

EA02-022:NVS-214ns

ENGINE STALLING

2000 – 2002 FOCUS

December 6, 2002

BOOK 1 OF 2

NHTSA COPY 1

Ford Motor Company

James P. Vendale, Director
Automotive Safety Office
Environmental & Safety Engineering

December 6, 2002

Ms. Kathleen C. DeMeter, Director
Office of Defects Investigation Safety Assurance
National Highway Traffic Safety Administration
400 Seventh Street, S. W.
Washington, DC 20590

Dear Ms. DeMeter:

Subject: EA02-022:NVS-214ns

Attached is the Ford Motor Company (Ford) response to the agency's letter that was received by Ford on October 1, 2002 requesting information relating to fuel delivery module (FDM) caused engine stalling complaints on 2000 through 2002 model year Ford Focus vehicles.

As Ford noted in its May 22, 2002 response, during the mid-1980s the agency performed an intensive study of engine stalling issues. In a report entitled Analysis of Stalling Problems, which was prepared by The Transportation Systems Center (Report No. HE702/S7502), the agency significantly noted, among other things, that although the rate of stalling complaints was comparable to the rate of complaints for other safety defect investigations, the rate of stalling-related accidents was lower than in most investigations that have led to recalls. Ford notes that two NHTSA investigations into stalling allegations (EA84-029 and EA84-031) were closed, in part because "[a]lthough there are a large number of complaints of stalling vehicles, the risk of injury or death appears to be low." This conclusion is consistent with our analysis of the information provided in our May 22, 2002 response and in this response. Of the responsive (identified as FDM related) reports, claims, and VOQs alleging stalling addressed in our May 22, 2002 response, there were five reports that allege some type of minor damage to the vehicle. None contain allegations of injury. In this response, of the reports, claims, or VOQs that have been identified to be FDM related, two allege some form of accident including one VOQ which provides a non-descript injury report. The customer failed to even mention the alleged injury when reporting the incident to Ford. Consistent with other agency findings, there is no evidence that FDM caused engine stalling on the Focus poses an unreasonable risk of accidents or injuries in a relatively large number of reported incidents.

As stated in our May 22, 2002 response, Ford acknowledges that stalling is not desirable. However, based on the information supplied with our May 22, 2002 response and in response to this information request, Ford continues to believe the conclusion stated in the agency's closing resume for PE98-057 applies to the subject investigation: "there is no data indicating that occupants of a stalled [subject vehicle] are exposed to greater risk of injury due to the [stalling] condition." In the closing resume to PE98-057, the agency observed that when vehicles stall while in motion, "[t]his gives the driver time and vehicle momentum with which to maneuver onto



the roadway shoulder, away from travel lanes." Given the low number of alleged minor accidents compared with the relatively large number of reports and claims identified, this conclusion also appears to be true of the Focus vehicles in this investigation. If this condition posed an unreasonable risk to safety, that risk would have manifested itself in the incidents described in the reports. We note that unlike some other causes of stalling, fuel filter contamination is more apt to provide warning in the form of driveability issues that gradually deteriorate allowing for the opportunity to seek repairs, before the filter becomes sufficiently plugged to cause a stall condition.

Ford has also provided information in response to Requests 26 and 27 of this inquiry that show that Focus vehicles meet acknowledged certification performance standards for controllability in case of loss of power assist to the steering and brake systems.

Based on the foregoing, including the information provided in this and our May 22, 2002 response and the agency's previous findings in stalling investigations, Ford continues to believe that the reports of engine stalling in the subject vehicles present no unreasonable risk to motor vehicle safety.

In summary, Ford agrees with the conclusions in the Transportation Systems Center report that are noted above and believes they are relevant to the subject investigation. We are not aware of any information or data subsequent to that report which would change the conclusions that the rate of stalling-related accidents was lower than in most investigations that have led to recalls and that "the risk of injury or death appears to be low." Although this condition may be undesirable, it does not represent an unreasonable risk to motor vehicle safety.

If you have any further questions, please contact me.

Sincerely,



James P. Vondale



Attachment

FORD MOTOR COMPANY (FORD) RESPONSE TO EA02-022

Ford's response to this Engineering Analysis Information request was prepared pursuant to a diligent search for the information requested. While we have employed our best efforts to provide responsive information, the breadth of the agency's request and the requirement that information be provided on an expedited basis make this a difficult task. We nevertheless have made every effort to provide thorough and accurate information, and we would be pleased to meet with agency personnel to discuss any aspect of this Engineering Analysis.

The scope of Ford's investigation conducted to locate responsive information focused on Ford employees most likely to be knowledgeable about the subject matter of this inquiry and on review of Ford files in which responsive information ordinarily would be expected to be found and to which Ford ordinarily would refer, as more fully described in this response. Ford notes that although electronic information was included within the scope of its search, Ford has not attempted to retrieve from computer storage electronic files that were overwritten or deleted. As the agency is aware, such files generally are unavailable to the computer user even if they still exist and are retrievable through expert means. To the extent that the agency's definition of Ford includes contractors and affiliated enterprises for which Ford does not exercise day-to-day operational control, we note that information belonging to such entities ordinarily is not in Ford's possession, custody or control. Notwithstanding this fact, the subject vehicle fuel delivery module supplier, Visteon, voluntarily assisted Ford in response to some of your requests. In the spirit of cooperation, Visteon has provided Ford with some confidential documents and has submitted a request for confidentiality to Ford. Ford has construed this request as pertaining to vehicles manufactured for sale in the United States, its protectorates and territories.

When preparing to respond to the agency's April 8, 2002 PE02-040 inquiry, in telephone conversations with Mr. Richard Boyd and Mr. Jeff Quandt, criteria were developed for Ford to use in searching for potentially relevant reports in Ford's databases. A copy of the proposed criteria was provided to the agency by facsimile on April 18, 2002 and agreed to on April 19. The criteria included a word search process that was designed to gather reports that would most likely contain allegations of vehicle stalling or driveability issues resulting in accidents or vehicles left on or beside the roadway in addition to reports simply alleging stalling. Ford's responses to this inquiry's requests are based on Ford's manual review of those reports that were located using the same previously agreed upon search criteria.

In a November 13, 2002 telephone conversation, Mr. Dick Boyd and Mr. Nate Seymour of the agency informed Ford personnel that our responses to Requests 20, 21 and 22 should be in accordance with the details which are described in the responses to those Requests.

Answers to your specific questions are set forth below. As requested, after each numeric designation, we have set forth verbatim the request for information, followed by our response. Unless otherwise stated, Ford has undertaken to provide responsive documents dated up to and including October 1, 2002, the date Ford received your inquiry. Ford has searched business units and/or affiliates within the following offices for responsive documents: Environmental and Safety Engineering, Ford Customer Service Division, Marketing and Sales Operations, Purchasing, Quality, Research, Global Core Engineering, Office of the General Counsel, Vehicle Operations, North American Car Product Development, and Ford of Europe Product Development.

Request 1

By calendar month, state the total number of MY 2002 Focus vehicles sold in the United States.

Answer

Ford records indicate that the approximate number of 2002 Focus vehicles sold in the United States (the 50 states and the District of Columbia) and its protectorates and territories (American Samoa, Guam, Marshall Islands, Micronesia, Northern Mariana Islands, Palau, Puerto Rico, US Minor Outlying Islands, and Virgin Islands) is 253,755. The totals by calendar month are provided in Appendix A (file:2002-12-6_Appendix_A) on the enclosed CD.

Request 2

By subject vehicle and model year, state the number and provide copies of all the following, from all sources, of which Ford is aware and which relate, or could relate to the alleged defect in the subject vehicles.

- a. owner/fleet complaints;
- b. field reports;
- c. crash/incident claims;
- d. subrogation claims;
- e. lawsuits; and
- f. third-party arbitration proceedings (where Ford is a party to the arbitration)

For each alphabetical category listed above, please state how many of the claims, complaints and/or lawsuits or arbitration proceedings included in your total figure concerned subject vehicles equipped with, at the time the claim, complaint and/or lawsuit or arbitration was initiated, the: (a) original or first FDM installed on the subject vehicles ("original FDM"); (b) the interim FDM installed on the subject vehicles on or around June, 2001 ("interim FDM"); and (c) the final (or current) FDM installed on the subject vehicles beginning on or around December, 2001 ("final FDM").

Answer

For purposes of identifying reports of incidents potentially involving the alleged defect and any related documents, Ford has gathered "owner reports" and "field reports" maintained by Ford Customer Service Division (FCSD), Intensified Customer Concern Definition (ICCD) data maintained by Ford's Quality Office, fleet reports maintained in a Fleet Test Database, and claim and lawsuit information maintained by Ford's Office of the General Counsel (OGC).

Descriptions of the FCSD owner and field report systems, the ICCD and the Fleet Test Database systems, and the criteria used to search each of these are provided electronically in Appendix B (file: 2002-12-6_Appendix_B) on the enclosed CD. These searches were further refined to locate possibly relevant reports for review by using key word searches (based on the April 19, 2002 agreement noted above) in Ford's review tool, the Electronic Data Download System (EDDS); these key word search criteria are also provided in Appendix B.

The following categorizations were used in the review of reports located in each of these searches:

<u>Category</u>	<u>Allegation</u>
A1	Stalls [Alleged to be related to the Fuel Delivery Module (FDM)]
A2	Driveability issue without the vehicle stopping/stalling (Alleged FDM Related)
A3	Stalls, vehicle at rest (Starts then stalls, stalls when put in gear, etc.) Alleged FDM Related
B1	Stalls, unknown if FDM related*
B2	Driveability or no starts, unknown if FDM Related*
B3	Ambiguous if related to stalling or driveability (No starts, etc.) Alleged FDM Related*

*Ford has also included owner reports that are ambiguous as to whether they meet the alleged defect criteria. Based upon engineering judgement, Ford does not believe that the reports included in the "B" categories can be considered as related to the "alleged defect." However, in the interest of complete disclosure they are being provided for the agency's information.

Owner Reports: The search and review of the Ford Master Owner Relations Systems (MORS) database records, as described in Appendix B, identified the following number of owner reports in accordance with the categories described above:

Category	A1	A2	A3	B1	B2	B3
Reports	164	33	0	841	211	4

= 1,253

Copies of these owner reports are provided in the MORS III portion of the electronic database contained in Appendix C (file:2002-12-6_Appendix C) on the enclosed CD. The categorization of each report is identified in the "Category" field. Due to the time constraints of attempting to respond to your inquiry promptly, Ford has only partially reviewed these reports to identify duplicate owner reports for an alleged incident. Those that have been identified are marked accordingly, and the group is counted as one report. Other duplicate reports, if they exist, have been counted separately. In other cases, certain vehicles may have experienced more than one incident and have more than one report associated with their VINs. These reports have been intentionally counted separately.

In the interest of responding promptly to this inquiry, Ford has not undertaken to gather the electronic images related to these contacts because of the largely duplicative nature of the information contained in the images, as well as the time and the burden associated with locating and producing those documents. The pertinent information related to those contacts generally would be included in the contact reports obtained from the MORS system. To the extent that those documents exist, they are reflected in the comments of MORS III contact reports. Upon request, Ford will attempt to locate any specific items that are of interest to the agency. Additionally, we have not attempted to determine the design level of FDM that may have been involved with each of the reports provided. MORS reports generally do not contain enough information to make such a determination.

Legal Contacts: Ford is providing, in Appendix B, a description of Legal Contacts and the activity that is responsible for this information, Litigation Prevention. To the extent that responsive (i.e., unambiguous) owner reports reflect that they are Legal Contacts, Ford has gathered the related files from the Litigation Prevention section. Based on this search, seven files were located and are provided in Appendix D. It should be noted that two of the litigation prevention files (Grant a/k/a Brown and Middleton) are also shown on the lawsuit and claims

log. Another file (Faliero) contains allegations of a minor accident due to a power steering issue but not due to the alleged defect.

ICCD Information: A search of the ICCD database as described in Appendix B located no reports that relate to the alleged defect, and 23 reports that are ambiguous as to whether they relate to the alleged defect. These reports are provided in Appendix E.

Fleet Reports: In addition to fleet reports that may be contained in the owner reports or field reports identified in this response, Ford conducted a search of its Fleet Test Database as described in Appendix B for reports that may relate to the alleged defect in the subject vehicles. No fleet reports were identified.

Field Reports: The search and review of the Ford Common Quality Indicator System (CQIS) database records, as described in Appendix B, identified the following number of field reports in accordance with the categories described above:

Category	A1	A2	A3	B1	B2	B3
Reports	60	36	3	298	168	35

= 588

Copies of these field reports are provided in the CQIS portion of the electronic database contained in Appendix C. The categorization of each report is identified in the "Category" field. When we were able to identify that responsive duplicate field reports for an alleged incident were received, each of these duplicate reports is marked accordingly, and the group is counted as one report. In other cases, certain vehicles may have experienced more than one incident and have more than one report associated with their VINs. These reports have been counted separately. Ford has not attempted to identify the design level of FDM that may have been involved with each of the reports provided. However, each report provides the vehicle's build date which provides an indication of the FDM design level the vehicle was equipped with at the time of its production. The original design FDM was used in production before June 14, 2001. The "interim" design FDM was used in production from June 14, 2001 until the "final" design began to be used in production on December 13, 2001 at the Wayne Assembly Plant and on February 14, 2002 at the Hermosillo Assembly Plant.

Subsequent to receiving this information request, the agency provided an electronic listing of VINs identified in Vehicle Owner's Questionnaires (VOQs) that have been identified as possibly associated with the alleged defect. Ford compared the VINs to those VOQs supplied with the agency's April 8, 2002 inquiry and removed the duplicates. A total of 130 individual VINs remained, one of which was not a subject vehicle. Ford made inquiries of its MORS database, for customer contacts, and its CQIS database, for field reports, regarding the 130 vehicles. Eighty-three owner reports (MORS) that may relate to the alleged defect and that are the subject of the VOQ VINs were located and are provided electronically in Appendix C. These owner reports are identified by a "Y" in the "Status" field and include the following number of reports:

Category	A1	A2	A3	B1	B2	B3	D
Reports	4	0	0	46	17	12	4

= 83

Twenty-one field reports that may relate to the alleged defect and are the subject of the VOQ VINs were located and are provided in Appendix F. These reports are categorized as follows:

Category	A1	A2	A3	B1	B2	B3	D
Reports	4	0	0	8	2	0	7

Note that a Category D has been added when reviewing the complaints and reports associated with the VOQ's. Category D reports are those that allege stalling or driveability issues which Ford believes are due to conditions other than FDM performance.

Ford also requested paper copies of the VOQs that have been identified by the agency as possibly being associated with the alleged defect in the subject vehicles. Of those not identified as part of the agency's April 8, 2002 inquiry, one report, VIN 1FAFP36351W132670, indicated that a low speed accident occurred at a gas station in June, 2001 and that the FDM had been replaced because of stalling in July 2002. The report does not indicate that the two incidents are related. In fact, Ford believes that it is very unlikely that if the June, 2001 incident was related to the FDM that the vehicle would have continued to function until July, 2002. Another report, VIN 1FAFP38301W295045, indicates that a "crash" occurred in the incident information box but gives no description of an accident occurring (further information provided under Crash/Injury Claims heading). Warranty records for 1FAFP38301W295045 indicate that the vehicle's FDM was replaced subsequent to the reported incident date. Ford's records do not indicate that any of the other VOQs that allege an accident or possible property damage had the vehicle's FDM serviced or that the incidents were due to the FDM not performing properly.

Finally, Ford searched its files for legal contacts concerning the 130 VOQ VINs. None were located.

Crash/Injury Incident Claims: For purposes of identifying alleged accidents or injuries potentially involving the alleged defect, Ford has reviewed responsive (i.e., FDM related) owner and field reports, lawsuits and claims, and warranty claims. Based on a reasonable and diligent search, Ford located one owner (MORS) report (VIN 1FAFP3434YW366482), one field (CQIS) report (VIN 1FAFP38301W295045), no warranty claims, and one lawsuit or claim alleging an accident that may be related to the alleged defect. The owner report is associated with the Witkowski subrogation claim described below. The field report, which is also subject of an agency VOQ, alleges two versions of the incident. The second or later version, presumably the more accurate version, alleges that the vehicle stalled and was safely parked on the side of the road. At some point after that, another vehicle "lost control" and struck the parked vehicle. The subrogation claim (Witkowski) alleges that the vehicle was involved in some type of accident due to engine stalling and loss of power steering assist. None of the reports allege that any injuries occurred, although the VOQ associated with the field report indicates one injury alleged in the incident information section of the report. The owner complaint and field report are noted in the "NHTSA Comment" field in the electronic file located in Appendix C. Lawsuit and claim information is provided as described below. Ford also notes that some of the reports in the database coded as ambiguous also contain allegations of an accident or property damage. Upon closer inspection of these reports it appears that four were ambiguous as to whether the alleged incident occurred due to the reported stalling or driveability condition. The accident alleged in another report does not appear to be due to the reported stalling condition. None allege an injury.

Claims and Lawsuits and Arbitrations: For purposes of identifying incidents potentially involving the alleged defect, Ford has gathered claim and lawsuit information maintained by Ford's Office of the General Counsel (OGC). Ford's OGC is responsible for handling product liability lawsuits, claims, and consumer breach of warranty lawsuits and arbitrations against the Company.

Based on a reasonable and diligent search, Ford located 24 lawsuits, no claims or consumer breach of warranty lawsuits, and no arbitrations related to the alleged defect in the subject vehicles. Ford has also located 17 lawsuits and one claim or consumer breach of warranty lawsuit that are ambiguous as to whether they meet the alleged defect criteria. We have included these lawsuits and claims as "non-specific allegations" for your review because of the broad scope of the request. Based on our engineering judgment, the information in these lawsuits and claims is insufficient to support a determination that they pertain to the alleged defect. We are providing the requested detailed information, where available, on the responsive and ambiguous lawsuits and claims in our Log of Lawsuits and Claims, as Appendix G (file:2002-12-6_Appendix_G) on the enclosed CD. It should be noted that two of the lawsuit and claim files (Brown a/k/a Grant and Middleton) are also referenced in the Legal Contacts section, with accompanying Litigation Prevention files attached. With regard to these lawsuits and claims, Ford has not undertaken to contact outside law firms to obtain additional documentation.

Request 3

State the number of warranty claims, including extended warranty claims, and requests for "good will," field, or zone adjustments received by Ford from start of subject vehicle production to present that relate to the alleged defect in the subject vehicles, by model, model year, calendar month, and problem claim code, if any. Each problem claim code must be identified. Please then state how many of the warranty claims, requests for "good will," and/or adjustments you included in your total figure for each subject vehicle model year, concerned subject vehicles equipped with, at the time the claim, request and/or adjustment was initiated, the: (a) original FDM; (b) the interim FDM; and (c) the final FDM.

Answer

Ford's ~~Automated~~ ~~Warranty~~ System (AWS) was searched for all claims meeting the criteria described in Appendix B. In addition to those claims that were provided in Ford's May 22, 2002 response, a total of 7821 claims meeting these criteria were located. Due to time constants of attempting to respond to your inquiry by the specific due date, Ford manually reviewed a sample size of 1535 (approximately 20 percent) of these claims and identified the following numbers of non-duplicative warranty claims that contain allegations that appear to be related to the alleged defect in accordance with the categories described above.

Category	A1	A2	A3	B1	B2	B3
Reports	1140	146	48	100	27	22

Ford also word searched all uncategorized claims (those not reviewed) a second time to determine if any allegations of accidents were indicated in the claims. The additional word search criteria used is provided in Appendix B. No alleged accidents were located during a manual review of these claims. ~~Electronic copies of all 7821 claims are provided in the AWS portion of the electronic database in Appendix G.~~ The categorization of each report is identified in the "Category" field. When we were able to identify that duplicate claims for an alleged incident were received, each of these duplicate claims is marked accordingly and the group is counted as one report. In other cases, certain vehicles may have experienced more than one incident and have more than one claim associated with their VINs. These claims have been counted separately. Ford has also included claims that are ambiguous as to whether they meet the alleged defect criteria. Based upon engineering judgement, Ford does not believe that the reports included in the "B" categories can be considered as related to the "alleged defect." However, in the interest of complete disclosure they are being provided for the agency's

information. Ford assumes that providing the warranty claims in the electronic database format meets the requirements of this request, because the agency can review or order the claims as desired. Ford has not attempted to identify the design level of FDM that may have been involved with each of the claims provided. However, each claim provides the vehicle's production date which as previously noted provides an indication of the FDM design level the vehicle was equipped with at the time of its production.

An electronic file containing the customer concern codes and the warranty condition codes is provided in Appendix B.

Requests for "goodwill, field, or zone adjustments" received by Ford to date that relate to the alleged defect in the subject vehicles, if any, would be indicated in the MORS reports identified above in response to Request 2.

Request 4

Is it Ford's opinion that SAE J726 Fine Dust provides an adequate representation of the sludge found in the subject vehicle's fuel tank? Please explain the reason(s) for your opinion.

Answer

SAE J726 Fine Dust does not, by itself, provide an adequate representation of the sludge found in some of the subject vehicle's fuel tanks. SAE J726 Fine Dust can represent one of the constituents found in the sludge. Various sulfates and chlorides, along with oily hydrocarbons are also key constituents. This opinion is based on studies performed by Southwest Research Institute.

Request 5

Provide copies of any durability testing conducted by, or on behalf of Ford, the fuel tank supplier or manufacturer and/or the FDM supplier or manufacturer that relate, or could in anyway be construed as relating, to the durability of the tank and/or the FDM in the subject vehicles.

Answer

Ford will be submitting Visteon's Design Verification Plan and Report for the fuel tank and FDM of the 2000 model year North American Focus under separate cover with a request for confidentiality to the NHTSA's Office of the Chief Counsel pursuant to 49 CFR, Part 512 as Appendix H-2. These documents represent the development/durability component testing done on the subject parts prior to Ford Engineering Sign-Off. Actual test reports and supporting documentation would be maintained in Visteon Corporation files. Documents concerning testing of the "interim" and "final" FDM design levels have been previously provided in Ford's May 22, 2002 response and in response to Request 10 of this inquiry.

Request 6

State the original projected life expectancy for the original, interim and final FDM installed in the subject vehicles and identify who (e.g., Ford, FDM manufacture, etc) made those projections.

Answer

The original projected life expectancy for the original FDM design was 100,000 miles as assessed by the FDM manufacturer. This projection was based on durability tests in place at that time. The projected life expectancy for the final FDM design is 150,000 miles. This is based on durability testing and Ford's field experience with this type FDM. Based on a newly developed bench test that reproduces the sludge failure mode, other bench tests, and warranty data we believe that the interim FDM is significantly more robust than the original FDM. However, because of the lack of field correlation data available to date, we cannot project a life expectancy of the interim design at this time.

Request 7

Identify the manufacturer(s) and supplier(s) of the fuel tank and FDM used in the subject vehicles for each model year.

Answer

The fuel tanks and FDM units used in production and for service of all model years of Focus vehicles were produced by ~~Johnson Corporation~~.

Request 8

Provide copies of all communications and all documents exchanged between Ford and the fuel tank and/or FDM manufacturers that relate, or in anyway could be construed as relating, to the alleged defect in the subject vehicles.

Answer

Responsive communications between Ford and the fuel tank/FDM supplier that were not provided in Ford's May 22, 2002 response to the agency's April 8, 2002 inquiry are provided in response to Request 9.

Request 9

Provide copies of any and all tests, studies, simulations, evaluations, assessments, analyses, investigations, inquiries, surveys or other similar actions conducted by or on behalf of Ford and/or of which Ford is aware, that relate, or in anyway could be construed as relating, to the alleged defect in the subject vehicles.

Answer

Ford is construing this request broadly and providing not only studies, surveys, and investigations related to the alleged defect, but also notes, correspondence, and other communications that were located pursuant to a diligent search for the requested information. The information provided is in addition to documents provided in Ford's May 22, 2002 response. Ford is providing the responsive non-confidential Ford documentation in Appendix H-1.

Ford will be submitting additional related documentation under separate cover with a request for confidentiality as Appendix H-2 to the NHTSA's Office of the Chief Counsel pursuant to 49 CFR, Part 512.

Request 10

Provide copies of any and all tests, studies, simulations, evaluations, assessments, analyses, investigations, inquiries, surveys or other similar actions conducted by or on behalf of Ford and/or of which Ford is aware, that relate, or in anyway could be construed as relating, to the sludge and/or any other contamination discovered in the fuel tanks and/or FDMs, of the subject vehicles. This request includes a request for copies of any report, study or survey, which discusses the cause, or potential cause, of the sludge and/or contamination.

Answer

Ford is construing this request broadly and providing not only studies, surveys, and investigations related to the alleged defect, but also notes, correspondence, and other communications that were located pursuant to a diligent search for the requested information.

Responsive non-confidential documents concerning sludge and/or other contamination discovered in the fuel tanks and/or FDMs of subject vehicles that were not provided in Ford's May 22, 2002 response are included in Ford's response to Request 9.

Ford will be submitting additional related documentation under separate cover with a request for confidentiality as Appendix H-2 to the NHTSA's Office of the Chief Counsel pursuant to 49 CFR, Part 512

Request 11

Identify the specific vehicle fuel system components that contain or contribute to the sludge and/or contamination found in the subject vehicles' fuel tanks and/or FDMs. Please also identify all elements found in the sludge and/or contamination and identify all fuel system components that Ford believes contribute, or could contribute to those elements and the reason(s) why.

Answer

None of the subject Focus vehicles' fuel system components initially contain the sludge. Ford's investigation of the issue discovered that the sludge develops from a combination of gasoline constituents and particulate contamination that varies with gasoline type. Several factors have been identified as potentially contributing to sludge development including: ~~the time of year, geographic area the fuel is to be sold in, the brand's refinery process, and, the shipping and storage methods.~~ Based on our investigation, fuel system components that may react with the gasoline or contribute to the development of the sludge are the fuel pump (copper and iron) and the fuel sender assembly (Iron). Plasticizers in the fuel system's rubber components, a theoretical contributor, have not been found to be present in the field samples analyzed by Ford.

Elements found in the sludge during our analysis were: copper, iron, sodium, sulfur, chlorine, silicon, magnesium, aluminum, potassium, calcium, carbon, hydrogen, and oxygen.

Request 12

Provide a concise description of the sludge. The description should include but not be limited to element and compound composition, viscosity, specific weight, and particle size.

Answer

The subject sludge was found to be a combination of small oxide particles, sulfates, and oily compounds of olefin. The elements found in the sludge are listed above in response to Request 11. The compounds found were sodium sulfate, iron sulfate, copper sulfate, potassium iron oxide, iron oxides, aluminum oxide, calcium oxide, silicon oxide, and magnesium oxide. Ford also believes that multiple oily compounds of olefin were present.

The particle size of the oxides was not explicitly measured, but based on micrographs the vast majority of the particles were under 60 microns (pore size of the original production FDM disk filter was 63 microns). The particles appeared to clump together to form the sludge that plugged the filters.

Ford has not measured the viscosity or the specific weight of the sludge.

Request 13

Concisely state Ford's opinion where the sludge is coming from and the reasons for that opinion.

Answer

Ford believes that sulfates are formed from a chemical combination of sulfur normally found in gasoline with sodium, iron and copper. Sodium and iron are contaminants normally found in gasoline to varying degrees. Copper is not normally present in gasoline entering the vehicle's fuel tank and is likely coming from the fuel pump components. Iron may also be coming from various fuel system components, as indicated in response to Request 11.

The formed sulfates and olefins normally found in gasoline are attracted to each other and form a sticky substance (sludge) that can stick to the surface of the filters in the fuel tank. Depending on the fuel motion into and around the filter, particles can stick to this combination of sulfates and olefins. The greater the fuel motion around the filter, the less likely particles will actually stick to the sulfates and olefins.

Ford's opinion is based on our chemical analysis of the sludge, our efforts to reproduce the failure mode (a minimum level olefin in the test fuel was required to reproduce the failure mode), our test results and field experience with different filter designs, and the collective knowledge of our material engineers and their understanding of how sulfates and olefins can interact.

Request 14

State whether the FDM (original, interim or final version) installed on the subject vehicles is used in any other Ford vehicle. If so, provide a list of all the vehicles: by model and model year that use the FDM.

Answer

The subject "original" design level FDM unit was used to produce 1995 through 2000 model year Contour and Mystique vehicles and 1999 through 2002 model year Cougar vehicles. No other vehicle models use the subject "interim" or "final" design FDMs.

December 6, 2002

Request 15

By type of FDM (original, interim, final) state the number of FDMs that have been sold by Ford to date.

Answer

Ford's records indicate that 28,831 original, 55,059 "interim", and 2,111 "final" type FDMs were sold by Ford in the United States as of October 8, 2002.

As the agency is aware, Ford service parts are sold in the U.S. to authorized Ford and Lincoln-Mercury dealers. Ford has no means by which to determine how many of the parts were actually installed on vehicles, the vehicle model on which a particular part was installed, or the reason that the installation was made.

Request 16

By type of FDM (original, interim, final) state that FDM's component name, service part number, supplier (name and address) and state the date the FDM became available to dealers.

Answer

All the FDMs used on the subject 2000-2002 model year Focus vehicles were produced by Visteon Corporation, 5500 Auto Club Drive, Dearborn, MI 48126. All three type FDM units are identified in Ford's service part system as a sender and pump assembly (component name). Appendix I (file: 2002-05-22_Appendix_I) on the enclosed CD contains the other requested information.

Note that the listing in Appendix I contains more than one part number for the "original" and "interim" FDM types used on Focus vehicles. The multiple part numbers represent changes that were made to the FDM units for reasons unrelated to the subject defect. Each part, however, shares the same filter protocol as the FDM type with which they are identified.

Request 17

Was the original FDM purged from production, dealer, or supplier inventory? If so, state the date(s) that purge(s) was completed.

Answer

The original type FDM was replaced in production as of June 14, 2001. An electronic block was placed in Ford's service part system to prevent any of the original type FDMs from being sent to dealers as of October 31, 2001.

Request 18

State whether the final (or current production) FDM will function properly if installed in the MY 2000 - 2002 subject vehicles.

Answer

As stated in our May 22, 2002 response to the agency's April 8, 2002 inquiry, the current production "sock filter" type FDM requires a different fuel tank than used on vehicles that were equipped with previous levels of FDM units. The current production FDM unit does not fit in to the previous level (vehicles produced at the Wayne Assembly plant prior to December 13, 2001 or at the Hermosillo Assembly Plant prior to February 14, 2002) fuel tank.

Request 19

State whether the final (or current production) fuel tank will function properly if installed in the MY 2000- 2002 subject vehicles.

Answer

For the same reason as stated in response to Request 18, the current production fuel tank is not compatible with the previous level FDM units used on Focus vehicles produced at the Wayne Assembly plant prior to December 13, 2001 or at the Hermosillo Assembly Plant prior to February 14, 2002. The current production fuel tank could only be used in an earlier build date vehicle if the original FDM unit were also replaced with a current level "sock filter" FDM unit.

Request 20

For model years 2000 to present, provide a list of all other Ford vehicles using a plastic or other non-steel fuel tank.

and

Request 21

For each Ford vehicle you identified in response to Question 20, please provide the information requested in Questions 2 and 3.

and

Request 22

For each Ford vehicle you identified in response to Question 20, please state whether sludge or a similar contamination you identified as existing in the Ford Focus has been observed in that vehicle.

Answer

In phone discussions between the agency and Ford regarding the scope of these requests, Ford was instructed to provide a list of Ford produced vehicles that were equipped with plastic fuel tanks. The agency would then decide, based on the number of owner reports concerning stalling in the agency's files, if other models would require investigation. On October 9, 2002, a list of those other plastic fuel tank equipped models was provided to the agency's Mr. Nate Seymour by e-mail. In a November 13, 2002 telephone conversation with the agency's Mr. Dick Boyd and Mr. Nate Seymour, Ford was informed that, based on the review of agency files, no further response was required to these (Nos. 20, 21 and 22) requests.

Request 23

Please explain why a 65 micron disk filter was used in the original FDM (98AP-9H307-EA) and why a 95 micron filter was used in the interim FDM (1MSU-9H307-AA), and provide copies of any documents, including any test, study, simulation, evaluation, assessment, analysis, investigation, inquiry, survey or other similar action, that in anyway explain or demonstrate why those choices were made.

Answer

The original filtration protocol for the subject FDM was designed and developed for use in Focus vehicles produced and sold in Europe. The 65 micron disk filter (actually 63 micron) was initially chosen based on prior field experience and was found to be adequate during development of those vehicles. The design has proven to be reliable and is still successfully being used in those vehicles. The design was therefore chosen for Focus vehicles including those to be produced and sold in the United States.

During Ford's investigation of the contamination/sludge issue, reported in the documents provided with our responses to the agency's April 8, 2002 Inquiry, it was discovered that the sludge tended to be oily and somewhat sticky. The sticky substance tended to hold particles allowing them to agglomerate. If this happens, the filter can become coated and plugging may occur. To help prevent this from occurring, the disk filter was revised to 95 microns. The 95 micron disk filter still filters those particles large enough to damage the fuel pump but allows smaller particles to pass and helps prevent agglomeration and plugging. To compensate for the additional particles that can pass through the 95 micron disk filter, the size area of the filter within the pump was increased to approximately three times that of the original design. Further description of the disk and pump filters used for the original and interim FDM designs are provided in response to Request 28. Documents provided with Ford's responses to the April 8, 2002 Inquiry provide the information available in Ford files regarding the change to the 95 micron disk filter.

Request 24

State what the filtering capabilities of the inline fuel filter are in the subject vehicles.

Answer

The inline fuel filter used on the subject Focus vehicles is specified to allow no more than 10 glass beads greater than 20 microns to pass when exposed to 100 mg of 10-30 micron glass beads. The capacity of the filter is 1.67 grams (minimum) with a 40 inches of mercury pressure drop at 130 liters per hour flow through the filter.

Request 25

Provide copies of any and all documents pertaining to the changes made in the fuel tank and FDM used in the 2002 model year Ford Focus built after December 5, 2001. Please include, material composition specifications, dimensions, and manufacturing and assembly procedures.

Answer

All 2000 through 2002 model year Focus fuel tanks are made from the same co-extruded composite material. They all have the same dimensions. The 2002 "sock filter" type FDM fuel tank uses a bayonet type retainer ring to locate the FDM; the 2000 and 2001 "disk filter" type FDM fuel tank use a ¼ turn cam lock type ring to match the FDMs used on those model years. Engineering drawings of the fuel tank assembly, including the FDM, are provided in Appendix H-2 that is part of the confidential response being submitted under a separate cover letter. Documents pertaining to the material composition specifications, dimensions, and manufacturing and assembly procedures reside in Viateon's files.

Request 26

Provide copies of any and all tests, studies, simulations, evaluations, assessments, analyses, investigations, inquiries, surveys or other similar actions conducted by or on behalf of Ford and/or of which Ford is aware, that relate, or in anyway could be construed as relating, to the loss of power steering in the subject vehicle. This request includes a request for any testing which documents, investigates, analyzes and/or discusses any increase in steering force necessary to be applied to overcome the loss of power steering.

Answer

As the agency is aware, the Ford Focus is sold in many countries around the world. As in the United States, many of these countries require that vehicles be certified to certain performance standards before they can be sold. The European Economic Community (EEC) and the United Nations Economic Commission For Europe (ECE) both require certain standards for vehicle operation without power assisted steering as would occur if the vehicle's engine were to stall. These standards require that a vehicle such as the Focus be capable of being steered around a 20 meter radius circle at 10 km/h with no more than 30 daN of force required at the steering wheel. The Focus easily meets these criteria. Representative EEC and ECE approval letters including the test documentation for which the approvals were based are provided in Appendix J-1. As noted in the provided test report, the Focus required only 15.2 daN and 15.5 daN force (approximately half the maximum allowable effort) to complete the left and right maneuver respectively.

Ford has not searched its files for every document that might be construed as responsive to your comprehensive request. However, Ford believes that the supplied documents clearly indicate that steering control is maintained for Focus vehicles when the power steering assist is lost due to engine stalling.

Request 27

Provide copies of any and all test, study, simulation, evaluation, assessment, analysis, investigation, inquiry, survey or other similar action conducted by or on behalf of Ford and/or of which Ford is aware, that relate, or in anyway could be construed as relating, to the effect an engine stall has on the subject's vehicle's power braking system. This request includes a request for any testing which documents, investigates, analyzes and/or discusses the additional brake pedal force necessary to be applied when, and if the brake booster becomes exhausted.

Answer

Focus vehicles meet United States' Federal Motor Vehicle Safety Standard (FMVSS) 135 for brake performance including the requirements for stopping distance and pedal force with the vehicle's engine off and with the power brake booster inoperative (system depleted). Copies of the test report cover sheets and data summary sheets used to certify the 2000 MY Focus to FMVSS 135 are provided in Appendix J-2 as representative for all model years.

Ford has not searched its files for every document that might be construed as responsive to your comprehensive request. However, Ford believes that the supplied documents clearly indicate that braking control is maintained for Focus vehicles when power brake assist is lost due to engine stalling.

Request 28

Please provide samples and a complete, detailed description of the three FDMs used in the subject vehicles. This description should include, but not be limited to: physical dimensions, filter dimensions and specifications, material composition, and adhesives and other fastening methods used to assemble the FDM.

Answer

Key FDM characteristics such as filter material, micron size, and surface area by FDM type are provided in a comparison chart in Appendix K (file: 2002-12-6_Appendix K) on the enclosed CD. Engineering drawings of the different FDMs are provided as part of Appendix H-2 that is being submitted with a request for confidentiality under separate cover to the NHTSA's Office of the Chief Counsel pursuant to 49 CFR Part 512. In response to Request 25, drawings of the fuel tank assemblies, that include the FDM as part of the assembly, are also provided in Appendix H-2. Samples of each level FDM are provided along with this response.

Request 29

State the date Ford ceased collecting information for use in responding to this Information Request. If there is more than one date for each information request listed here provide the date Ford ceased collecting information responsive to that request.

Answer

Except in those cases where a later date is noted on the face of a document, and for its warranty claim search and service part sales data, Ford collected information for use in response to this Information Request dated through October 1, 2002, the date Ford received the this inquiry. Ford's warranty database search had a cutoff date of September 30, 2002. Service part sales data was obtained from Ford's database on October 8, 2002.

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