necessary
21	Move parts to final electrical test and marking operation			Material integrity			No damage occurs during handling	Visual	Every lot	Every transport	Operator	Reject and segregate
22	100% Electrical Test and marking operation	Multitester		Resistance		SC	Poka yoke to lock out parts out of spec, and release until key is inserted	Multitester	100%	100%	Poka yoke	Reject and segregate
				Drop voltage measurement across the resistance				Multitester	100%	100%	In process inspection report 80-0000762	Reject and segregate
				Correct mark location			According to template	Approved template	1 piece for every heater carrier	First Off	In process Inspection report 80-0000762	Reject and segregate Inspect material since the last time checked
									2 pieces for every heater carrier	Every 20 pcs	In process Inspection report 80-0000762	Reject and segregate Inspect material since the last time checked
								Visual	100%	100%	Operator	
23	Move parts to packaging area			Material integrity			No damage occurs during handling	Visual	Every lot	Every transport	Operator	Reject and segregate
24	Pack finished parts Bar code label attached			Quantity Correct			Correct quantity on bar code label	Visual	100%	100%	Operator	Reject, segregate, 100% inspect and correct as necessary
				Correct identification of packaging			Correct part number	Visual	100%	100%	Operator	Reject, segregate, 100% inspect and correct
25	Move parts to final inspection audit	Audit stamp		Material integrity			No damage occurs during handling	Visual	Every lot	Every transport	Operator	Reject and segregate
26	Final Inspection Audit			Correct Quantity			Correct quantity	Visual	100%	100%	Operator Packaging Audit 80-0000770	Reject, 100% inspect and correct Reject, segregate, 100% inspect and correct as necessary
				Identificacion			Correct identification	Scanner	1 box and bag	Each Box	Scanner Machine	Reject and segregate

CONTROL PLAN

Number of Characteristics	
Document with special archives	

☐ Pre-Launch ☐ Prototype ☑ Production Control Plan Number: 0670	Key Contact/Phone Oliva Leija (Quality Engineering) 830-774-3512 ext 807	Date (Orig.) 28. Jun 04	Date (Rev.) Feb 09, 2005 / Rev 03
Part Number/Latest Change Level **WET# 11003589E,** **ECL: 001** **Customer # 330131**	Core Team Alejandro Ornelas (Quality Engineering), Gerardo Barron (Quality Engineering), Jose Luis Yruegas (Engineering), Gregorio Martinez (Engineering), Carlos Marin (Production).	Customer Engineering Approval/Date (If Req'd.)	
Part Name/Description **FSB RH,LH Basis**	Supplier/Plant Approval/Date	Customer Quality Approval/Date (If Req'd.)	
Supplier/Plant **W.E.T. Sistemas Automotrices S.A de C.V.** Supplier Code	Other Approval/Date (If Req'd.)	Other Approval/Date (If Req'd.)	

Part/ Process Number	Process Name/ Operation Description	Machine, Device, Jig, Tools For Mfg.	Characteristics No	Characteristics Product	Characteristics Proces	Special Char. Class	Methods Product/Process Specification/ Tolerance	Methods Evaluation Measurement Technique	Methods Sample Size	Methods Sample Freq.	Methods Control Method	Reaction Plan
27	Flammability	Test lab Flammability chamber		Rate of burn		▽	FMVSS 302	Flammability Test	Quarterly by composition		Audit	
28	Move to shipping area	Pallet Jack			Packaging integrity		No damage occurs during handling	Visual	Every lot	Every transport Transport	Operator	Reject and segregate
29	Store	Fork lift			Shelf Location		Correct Location	Visual	100%	100%	Data entry into ERP (BaaN)	Segregate and re locate to correct position
30	Ship upon release				Product		Correct product	Visual	100%	Every Shipment	Shipping Audit	If wrong product/quantity, shipment will put on hold, re-inspect 100% and correct immediately
					Quantity		Correct Quantity	Visual	100%	Every Shipment	Report	