P. 019

VOLKSWAGEN

GROUP OF AMERICA

OFFICE OF DEFECTS & INVESTIGATIONS

2011 SEP 26 A 10:28

Received 9/26/11
Dmg

Scott Yon
Chief, Vehicle Integrity Division
Office of Defects Investigation
U.S. Department of Transportation
National Highway Traffic Safety Administration
1200 New Jersey Avenue S.E.
Washington, DC 20590

CHRISTOPHER T. SANDVIG NAME
GM – COMPLIANCE / TREAD TITLE
PRODUCT COMPLIANCE DEPARTMENT
248-754-5000 PHONE
248-754-5093 FAX

SEPTEMBER 22, 2011 DATE

Subject: EA11-002 NVS-212cag

VOLKSWAGEN GROUP OF AMERICA, INC.
3800 HAMLIN ROAD
AUBURN HILLS, MI 48326
PHONE +1 248 754 5000

Dear Mr. Yon:

Please find attached Volkswagen's response to your letter dated August 09, 2011 requesting information concerning reports or allegations of a vehicle fire, related to failure or malfunction of the coil-on-plug ignition coil assembly on certain 2001-2007 MY Volkswagen Passat and Passat Wagon vehicles equipped with a 4 cylinder, turbocharged engine.

To ensure clarity in the presentation of information included in this response, Volkswagen understands the "alleged defect" to refer to vehicles that experienced actual engine compartment or complete vehicle fires that were characterized by actual flame and combustion damage, as opposed to "non-fire" thermal events resulting in damage limited to the subject component and associated wiring or adjacent parts ("component overheating"). However, in response to your information request Volkswagen is providing information with respect to both types of incidents.

For your convenience, each request is restated verbatim and then followed by our response.

Please contact me if you have any questions regarding this response.

Sincerely,

Christopher T. Sandvig
General Manager - Compliance/TREAD
Service and Quality

Attachments

1. State by model and model year, the number of subject vehicles VW has manufactured for sale or lease in the United States. Separately, for each subject vehicle manufactured to date by VW, state the following:

   a. Vehicle's identification number (VIN);
   b. Model Year;
   c. Vehicle's date of manufacture;
   d. Date warranty coverage commenced;
   e. The State in the United States where the vehicle was originally sold or leased (or delivered for sale or lease);
   f. Original equipment coil manufacturers/suppliers names;
   g. Whether or not the vehicle is subject to NHTSA safety recall 08V-156;
   h. If affected by 08V-156, the date the recall was completed, or "n/a" if not completed;
   i. Whether or not the vehicle is subject to an EPA mandated emissions recall involving the ignition coil(s); and,
   j. If affected by an emissions recall, the date the recall was completed, or "n/a" if not completed.

   Provide the table in Microsoft Access 2007, or a compatible format, entitled "**PRODUCTION DATA**."

   Response 1

   In response to your inquiry, Volkswagen has identified the following number of 2001-2007 Model Year (MY) Passat vehicles manufactured and sold to Volkswagen Group of America, Inc. for resale or lease in the United States that were equipped with a 4 cylinder, turbocharged engine.

Subject Vehicles	MY 2001	MY 2002	MY 2003	MY 2004	MY 2005	MY 2006	MY 2007
[1]Passat	41,216	57,898	67,592	51,642	20,745	54,098	35,547

   Please see Microsoft Excel file entitled "PRODUCTION DATA.xlsx" for responses to subparagraphs "a" through "j" attached hereto as Exhibit to Request 1.

[1] Production count for model years 2001-2006 Passat vehicles sold or leased in Puerto Rico are not included, as these model year vehicles were not imported and sold by Volkswagen Group of America, Inc.

"Coil-on-plug" Ignition Coils

Volkswagen understands a "coil-on-plug" ignition coil as an ignition coil where the actual coil pack is located on top of the plug which reaches into the cylinder head. Volkswagen does not use such a design in the subject vehicles. The coils that Volkswagen understands to be subject to this inquiry are referred to as pencil coils. In the pencil coil design, the actual coil is located in the shaft or "pencil" part of the ignition coil and is located inside the cylinder head spark plug well. The head of the coil which is "on the plug" carries only the electronics (the printed circuit board) and the electrical connector. In response to this inquiry Volkswagen will refer to the subject ignition coil design as pencil ignition coils.

Pencil ignition coils installed in subject vehicles were sourced from Bremi Auto-Electric Ernst Bremicker GmbH ("Bremi"), Era PowerTrain GmbH ("Era"), Pulse GmbH & Co. KG ("Pulse"), and Eldor Corporation S.P.A. ("Eldor").

Eldor and Pulse remain as suppliers of factory installed pencil ignition coils for the subject vehicles.

The manufacturer of the ignition coils originally installed in some of the vehicles listed has been identified as "Eldor", "Pulse" or "Bremi" in the Exhibit to this request. Production constraints made a second supplier necessary. Thus Eldor and Pulse supplied the pencil ignition coils installed on some of the subject vehicles. Because those pencil ignition coils are interchangeable, the identity of the specific supplier of coils installed on certain vehicles was not documented by VIN. For those the table shows "Eldor or Pulse".

Volkswagen notes that neither the Environmental Protection Agency ("EPA") nor the California Air Resources Board ("CARB") mandated any emissions recall related to ignition coils or pencil ignition coils on the subject vehicles, nor on any other Volkswagen or Audi vehicle. The "P1 / 28F3" emission service action, involving the replacement of pencil ignition coils, is a voluntary emission service action undertaken in coordination with EPA and CARB.
NHTSA was informed about this voluntary emission service action with email dated Nov 18, 2009. Volkswagen is including a copy of documents relating to this voluntary emissions service action as an Exhibit to Request 7 for the Agency's review.

Source: Business Objects Vehicles Universe

Date Gathered: Through the date of the inquiry

Exhibit to Request 1

Please see data provided in Microsoft Excel format in the Exhibit to Request 1 folder on the EA11-002 Data Collection Disc

2. State the number of each of the following, received by VW, or of which VW is otherwise aware, which relate to, or may relate to, the alleged defect in the subject vehicles:

   a. Consumer complaints, including those from fleet operators;
   b. Field reports, including dealer and employee field reports;
   c. Reports involving a crash, injury, burn injury, or fatality, notices received by the manufacturer alleging or proving that a death or injury was caused by a possible defect in a subject vehicle;
   d. Property damage claims;
   e. Subrogation claims by insurance companies;
   f. Third-party arbitration proceedings where VW is or was a party to the arbitration; and
   g. Lawsuits, both pending and closed, in which VW is or was a defendant or codefendant.

   For subparts "a" through "e," state the total number of each item (e.g., consumer complaints, field reports, etc.) separately. Multiple incidents involving the same vehicle are to be counted separately. Multiple reports of the same incident are also to be counted separately (i.e., a consumer complaint and a field report involving the same incident in which a crash occurred are to be counted as a crash report, a field report and a consumer complaint).

   In addition, for items "c" through "g," provide a summary description of the alleged problem and causal and contributing factors and VW's assessment of the problem, with a summary of the significant underlying facts and evidence. For items "f" and "g," identify the parties to the action, as well as the caption, court, docket number, and date on which the complaint or other document initiating the action was filed, as applicable.

   Response 2

   Volkswagen has conducted a broad and thorough review of its records, in relation to the concern raised by NHTSA and produces the requested information herein, as described below.

   Volkswagen evaluated all records which met the TREAD definition of "fire", thus including smoke and smoldering as "fire" events. Records were manually screened to identify those which met the alleged defect in subject vehicles.

   In response to your inquiry with respect to the alleged defect, Volkswagen has identified 56 unique incidents across all data sources (also including warranty data) among the nearly 239,000 subject vehicles from MY 2001-2007.

Volkswagen notes that the following responses to subparagraphs "a" through "g" include multiple reporting about the same underlying incident; these counts may not be added together because a false total count would result.

Volkswagen also notes that although on the face of the document a coil failure was alleged, some incidents on closer review turned out to be not coil related in the end.

In response to your inquiry,

a) Volkswagen has identified **30** consumer complaints related to the alleged defect in the subject vehicles.

b) Volkswagen has identified **25** field reports related to the alleged defect in the subject vehicles.

c) Volkswagen has received **0** reports involving a crash, burn or other injury, or notices/claims of injury or death alleging or proving that a death or injury was caused by the alleged defect in the subject vehicles.

d) Volkswagen has identified **0** property damage claims related to the alleged defect in the subject vehicles.

e) Volkswagen has identified **4** subrogation claims related to the alleged defect in the subject vehicles.

f) Volkswagen has identified **0** third-party arbitration proceedings where VW is or was a party to the arbitration related to the alleged defect in the subject vehicles.

g) Volkswagen has identified **0** lawsuits, pending or closed, in which Volkswagen is or was a defendant or codefendant.

Source: TREAD repository

Date Gathered: Through the date of the inquiry

3. Separately, for each item (i.e., complaint, report, claim, notice, or matter) within the scope of your response to Request No. 2, state the following information:

   a. VW's file number or other identifier used;
   b. The category of the item, as identified in Request No. 2 (e.g., consumer complaint, field report, etc.);
   c. Vehicle's owner or fleet name (and fleet contact person), address, and telephone number;
   d. Vehicle's VIN;
   e. Vehicle's model year;
   f. Vehicle's date of manufacture;
   g. Vehicle's mileage at time of incident;
   h. Incident date;
   i. Report or claim date;
   j. Whether a fire is alleged;
   k. Whether the ignition key was on, off, or whether the position was unknown at time of the fire;
   l. Whether a crash is alleged;
   m. Whether an injury is alleged, including burn injuries;
   n. If an injury is alleged, the type of injury alleged;
   o. Whether the vehicle was re-purchased by VW; and,
   p. If a vehicle was re-purchased, the reason for the vehicle re-purchase, including a statement of action(s) taken with or on the vehicle.

   Provide this information in Microsoft Access 2007, or a compatible format, entitled "**COMPLAINT DATA**".

   Response 3

   In response to your inquiry, Volkswagen is providing copies of documents identified for subparagraphs "a" through "p" in a Microsoft Excel file entitled "COMPLAINT DATA.xlsx" attached hereto as Exhibit to Request 3. The records are organized in ascending order by file ID number.

   Source, Date Gathered: See Response Two

Exhibit to Request 3

Please see data provided in Microsoft Excel format in the Exhibit to Request 3 folder on the EA11-002 Data Collection Disc

4. Produce copies of all documents related to each item within the scope of Request No. 2. This should include any and all documents submitted by third parties including expert reports or analyses in support of a subrogation or other legal claim. Organize the documents separately by category (e.g., consumer complaints, field reports, etc.) and describe the method VW used for organizing the documents.

Response 4

Volkswagen notes that some of the information contained in the materials provided may be considered personal / private by the individuals concerned.

In response to your inquiry, Volkswagen is providing copies of documents identified for each item in Response 2. The documents are in an Adobe Acrobat file entitled "REQUEST NUMBER FOUR DATA.pdf" attached hereto as Exhibit to Request 4. The records are organized in ascending order by file ID number.

Source, Date Gathered: See Response Two

Exhibit to Request 4

Please see data provided in Adobe Acrobat format in the Exhibit to Request 4 folder on the EA11-002 Data Collection Disc

5. State, by model and model year, a total count for all of the following categories of claims, collectively, that have been paid by VW to date that relate to, or may relate to, the alleged defect in the subject vehicles: warranty claims; extended warranty claims; claims for good will services that were provided; field, zone, or similar adjustments and reimbursements; and warranty claims or repairs made in accordance with a procedure specified in a technical service bulletin or customer satisfaction campaign.

   Separately, for each such claim, state the following information:

   a. VW's claim number;
   b. Vehicle's owner or fleet name (and fleet contact person) and telephone number;
   c. Vehicle's identification number (VIN);
   d. Model year;
   e. Vehicle's date of manufacture;
   f. Repair date;
   g. Vehicle's mileage at time of repair;
   h. Repairing dealer's or facility's name, telephone number, city and state or ZIP code;
   i. Labor operation number;
   j. Problem code;
   k. Replacement part number(s) and description(s);
   l. Whether a fire is alleged;
   m. Whether the ignition key was on, off, or the ignition position was unknown at time of fire;
   n. Whether a crash is alleged;
   o. Whether an injury is alleged, including burn injuries;
   p. Type of injury, if any;
   q. Concern stated by customer; and
   r. Comment, if any, by dealer/technician relating to claim and/or repair.

   Provide this information in Microsoft Access 2007, or a compatible format, entitled "**WARRANTY DATA.**"

   Response 5:

   In response to your inquiry, Volkswagen has identified **18** paid warranty claims, related to the alleged defect in the subject vehicles.

   Volkswagen is providing copies of documents identified for subparagraphs "a" through "r" in a Microsoft Excel file entitled "WARRANTY DATA.xlsx" attached hereto as Exhibit to Request 5. The claims are organized in ascending order by claim ID number.

   Source: TREAD repository

   Date Gathered: Through the date of the inquiry

Exhibit to Request 5

Please see data provided in Microsoft Excel format in the Exhibit to Request 5 folder on the EA11-002 Data Collection Disc

6. Describe in detail the search criteria used by VW to identify the claims identified in response to Request No. 5, including the labor operations, problem codes, part numbers and any other pertinent parameters used. Provide a list of all labor operations, labor operation descriptions, problem codes, and problem code descriptions applicable to the alleged defect in the subject vehicles. State, by make and model year, the terms of the new vehicle warranty coverage offered by VW on the subject vehicles (i.e., the number of months and mileage for which coverage is provided and the vehicle systems that are covered). Describe any extended warranty coverage option(s) that VW offered for the subject vehicles and state by option, model, and model year, the number of vehicles that are covered under each such extended warranty.

Response 6

In order to respond to your inquiry, the following search criteria were used to search the TREAD repository to identify warranty claims in response to Request 5:

- All 2001-2007 MY Volkswagen Passat and Passat Wagon vehicles equipped with a 4 cylinder, turbocharged engine, manufactured and sold to Volkswagen Group of America, Inc. for resale or lease in the United States

- All TREAD repository warranty claims categorized under TREAD Category 23 – Fire

The individual warranty claims were then manually screened to identify those which reported or alleged a vehicle fire, related to the failure or malfunction in the pencil ignition coil assembly.

The following is a list, by model year and model, of the terms of the New Vehicle Limited Warranty coverage offered by Volkswagen on the subject vehicles:

2001	Passat : 2 Years / 24,000 miles	New Vehicle Limited Warranty
2002	Passat : 4 Years / 50,000 miles	New Vehicle Limited Warranty
2003	Passat : 4 Years / 50,000 miles	New Vehicle Limited Warranty
2004	Passat : 4 Years / 50,000 miles	New Vehicle Limited Warranty
2005	Passat : 4 Years / 50,000 miles	New Vehicle Limited Warranty
2006	Passat : 4 Years / 50,000 miles	New Vehicle Limited Warranty
2007	Passat : 4 Years / 50,000 miles	New Vehicle Limited Warranty

Volkswagen does not offer an extended warranty on the subject vehicles related to the subject component.

Source: VWGoA

Date Gathered: Through the date of the inquiry

7. Produce copies of all service, warranty, and other documents that relate to, or may relate to, the alleged defect in the subject vehicles that VW has issued to any dealers, regional or zone offices, field offices, fleet purchasers, or other entities. This includes, but is not limited to, bulletins, advisories, informational documents, training documents, or other documents or communications, with the exception of standard shop manuals. Include any such documents related to EPA emissions recalls or any related Service Action Circulars (service campaigns or VW petitions) that involve the ignition coils used in the subject vehicles. Also include the latest draft copy of any communication that VW is planning to issue within the next 120 days. For each such action, provide a list of the VW vehicles affected and provide the following information:

   a. Vehicle's make;
   b. Vehicle's model; and
   c. Vehicle's model year.

   Response 7

   Volkswagen notes that the subject vehicles are not and were not involved in any EPA or CARB mandated emissions recall.

   Volkswagen is providing documents related to the voluntary emissions service actions and related Service Action Circulars, each of which involve pencil ignition coils used in the subject vehicles. Volkswagen would like to emphasize that these voluntary (emissions) service actions (WG and P1) are conducted to address customer satisfaction issues like rough idling, MIL illumination etc. and not because of the alleged defect.

   A table outlining each item in "a" through "c" is being provided in an Adobe Acrobat file format, entitled "REQUEST NUMBER SEVEN DATA.pdf" attached hereto as Exhibit to Request 7.

   Volkswagen provides copies of the requested documents in an Adobe Acrobat file format, in a folder entitled "REQUEST NUMBER SEVEN DATA" attached hereto as Exhibit to Request 7.

Source: VWGoA

Date Gathered: Through the date of the inquiry

Exhibit to Request 7

Please see data provided in Adobe Acrobat format in the Exhibit to Request 7 folder on the EA11-002 Data Collection Disc

8. 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, VW. For each such action, provide the following information:

   a. Action title or identifier;
   b. Actual or planned start date;
   c. Actual or expected end date;
   d. A 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 8

   Volkswagen has conducted a "mystery shop" survey of aftermarket pencil ignition coils. The conclusion of this survey is provided herein.

   A table outlining items "a" through "f" is provided in an Adobe Acrobat file format entitled "REQUEST NUMBER EIGHT DATA.pdf" attached hereto as Exhibit to Request 8.

   Volkswagen provides copies of the requested document in an Adobe Acrobat file format, in a folder entitled "REQUEST NUMBER EIGHT DATA" attached hereto as Exhibit to Request 8.

   Action 1 - Aftermarket Coil Performance Evaluation

   Start Date: February 21, 2011
   End Date: July 13, 2011

   Objective

   Aftermarket pencil ignition coils for use on the subject vehicles have been and are still offered for sale by independent workshops and part suppliers.

   Volkswagen has conducted analysis ("mystery shop") of aftermarket pencil ignition coils, to gain an understanding of the prevalence of aftermarket products and to determine the performance and quality level as compared to OEM pencil ignition coils as sold and used by Volkswagen.

Responsible: VWAG Laboratory

Conclusion

None of the samples taken would have gained engineering approval from Volkswagen.

Volkswagen analyzed 59 aftermarket pencil ignition coils and found that:

- 6 parts were found with an internal design clearly different from OEM pencil ignition coils (these parts are understood as reverse engineered parts)
- 18 parts were found with an internal design being nearly identical to OEM coils (slightly different printed circuit board layout, identical electrical components)
- 35 parts were found with a layout and components that Volkswagen cannot differentiate from OEM parts

Nearly all reverse engineered parts initially worked when measured electrically, but 5 out of 6 failed when subjected to Volkswagen's thermal shock and open-load tests. Also some aftermarket parts with OEM-like or near-OEM layouts failed. Volkswagen would not have approved those parts for either series production or spare parts.

Volkswagen requirements for both series and spare parts are identical. When being produced the part does not "know" whether it will fit into the series production or will be sold as a spare part.

Volkswagen provides the thermal shock and open-load requirements as an example for tests pencil ignition coils are subject to during development under request for confidentiality.

Volkswagen concludes that the reverse engineered aftermarket parts are not reliable in field service. Also the OEM-like aftermarket parts would have been rejected by Volkswagen for serial production or as a spare part. Volkswagen is not aware of how these products are brought into the market.

Due to the fact that some aftermarket parts appear to be identical or substantially similar to OEM parts, it will not be possible to distinguish between those aftermarket and true OEM parts in the case of an overheating component.

Source: VWGoA

Date Gathered: Through the date of the inquiry

Exhibit to Request 8

Please see data provided in Adobe Acrobat format in Exhibit to Request 8 folder on the EA11-002 Data Collection Disc

9. Describe all assessments, analyses, tests, test results, studies, surveys, simulations, investigations, inquiries and/or evaluations (collectively, "actions") that relate to, or may relate to, VW emission recalls J1-28F2 and/or P1-28F3 that have been conducted, are being conducted, are planned, or are being planned by, or for, VW. For each such action, provide the following information:

   a. Action title or identifier;
   b. Actual or planned start date;
   c. Actual or expected end date;
   d. A brief summary of the subject and objective of the action;
   e. Engineering group(s)/supplier(s) responsible for designing and for conducting the action;
   f. Any and all analyses of any safety consequences arising from the condition addressed by the action; and,
   g. 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 9

   Volkswagen is providing materials presented to EPA and CARB in connection with the voluntary emissions service actions that were also previously provided to NHTSA in response to PE10-027. A table outlining each item in "a" through "g" is provided in an Adobe Acrobat file format entitled "REQUEST NUMBER NINE DATA.pdf" attached hereto as Exhibit to Request 9.

   Volkswagen provides copies of the requested documents in an Adobe Acrobat file format, in a folder entitled "REQUEST NUMBER NINE DATA" attached hereto as Exhibit to Request 9.

   Action 1 – Emission Defect Reporting

   Volkswagen has identified a number of Emissions Information Reports that were required according to the US emission defect reporting legislation and have been sent to EPA and/or CARB. These reports were the basis for the decision to replace former pencil ignition coils with the current version in a voluntary Emissions Service Action.

   Action 2 – Coil Collection Program

   Volkswagen has collected various sets of pencil ignition coils (to create a representative statistical basis), that were replaced under Emission Service Actions "J1-28F2 / P1-28F3", to gain an understanding of the types of pencil ignition coils typically found in customer vehicles.

As result of this survey, 59 vehicles of a total 417 vehicles were found to be partially or fully equipped with readily detectable aftermarket coils (i.e. parts not carrying proper OEM labeling). This provides a rate of 14%. Volkswagen notes that as an outcome of the "mystery shop", discussed above, even the OEM label may not provide a definitive means to differentiate between aftermarket and OEM pencil ignition coils. As a consequence, the rate may be higher.

Source: VWGoA

Date Gathered: Through the date of the inquiry

Exhibit to Request 9

Please see data provided in Adobe Acrobat format in the Exhibit to Request 9 folder on the EA11-002 Data Collection Disc

10. In June 2008, VW conducted Recall 08V-156. Of the vehicles in the recall population, what is the actual number of ignition coil failures after the recall remedy is performed?

Response 10

The recall action 08V-156 (R5) did not include pencil ignition coils and therefore would not have changed the field performance of these parts.

The 08V-156 (R5) safety recall, initiated in the fall of 2008, successfully addressed the potential risk of fire caused by heat shield deterioration and possible fuel line fracture on 1.8T vehicles.

Since most of the subject vehicles are out of warranty, Volkswagen has no information in its database on how many pencil ignition coils, on vehicles affected by 08V-156 (R5), have been replaced after the recall has been performed.

11. Discuss whether or not the subject vehicle's engine management system has the capability to detect an engine misfire (i.e., a loss of ignition to one or more spark plugs) and, if so, the method used to detect misfire and its detection sensitivity (how "capable" the system is at detecting misfire). State any potential impact(s) an engine misfire may have on the catalytic converter, and discuss specifically any impacts misfire has on the catalyst's exterior surface temperature. Discuss and explain any steps the engine management system takes once a misfire is detected, including driver warning and fault code storage, and any countermeasure(s) the system can implement to protect or otherwise mitigate catalytic converter damage and/or overheating. Discuss any applicable Federal or State regulations related to engine misfire detection and potential countermeasures for the subject vehicles, including any citations the regulations are identified by.

Response 11

In response to your inquiry, Volkswagen is providing the following summaries to address the items requested in Request 11 under request for confidentiality. Additional information, charts, tables, and regulatory information are clearly identified within the Attachment list, hereto as Exhibit to Request 11.

Engine Management System Misfire Detection Capability

Attachment 11-01 for the Passat B5 generation (MY 2001 – 2005) and Attachment 11-02 for the Passat B6 generation (MY 2006 – 2007) explain in detail how misfire is detected on the subject vehicles. These documents are standard references or General Descriptions for the EPA and part of the On-Board Diagnostics (OBD) description.

Attachment 11-03 provides an overview of the different ignition systems in the subject vehicles and their respective parameters. These values represent the thresholds (the sensitivity) of the system. If these values are exceeded countermeasures (deactivation of the respective cylinder) are triggered. Please note that certain dynamic ranges are specified, the higher the current engine's load, the lower are thresholds. Depending on engine load, vehicle speed and other conditions the ECU determines when measures must be taken. Volkswagen notes that there is no regulation or other requirement to implement cylinder deactivation as a reaction to misfire.

The 1.8T engine (developed during the late 1990's) is an engine concept that can detect misfires, but (in its serial version) is not able to initiate internal countermeasures (cylinder deactivation e.g. by cutting off the fuel injection for a single cylinder). The engine management system does inform and alert the driver about the abnormal condition by illumination of the Malfunction Indicator Lamp ("MIL"). The owner's manual provides information on necessary driver's reaction required to help prevent catalytic converter damage.

For misfires in the 1.8T engine, driving cycles were detected in which excessively high temperatures could be reached (resulting in smoke and/or odor), creating the need to implement a cylinder deactivation strategy. Accordingly, the 1.8T engine management system was updated under Safety Recall 08V-156 (R5) to include cylinder deactivation capability.

In general, two misfire conditions can be identified: Emission-relevant misfires and those that can damage the catalytic converter. Both conditions will trigger the respective fault codes as described in the General Description documents.

An emission-relevant misfire condition will continuously illuminate the MIL. A misfire condition that could damage the catalytic converter will cause the MIL to flash.

In either case, the owner's manual instructs the driver to "continue driving with reduced power and have the cause corrected right away," see Attachment 11-04.

A misfire (loss of ignition) condition will cause unburned fuel to enter the exhaust system unless the engine management system triggers countermeasures (cylinder deactivation).

Unburned fuel will be "ignited" downstream in the catalytic converter causing heat to be released over and above that normally transmitted with the exhaust gas. Thus the internal temperature of the catalytic converter will rise and the surface temperature will also increase accordingly. This can occur in the 1.8T engine (prior to the 08V-156 (R5) recall software update), because the engine control unit, in its original version, is not able to trigger countermeasures (cylinder deactivation).

Attachment 11-05 shows the effect of misfires with and without cylinder deactivation, illustrated using the 1.8T engine as the example.

Deactivation of the misfiring cylinder will not allow exhaust temperatures to rise above normal operation temperatures, on the contrary, deactivation limits temperatures to levels below normal operation (because there now is one cylinder less generating exhaust gas).

Regardless of the engine's ability to initiate countermeasures, the warning strategy and instructions to the driver remain the same.

Volkswagen provides copy of the regulatory requirements as Attachment 11-06. Volkswagen notes that the content of these requirements corresponds to the General Descriptions provided as Attachments 11-01 and 11-02. The requirement is limited to misfire detection and fault code storage accompanied by MIL illumination. Volkswagen notes further that the implementation of a cylinder deactivating functionality clearly exceeds all applicable requirements. The regulation would not even require the MIL to flash when cylinder deactivation occurs.

Exhibit to Request 11

Please see data provided in an Adobe Acrobat format in the Exhibit to Request 11 folder on the EA11-002 Data Collection Disc

12. Furnish VW's assessment of the alleged defect in the subject vehicle, including:

a. The causal or contributory factor(s);
b. The failure mechanism(s);
c. The failure mode(s);
d. The effectiveness of Recall 08V-156 in reducing the risk of fire and/or coil failures;
e. The risk to motor vehicle safety that 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; and
g. The reports included with this inquiry.

Response 12

Volkswagen remains confident in the safety of Volkswagen's OEM pencil ignition coils and the subject vehicles. Ignition coil incidents identified since the Preliminary Evaluation PE10-027, as well as the additional research conducted by Volkswagen, confirm this conclusion. When separated from the other engine compartment matters addressed in the 08V-156 (R5) recall not associated with Volkswagen pencil ignition coils, at issue are only a small number of relevant incidents that are *de minimus* and do not constitute a risk to motor vehicle safety.

Volkswagen has evaluated the allegations of defect and, more importantly, the actual instances of complaints in the field. The Engineering Analysis into these parts must be just as meticulous in its identification of safety-related failures by the subject parts. Volkswagen is concerned by inclusion of unrelated issues which shadow and obscure this inquiry - whether it is the numerous cases clearly relating to the 08V-156 (R5) condition (heat shield issue), which was the subject of the earlier recall, or the large number of aftermarket and substandard replacement pencil coils found in the subject vehicles during the survey. To be sure, Volkswagen understands the frustration of its drivers with the overall performance of pencil ignition coils; however, NHTSA must separate these complaints from any potential safety issues. Upon a clear and detailed assessment, this Engineering Analysis should find that pencil ignition coils present no issue related to motor vehicle safety.

Volkswagen affirms the detailed presentation made in its response to the Preliminary Evaluation PE10-027 and would point out here that the additional experience and testing of the subject pencil ignition coils further confirm and support Volkswagen's conclusions.

Vehicle Owner Questionnaires, Warranty Claims, Consumer Complaints, and Field Reports

Volkswagen examined in detail all additional vehicle owner questionnaires (VOQs), warranty claims, consumer complaints, and field reports, subject to this Engineering Analysis, and which were not otherwise included in the response to PE10-027.

The twenty-five additional VOQs that NHTSA provided with this EA do not bear up to detailed scrutiny as supporting this investigation. Most incidents concerned vehicles that had not been brought in by the customer for the 08V-156 (R5) recall. Many others related to simple performance, MIL light and customer satisfaction issues, which were covered by the "J1-28F2 / P1-28F3" voluntary emissions service actions. A review of these VOQs found only one of the twenty-five that indicated a fire related to a pencil ignition coil issue - but there the customer had substantial notice in a MIL light and performance issues.

Like the VOQs cited with regard to the Preliminary Evaluation PE10-027, Volkswagen remains concerned by the high number of incidents presented by NHTSA as a basis for this investigation which, on their face, are unrelated to pencil ignition coils. Two VOQs presented in support of this Engineering Analysis, for example, concerned vehicles that did not even have pencil ignition coils[2].

With regard to the additional warranty claims, consumer complaints and field reports, a detailed assessment revealed only a group of matters related not to pencil ignition coils, but rather to the 08V-156 (R5) recall[3], aftermarket parts[4], or vague allegations with no investigation or analysis[5].

Aftermarket Parts

Volkswagen identified aftermarket parts as an important issue for analyzing the reported pencil ignition coil-related incidents and Volkswagen's recent investigations supports this conclusion and emphasizes its significance.

Volkswagen conducted a field survey and found that at least 14% of the vehicles coming into the workshops performing the "J1-28F2 / P1-28F3" emission service action were equipped with aftermarket pencil ignition coils. More importantly, in a separate study of 59 aftermarket pencil ignition coils collected from the market (bought at independent workshops in a course of "mystery shopping"), Volkswagen found that the samples would not have passed Volkswagen's tests for such components if used by Volkswagen as OEM parts.

[redacted]

Furthermore, a number of the aftermarket pencil ignition coils also had unauthorized "Volkswagen" markings or logos, (which even raises questions of the provenance of "Volkswagen" parts found in an overheating or fire incident).

Given the age and mileage of many of the subject vehicles, in Volkswagen's view, NHTSA must recognize the significant impact of the aftermarket pencil ignition coils to this inquiry. Indeed, Volkswagen found aftermarket pencil ignition coils to be involved in at least 3 fire incidents[6] among the incidents reviewed during the Engineering Analysis. Once more, a rigorous examination of alleged pencil ignition coil cases must separate the real Volkswagen OEM parts from the wide field of substandard aftermarket parts. Volkswagen cannot be held responsible for the performance of aftermarket parts.

Summary

When actual cases involving Volkswagen pencil ignition coils are separated from the component overheating and other unrelated engine compartment matters, including the 08V-156 (R5) recall, voluntary emissions service actions, and large aftermarket collection of substandard parts, the Engineering Analysis will find only a handful of incidents in this large and aged fleet of subject vehicles.

At issue are only a small number of relevant incidents that are *de minimus* and do not constitute a risk to motor vehicle safety. Volkswagen has calculated an over-all pencil ignition coil failure rate related to the alleged defect. Volkswagen notes that the oldest vehicle subject to this inquiry is actually 11 ½ years of age. The subject vehicles have reached an average age of nearly 100 months in service (more than 8 years). Assuming an average mileage of 15,000 miles per year, this provides an average mileage of 120,000 miles for the subject vehicles. When adding up the pencil ignition coil related incidents from the PE and EA for the subject vehicles, a failure rate of 0.106 R/1000 or an annual failure rate of 0.013 R/1000 can be established, for a period of 100 months in service.

Volkswagen notes that the over-all rate has not changed, although the scope of vehicles has been expanded and approximately one year has passed since the PE was answered. However, the annual rate has dropped as the average age of the vehicles now is over 8 years compared to the average of below 7 years during the PE.

In almost every incident, pencil ignition coil issues have led to a simple failure of the part and caused the rough running engine, MIL illumination and other comfort issues experienced by customers. (Again, this has caused Volkswagen to proactively initiate the voluntary emission service actions, P1/J1, based on a warranty rate of up to 10% that have been detected in certain emissions reporting groups at the time the action was initiated).

[6] Reference: [redacted]

All such component issues, however, do not pose a safety risk, as the vehicle remains safe and controllable and the driver is immediately alerted about the malfunction via reduced performance as well as MIL illumination (as also illustrated by some of the VOQs provided).

Indeed, Volkswagen is not aware of any crashes, injuries or fatalities which could relate to the limited number of pencil ignition coil incidents over nearly 12 years of service and approximately 40 billion miles traveled.

Volkswagen submits that when considering the very small number of incidents which can be attributed to pencil ignition coils, there is no concern related to or affecting motor vehicle safety. Volkswagen notes this *de minimus* rate is substantially less than a matter NHTSA closed in PE09-032 in a similar context. This Engineering Analysis must reach its conclusions after an examination of incidents related to Volkswagen OEM pencil ignition coils. Volkswagen remains confident in the safety of the OEM Volkswagen pencil ignition coils and the subject vehicles.

* * *