



Chassis & Safety
NVS-210

2008 APR 24 P 1:57

OFFICE OF DEFECTS
INVESTIGATION

VDO Automotive AG – Postfach 10 09 43 – 93009 Regensburg

National Highway Traffic Safety Administration.
Attn. Ms. Kathleen C. DeMeter, Director
Office of Defects Investigation
West Building W45-302
1200 New Jersey Avenue, S.E.
Washington, D.C. 20590, USA

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Date

April 23, 2008

Your message dated

Our Reference

Your reference

NVS-212-pco
EA08/001

OC3 BMW

Ms. Kathleen C. DeMeter, Director
Office of Defects Investigation
National Highway Traffic Safety Administration
West Building W45-302
1200 New Jersey Avenue, S.E.
Washington, D.C. 20590

Dear Ms. DeMeter:

This is in further response to your letter of February 29, 2008 seeking information regarding the occupant classification sensor mat known as the OC3. Continental AG, on behalf of VDO Automotive AG, provided the first part of the response on March 31, 2008. As in that first response, this letter will refer to the company as VDO Automotive AG.

1. State in a table format, by make, model and model year, all vehicles that use the subject component made by Continental for eventual sale or lease in the United States.

Provide the above table also in Microsoft Excel format, entitled "QUESTION ONE DATA."

RESPONSE:

The requested information was provided on March 31, 2008. Continental has subsequently learned from BMW that some additional models use the subject component. An updated Table is enclosed as Attachment One. The updated table is also provided in Microsoft Excel format, as requested.

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Johannes Suttmeier
Registered office:
Regensburg, Germany;
Commercial registry:
Regensburg, HRB 10510

Managing Board:
Dr. Alan Hippe, Holmut Matschi

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2. Describe all assessments, analyses, tests, test results, studies, surveys, simulations, investigations, inquiries and/or evaluations (collectively, "actions") that relate to, or may relate to, the alleged defect in the subject vehicles that have been conducted, are being conducted, are planned, or are being planned by, or for, BMW and other applicable subject vehicles. For each such action, provide the following information:
 - a. Action title or identifier;
 - b. The actual or planned start date;
 - c. The actual or expected end date;
 - d. Brief summary of the subject and objective of the action;
 - e. Engineering group(s)/supplier(s) responsible for designing and for conducting the action; and
 - f. A brief summary of the findings and/or conclusions resulting from the action.

For each action identified, provide copies of all documents related to the action, regardless of whether the documents are in interim, draft, or final form. Organize the documents chronologically by action.

RESPONSE: VDO Automotive AG has conducted an extensive internal investigation of the alleged defect involving a substantial number of assessments, analyses, tests and other actions. Collectively, these actions can be summarized by reference to the modifications that were made to the subject component and that were described in response to Question 3 in the March 31 response. A summary of the internal investigation, organized by reference to the modifications and containing the information requested above, is attached at Confidential Attachment 2.

Due to the enormous quantity of documents related to the internal investigation (over 20 gigabytes of data stored in over 40,000 files on a hard drive), and the fact that most of these documents are in the German language and would require translation, it has not been possible to produce "copies of all documents" that are related to this investigation, nor has it been possible to organize them chronologically. We have made a good faith effort to group similar documents together.

By agreement with your office, we are providing the following documents at this time, identified as Confidential Document Attachment A:

- A set of the investigation-related documents mainly related to the E83 platform, as a typical example of the documentation of the investigation across all the development platforms. Similar documents exist for most other platforms identified in response to Question 1. Where numerous documents were located with similar information (such as 8D reports on returned parts, for example), an exemplar is being provided, rather than all documents.
- All independent analyses of the alleged defect conducted under contract to VDO Automotive AG.

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- All minutes of VDO Automotive's Product Safety Committee meetings at which the alleged defect in the OC3 mat was discussed. VDO Automotive has made a good faith effort to identify all such minutes, and has redacted the discussions unrelated to the alleged defect.
- Exemplar documents showing engineering drawings related to the modifications identified in response to Question 3.
- Final (or latest) version of documents that are updated with new information (such as warranty data analysis, field return analysis, and similar documents).
- Exemplar documents, including agendas and meeting minutes, related to meetings between and among BMW and VDO Automotive AG and IEE (the supplier to VDO Automotive AG) related to the alleged defect. Where numerous documents were located with similar information, such as agendas of recurring meetings or cumulative action item lists, an exemplar is being provided.

By agreement with your office, VDO Automotive AG is not providing the following at this time:

- E-mails.
- Documents that are collateral to the investigation but which may have been consulted during the investigation (such as original product specifications).
- Contracts or other commercial agreements between VDO Automotive AG and its customers or suppliers) and documents primarily related to warranty cost allocation or other cost/responsibility allocation between VDO Automotive AG and its customers or suppliers.
- Documents related to the development and validation of repair procedures which ultimately resulted in the Technical Service Bulletin already provided to NHTSA by BMW.
- Investigation-related documents not described in the previous description of documents to be provided.

A few additional observations are in order. First, the documents being provided today that were originally created in the German language have been translated as rapidly as possible to facilitate this submission. Where a document was originally created in German, the German version appears adjacent to the translation in the submission. While good faith efforts were made to translate all information accurately, it is possible that some translations are imperfect, either in grammatical construction or in substance. VDO Automotive will supplement this submission if it identifies any material error in translation.



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Second, in some cases, to expedite the translation process, the English language version contains the substance of the German document, but not its format. For example, if the German document contained a pie chart of data, the English language version translates the caption and data from the pie chart, but does not replicate the graphic pie chart, given the time available to prepare this submission.

Third, Excel spreadsheets related to the investigation could not generally be printed into a legible hard copy due to formatting issues. Where an Excel spreadsheet could not be printed into a legible hard copy, a page identifying the spreadsheet will appear in the main document production, and the spreadsheet itself (in English and, where applicable, the German version) will be provided on a disk, identified as Confidential Document Attachment B.

Fourth, many documents contain automatic date programs which cause the document to be redated to the present date on which it was opened and printed. VDO Automotive has not attempted to remove or alter that program; accordingly, the affected documents will contain an automatic date header or footer indicating a date within the past several days when the document was printed for this submission. In most cases, the actual date of the document or presentation will appear on the first page of the document or presentation.

Fifth, numerous documents are being provided that were originally created by BMW. NHTSA should direct any questions about the information contained in those documents to BMW.

Finally, some PowerPoint presentations contain embedded videos which could not be reproduced in the time available. The presence of such an embedded video will be obvious on the face of the document by an icon. VDO Automotive will make available to NHTSA any such video upon request.

3. **Describe all modifications or changes made by, or on behalf of BMW or other applicable subject vehicles, in the design, material composition, manufacturing, quality control, supply, or installation of the subject component, from the start of production to date, which relate to, or may relate to, the alleged defect in the subject vehicles. For each such modification or change, provide the following information:**
 - a. **The date or approximate date on which the modification or change was incorporated into mat sensor production;**
 - b. **A detailed description of the modification or change;**
 - c. **The reason(s) for the modification or change;**
 - d. **The part numbers (service and engineering) or the original component;**
 - e. **The part number (service and engineering) of the modified component; and**
 - f. **Whether the modified component can be interchanged with earlier production components.**



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Also, provide the above information for any modification or change that Continental is aware of which may be incorporated into vehicle production within the next 120 days.

RESPONSE: The requested information was provided on March 31, 2008. Continental has subsequently learned from BMW that some additional models use the subject component. An updated Table is enclosed as Confidential Attachment Three.

4. Produce one each of the following:

- a. Exemplar sample of each seat mat prior to and after the 11/2005 BMW built date; and
- b. Field return sample of the subject component exhibiting the subject failure mode.

RESPONSE: The requested information was provided on March 31, 2008. Unless requested by NHTSA, Continental does not plan to provide additional mat samples for the models added to the supplemental response to Questions 1 and 3.

5. Provide a summary description and function of the seat mat sensor in the role of occupant detection. Specifically, describe the role of the center grid section versus the "side bolster" grid sections and their roles in the detection of children (including child safety seats), adults and out-of-position children and adults. Describe the ramification of the post 11/2005 OC3 mat design (elimination of the side bolster grid sections) in its ability to detect all the different occupant types. The information shall include where applicable:

- a. Functional block/flow diagram; and/or
- b. Picture/illustration of the components and component location including the seat mat and seat assembly.

RESPONSE: The seat mat sensor (OC3) is one component of the vehicle's complete air bag system. The seat mat sensor is mounted in the front passenger seat between the trim and the A-surface of the foam. The OC3 mat is used to differentiate a 5th percentile female from an infant child restraint system containing a 12 month old infant. With the exception of the E53 platform, the OC3 is not used to detect children older than infants, because BMW has chosen to use a low risk deployment strategy for compliance with FMVSS 208 for older children in most vehicles containing the OC3 mat.

The OC3 major components are (1) the sensor mat, which consists of two laminated layers of plastic substrate on which conductor lines and sensing areas (sensor cells) are printed, and (2) the electronic control unit (ECU) with an implemented algorithm. Pictures, including examples of actual measured profiles on the sensor cells, are enclosed as Attachment 4.



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When the passenger seat is occupied, the sensor cells detect the force applied to each cell by the occupant (or child restraint, as the case may be). This force ("resistance") is measured by the ECU at intervals of 1.0 seconds. Higher force decreases the resistance and a lower force pressure increases the resistance of the sensor cells. The ECU algorithm decides whether the profile is a human or a child restraint or whether the seat is unoccupied. The ECU algorithm typically distinguishes among three classes:

- Class 0: passenger seat not occupied;
- Class 1: passenger seat occupied by an infant child restraint;
- Class 2: passenger seat occupied by an adult (5% female or larger).

The above summarizes the classification logic for all platforms except E53. In the E53, Class 1 includes the infant child restraints as well as three year old and six year old children, either in a child restraint or on the passenger seat.

There is no difference between the function of the side bolster sensor cells and the center grid sensor cells in terms of the classification of child restraints or adults. All of the cells perform as described above. The removal of the side bolster sensor cells has no effect on the ability of the OC3 mat to perform its classification task. If the base of a child restraint is too large to engage the center grid sensor cells, the algorithm will decide that the passenger seat is not occupied, and will transmit "Class 0" to the airbag ECU. The airbag ECU will suppress the air bag, which is the same result that would obtain if the center grid detected an infant child restraint.

6. Furnish Continental's assessment of the alleged defect in the subject vehicle (both in BMW and in other applicable subject vehicles), including:

- a. The causal or contributor factor(s);
- b. The failure mechanism(s);
- c. The failure mode(s);
- d. Is the failure intermittent or permanent
- e. The risk to motor vehicle safety it poses;
- f. What warnings, if any, the operator and the other persons both inside and outside the vehicle would have that the alleged defect was occurring or subject component was malfunctioning.

RESPONSE: VDO Automotive is an intermediate supplier of the subject components (OC3 occupant classification sensor mats) that are ultimately integrated into front outboard passenger seats installed in vehicles manufactured by BMW. VDO Automotive does not install the mats into the automobiles' seats or the seats into the finished automobiles.



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As the field performance of the OC3 sensor mat is dependent on many aspects of mat, seat and vehicle design and integration that are outside the control of VDO Automotive, we believe it appropriate to defer to BMW's assessment of the alleged defect at this time.

If you have any questions regarding this submission, please call Fredric E. Roth, Jr., Esq., at 704-583-8710.

Sincerely,

A handwritten signature in cursive script, appearing to read "Dr. Henderikus-L Offereins".

Dr. Henderikus-L Offereins

Director, Occupant Classification

Enclosures

Q1_MYmodel

OC3 Production of VDO Automotive AG

Valid: April 14st 2008

Make	Model Series	Model Name	Model Year**	Seat Types
BMW	5 and 7 series	E60/61/65/66	MY 2004 to present	Basis / Basis Klima and Sport
BMW	5 and 7 series	E60/61/65/66	MY 2004 to present	MFS and MFS Klima
BMW	6 series	E63	MY 2006 to present	Basis and Sport
BMW	6 series	E64	MY 2006 to present	Basis and Sport
BMW	X3	E83	MY 2004 to present	Basis and Sport
BMW	X5	E53	MY 2006 and MY 2007	Basis and Sport
BMW	Z4	E85/86	MY 2004 to present	Basis and Sport
Mini	Mini	R50/53	MY 2004 to MY 2007	Basis and Sport
Mini	Mini	R52	MY 2004 to present	Basis and Sport
BMW	3 Series	E90/E91	MY 2004 to present	Basis and Sport
BMW	3 Series	E92*	MY 2007 to present	Basis and Sport
BMW	3 Series	E93*	MY 2007 to present	Basis and Sport
Rolls Royce	Phantom / extra long	RR01*/EWB*	MY 2006 to present	
Rolls Royce	Cabrio / Coupe	RR02*/03*	MY 2007 to present	

* Models unaffected by circuit cracks;

** MY information is based on VDO Automotive AG, best of knowledge;

Information above does not differentiate between different generations of OC3, which is available in question 3 response;

ATTACHMENTS 2 AND 3

DOCUMENTS 00001 TO 002657

SUBMITTED TO OFFICE OF CHIEF COUNSEL

UNDER A REQUEST FOR CONFIDENTIAL TREATMENT