Special Bulletin SP18-35D

Date	Expiration	Release	Page
11.2018	**11.2020**	**4**	**1(14)**

Revision: D General revision. **Do not** use former versions. 08/21/2019

P20EE (diagnostic troubleshooting code) SOLUTION - NOX CONVERSION EFFICIENCY

Prevost vehicles

B13R (9700 us/can)

DESCRIPTION

For the vehicles **on which a notification** for SP18-35 **exists**, perform the following checklist and operations. It has been determined that these vehicles had the code (DTC) P20EE activated.

DO NOT perform this special bulletin on a specific vehicle unless a notification exists, otherwise, no reimbursement will be awarded.

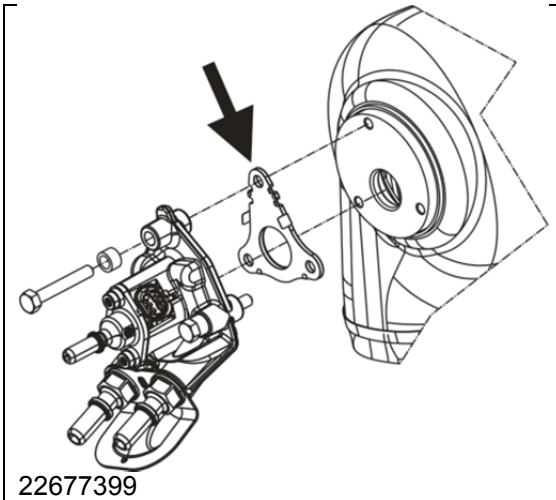
MODEL YEAR(S) AND VEHICLES INVOLVED

NOTICE TO SERVICE CENTERS *Verify vehicle eligibility by checking warranty bulletin status with **SAP** or via **ONLINE WARRANTY SYSTEM** available on Service / Warranty tab of Prevost website.*	
H3-41, H3-45 coaches Model Year : 2017 - 2019	GHG17 or OBD18 compliant vehicles From 2PCH33494***H***C71***3735*** up to 2PCH33492***K***C71***0467*** (not incl.)
H3-45 VIP motorhomes Model Year : 2017 - 2019	
X3-45 coaches Model Year : 2017 - 2019	GHG17 or OBD18 compliant vehicles From **4RK**G33491***H***973***7417*** up to **4RK**G33490***K***973***7576*** (not incl.)
X3-45 coaches Model Year : 2017 - 2019	GHG17 or OBD18 compliant vehicles From 2PCCS3495***H***C73***6180*** up to 2PCCS3498***K***C73***6407*** (not incl.)
X3-45 VIP commercial use Model Year : 2017 - 2019	
X3-45 VIP motorhomes Model Year : 2017 - 2019	
VOLVO 9700 Model Year : 2017 - 2019	GHG17 or OBD18 compliant vehicles From 3CET2V927***H***5***184392*** up to 3CET2V926***K***5***194709*** incl.

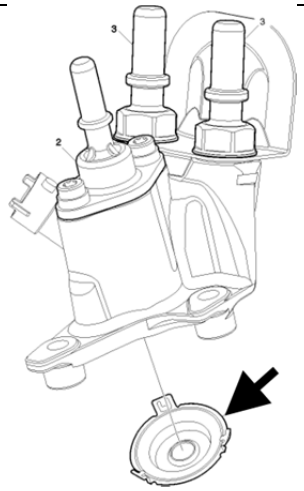
MATERIAL

Part required

Part No.	Description	Qty
22677399	GASKET, DEF INJECTION NOZZLE	1
21376801	SEALING PLATE	1



22677399



21376801

NOTE
Material can be obtained through regular channels.

Other parts that may be required

Part No.	Description	Qty
22303390	NOx SENSOR, PRE	1
22303391	NOx SENSOR, POST	1

DANGER

Park vehicle safely, apply parking brake, stop the engine. Prior to working on the vehicle, set the ignition switch to the OFF position and trip the main circuit breakers equipped with a trip button. On Commuter type vehicles, set the battery master switch (master cut-out) to the OFF position.

IMPORTANT NOTES

DO NOT perform WB18-04 or WB18-84 EMS & ACM SOFTWARE UPDATE before the following checklist, otherwise useful diagnostic codes and monitor data could be erased.

Wb18-04 for Prevost coaches, Wb18-84 for Volvo 9700

Any troubleshooting labor of active DTCs (Diagnostic Troubleshooting Codes) other than P20EE is considered as a separate operation of the RO (repair order) and cannot be charged to this special bulletin.

PART 1

Vehicle identification		
H3	☐	V.I.N (short) : __ – __ __ __ __
X3	☐	
9700	☐	

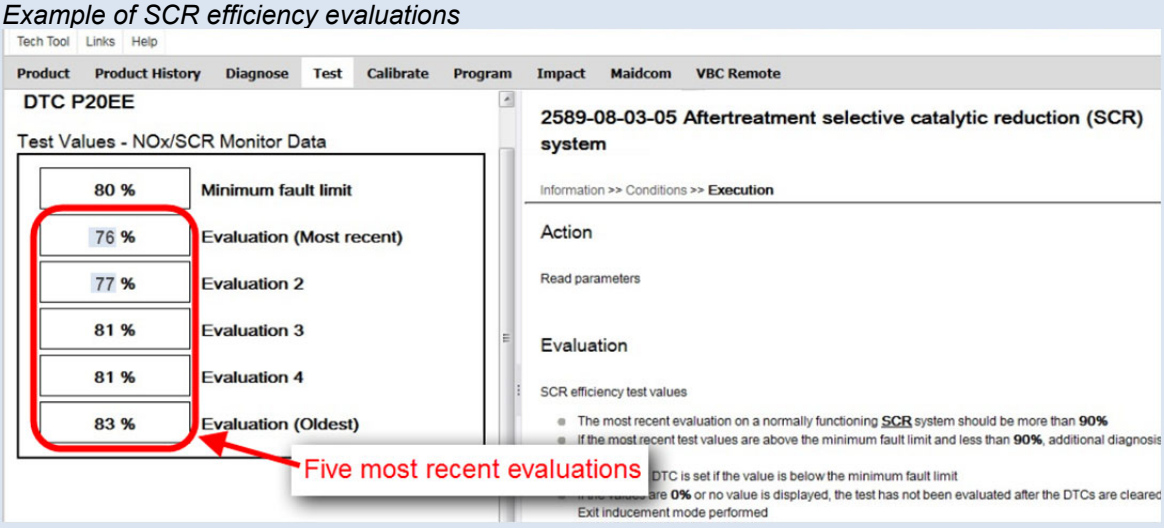
OPERATIONS TO BE PERFORMED IN ADVANCE BY THE SERVICE ADVISOR

Ask the customer whether he/she noticed an abnormal consumption of oil or coolant.

Search all relevant information concerning the aftertreatment system or severe turbo failure in the history of repairs of the vehicle and record. Attach to the repair order.

Also check if SP18-35 has already been performed on that particular coach. If this is the case, do not perform SP18-35 once again, contact the Technical Publications for instructions. You can send a message to the Technical Publications functional mailbox: *technicalpublications_prev@volvo.com*

NOTE/RESULTS:

#	checklist	INITIALS & DATE
1	Connect PTT and check the diagnostic codes related to EMS and ACM. Take a screen capture of the DTCs and attach to the repair order. Confirm that code P20EE is present (whether active or inactive). If P20EE <u>is not</u> present, do not continue with this checklist. ➡ Is the code P20EE present? YES ☐ NO☐	
COMMENTS/RESULTS:		
2	Take a screen capture of the five most recent ***SCR efficiency evaluations*** (Test screen 2589-08-03-05), attach to the repair order. *Example of SCR efficiency evaluations*  ➡ Are the five most recent SCR efficiency evaluations hovering around or lower than 80%? YES☐ NO☐	
COMMENTS/RESULTS:		
3	Check if there are leaks at the Charge Air Cooler (soapy water test). Check if there are leaks of EGR, exhaust gas (between turbo and SCR converter). Note any presence of soot. Any repair is considered as a separate operation of the RO (repair order) and cannot be charged to this special bulletin. ***Note: Try to clear exhaust clamps while keeping in mind the state of the insulating blankets to avoid damages because the heat can make them fragile over time.*** ➡ Leaks were found? YES☐ NO☐	
COMMENTS/RESULTS:		

4 Remove DEF doser and perform all dosing amount tests (Test screen 2589-08-03-05) and record the results below.

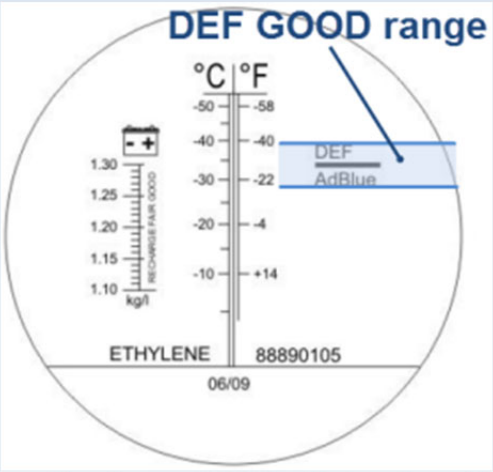
Expected values: small dosing = 49 - 60 ml large dosing = 196 - 240 ml

Dosing amount: small_____ ml large _____ ml

➡ Are the results from the DEF dosing amount tests normal? YES☐ NO☐

COMMENTS/RESULTS:

5 Test the concentration of DEF and record the result below. Tool: refractometer # 88890105.



Apply a drop of DEF on the viewer of the refractometer. If the level is above the word "DEF" or below the word "AdBlue" the DEF is contaminated. If no level is shown, it may indicate chemical residue, such as pure water or diesel fuel.

➡ Is the DEF of proper concentration? YES ☐ NO☐

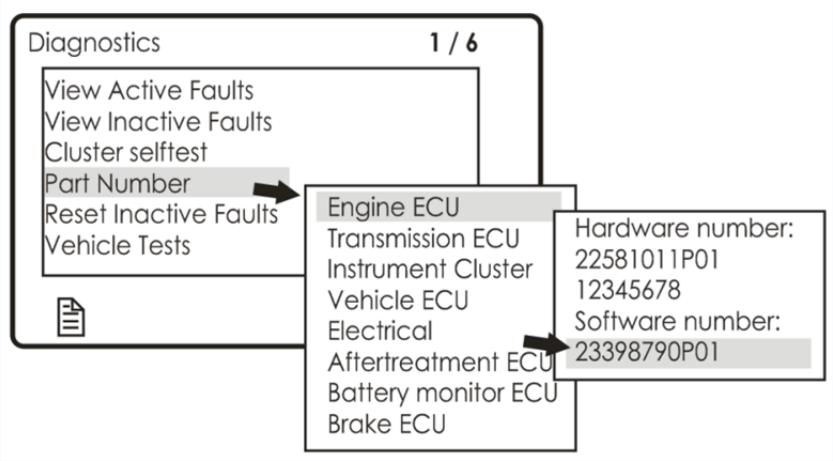
COMMENTS/RESULTS:

6 Check inside the pipe downstream of the DEF injector for any accumulation of solid (*crystallized*) DEF, attach pictures of crystal accumulations if applicable. Solid DEF will be removed during PART 2 with ***Sulfur Regen*** if applicable. Reinstall the DEF injector with two new seals.

NOTE: A small amount of crystal accumulation is normal.

➡ Is there significant/excessive DEF crystal buildup? YES ☐ NO☐

COMMENTS/RESULTS:

7	Check and record the engine ECU (a.k.a. Engine Control Module ECM) software number. To do so, check in the dashboard DID. Select DIAGNOSTICS > PART NUMBER > ENGINE ECU  ➡ Engine ECU software number: _____	

COMMENTS/RESULTS:

8 Perform a ***NOx Conversion Test***.

INSTRUCTIONS

Read all the parts of step 8 to clearly understand the purpose of the test, know which part of the graph curves you should monitor and be aware of the possible behaviors of the conversion test.

Note: It will be necessary to start the engine from the rear of the vehicle.

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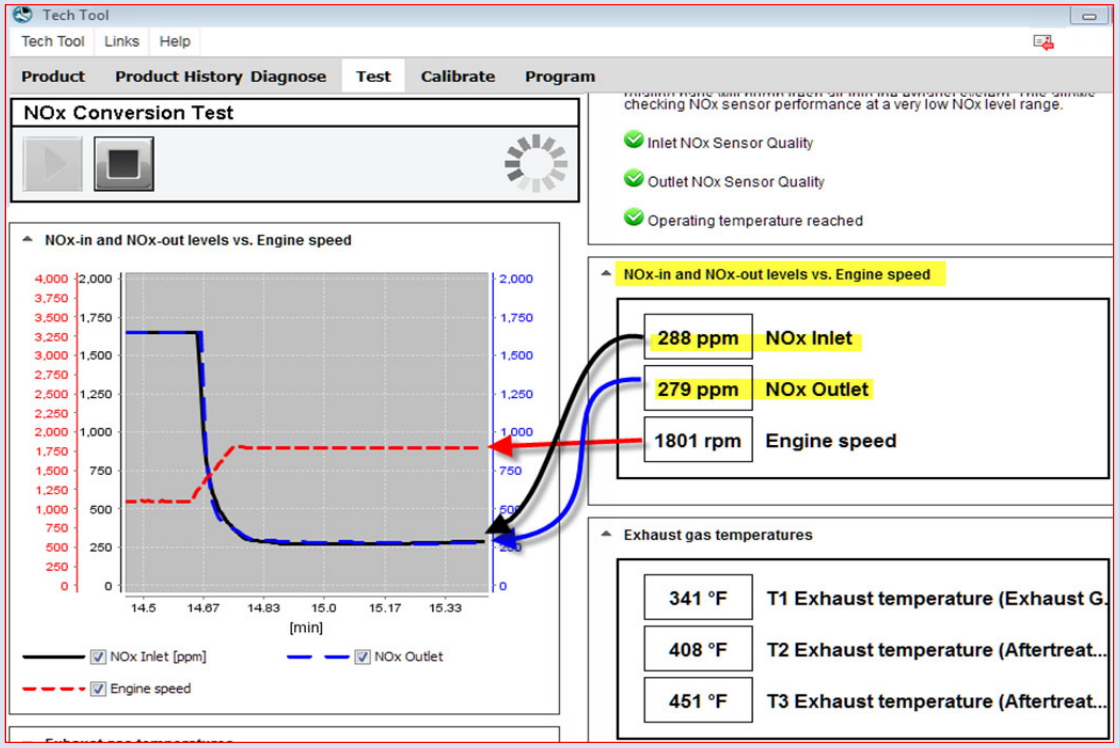
Use this test to compare the inlet and outlet NOx sensor ppm levels. Usually we monitor the last part of the test, just before shutdown, when the engine runs at high rpm (1800 rpm). Both levels should be close to each other at that point. See the example below (image). **Take screen captures.**

IMPORTANT NOTE: If the vehicle has the engine ECU software number 23470183 (see step 7), the test will behave differently than what is shown in the example below. In this case, refer to **NOx Conversion Test With ECU software number 23470183.**



USUAL BEHAVIOR

If both NOx sensor ppm levels are **close to each other** during the last part, as shown in the example above (image), then both NOx sensors are good.

If ppm levels difference **exceeds 10%**, then the sensor reading higher should be considered as defective.

$$ppm\ levels\ difference\ (\%) = \frac{highest\ value - lowest\ value}{lowest\ value} \times 100$$

Ex.: $ppm\ levels\ difference\ (\%) = \frac{(288-279)}{279} \times 100 = 3.2\ (\%)$

➡ Are both original NOx sensors good (ppm difference ≤10%)? YES ☐ NO☐

ppm levels difference = _____**%**

Replace the defective sensor[1] if applicable and then perform a new NOx sensor test once again to make sure that the replacement sensor is good.

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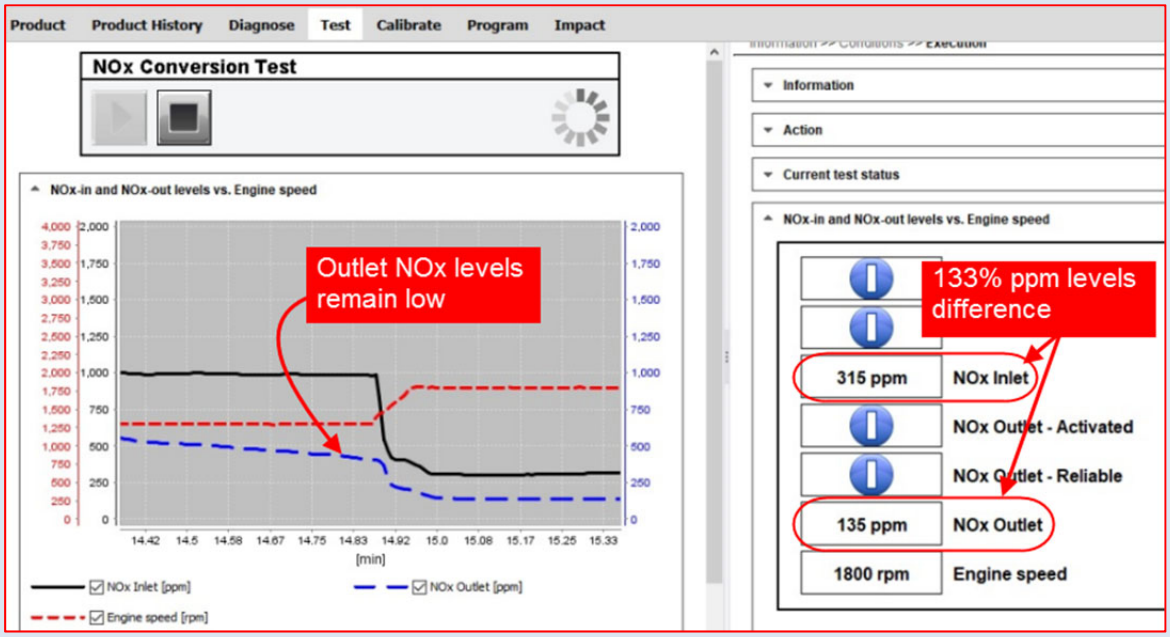
NOx Conversion Test With engine ECU software number 23470183

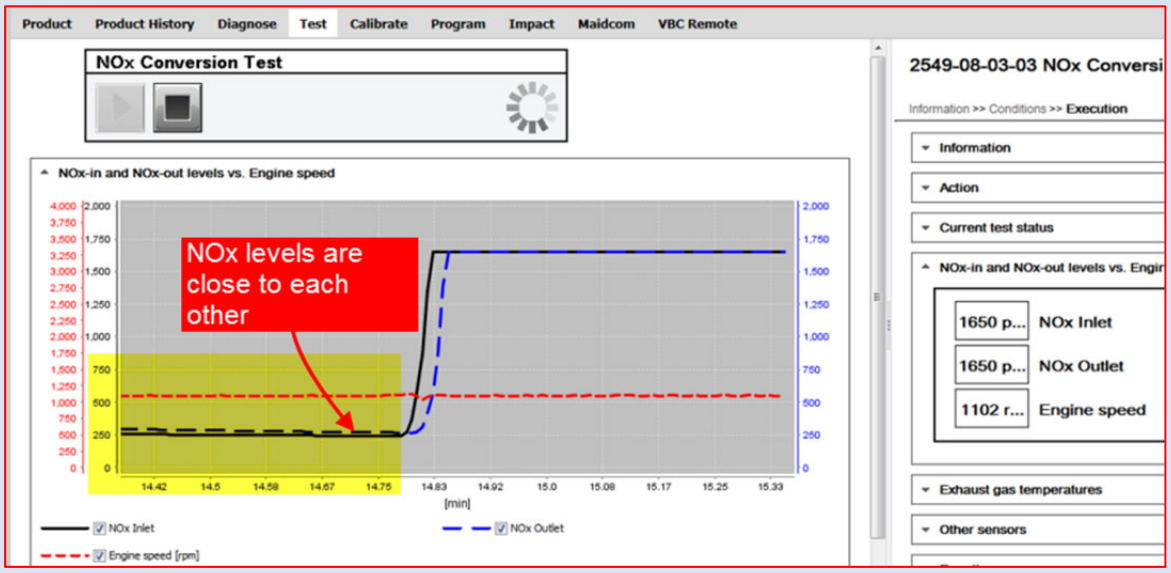
Engine ECU software number 23470183 allows DEF dosing to continue during the last part of the NOx conversion test (just before shutdown). This causes continued low outlet NOx sensor ppm levels, as seen in the example below. **Take screen captures.**



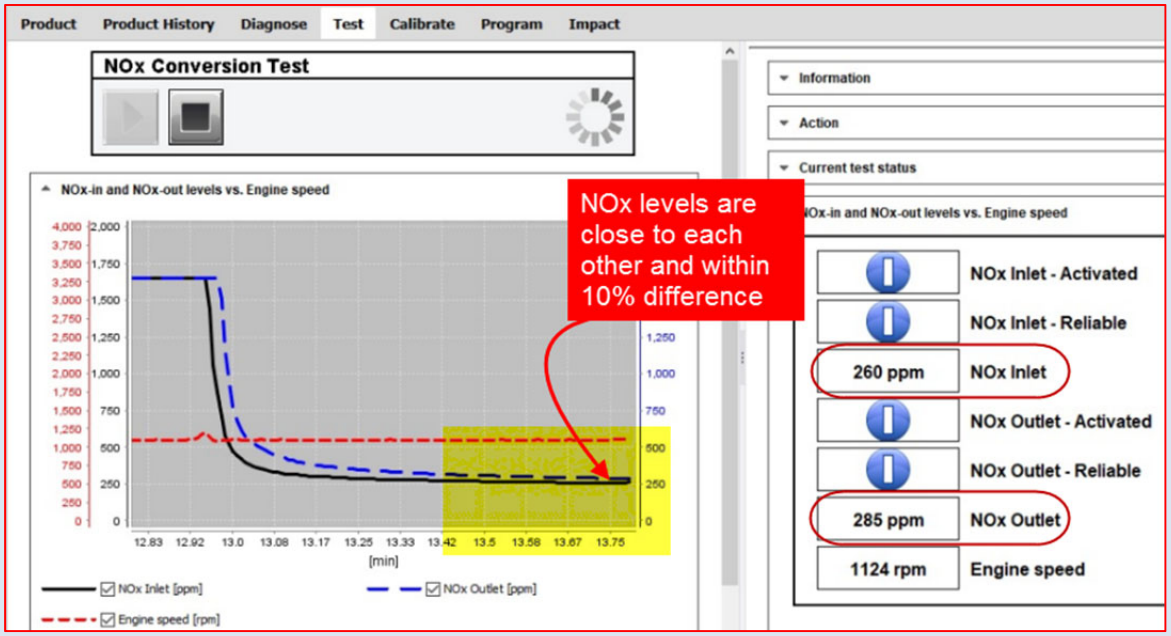
DIFFERENT BEHAVIOR. *In this example, the NOx sensors ppm levels are not close to each other because DEF is still injected during the last part of the test.* ***In this instance****, **review earlier sections of the test** to ensure that both sensors are responding to changes in the same manner. Examples of different stages to review are shown below.*

[1] Change only one sensor, since both will eventually be replaced with the new SCR converter

COMPARISON SHOULD BE DONE WHEN BOTH NOX SENSORS ARE READING BELOW 600 ppm



The NOX sensors levels are close to each but earlier during the test (images above & below).



If both NOx sensor ppm levels are **close to each other** at a point during the test as shown in the examples (image) above, then both NOx sensors are good.
If ppm levels difference is **greater than 10%**, then the sensor reading higher should be considered as defective.

COMMENTS/RESULTS:

9 **<u>If all</u> of the five following conditions** are satisfied, **do not perform PART 2** of this bulletin. Send this checklist along with screen captures to the Technical Publications to request approval for the SCR converter replacement.

<u>Conditions</u>

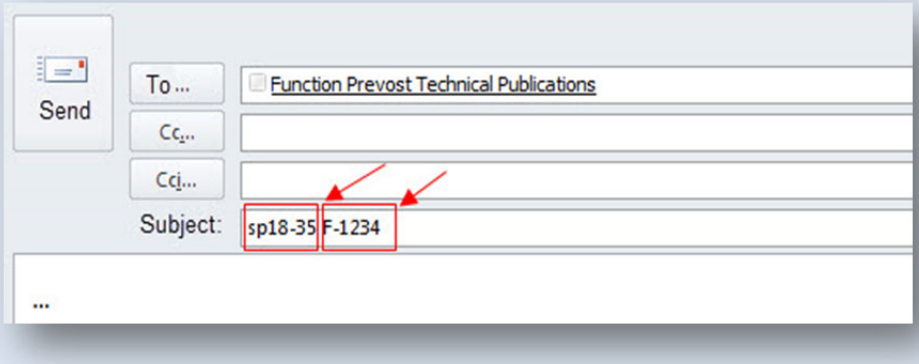
1) Engine is free from major component failure/performance issues
2) Five most recent SCR efficiency values hovering around or below 80% (step 2)
3) DEF dosing amount tests showed normal values (step 4)
4) DEF concentration within GOOD range (step 5)
5) Both original NOx sensors are good (step 8)

All five conditions satisfied, bulletin ended at step 9 (<u>no need</u> to perform sulfur regeneration nor a road test): ☐

⇩

<u>Authorization for the replacement of the SCR converter</u>. An analysis of this checklist with the comments/results must be done in order to allow the replacement of the SCR converter. Scan and send this checklist and all the relevant documents, photos, etc. to the Technical Publications functional mailbox: *technicalpublications_prev@volvo.com*

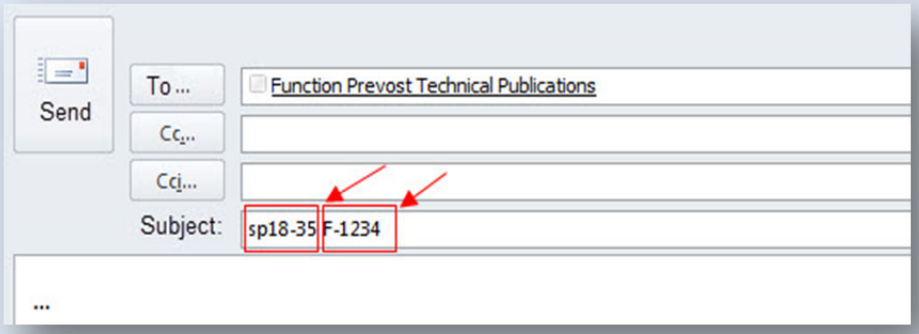
Please indicate in the "subject line": <u>SP18-35</u> and the <u>short V.I.N</u>. as in the example below…



COMMENTS/RESULTS:

PART 2

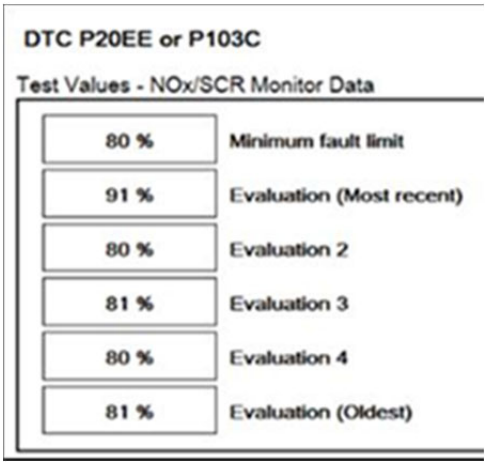
#	checklist	INITIALS AND DATE
1	Perform <u>one</u> ***Sulfur Regeneration*** (Test screen 2589-08-03-02).	
COMMENTS/RESULTS:		
2	Do a test drive of at least 1 hour to 1 ½ hour at highway speed (45 minutes in each direction).	
COMMENTS/RESULTS:		
3	Connect PTT and take a screen shot of the last five (5) ***SCR efficiency evaluations*** (Test screen 2589-08-03-05). a) Make sure that the EMS has been able to carry out a **<u>new evaluation</u>** (see example below showing the latest evaluation on top of the previous evaluations). **Note: It is very likely that a new evaluation cannot be carried out if the outside temperature is rather cold during the road test. If this is the case, return the vehicle into service. Please check the box below and indicate the outside temperature.** ☐ **EMS could not carry out a new evaluation** **Outside temp: _____ °** b) If SCR efficiency value on the most recent evaluation is >85% vehicle may be released (Typical new SCR is expected to get >90% SCR efficiency). This special bulletin can then be closed. Please, attach this filled checklist to the repair order in SAP. c) **<u>Authorization for the replacement of the SCR converter</u>**. If post-road test SCR efficiency value is less than 85%, an analysis of this checklist with the notes/results must be done in order to allow the replacement of the SCR converter. Scan and send this checklist and all the relevant documents, photos, etc. to the Technical Publications functional mailbox: *technicalpublications_prev@volvo.com* Please indicate in the "subject line": <u>SP18-35</u> and the <u>short V.I.N</u>. as in the example below…	



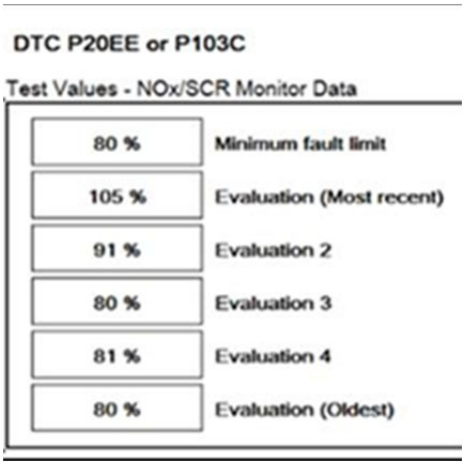
COMMENTS/RESULTS:

Example of SCR performance test

Before the road test



After the road test (most recent evaluation=105%)



ADDITIONAL COMMENTSS/RESULTS:

PARTS / WASTE DISPOSAL

Discard waste according to applicable environmental regulations (Municipal/State[Prov.]/ Federal)

ESTIMATED TIME

PART 1 only

The time required to perform PART 1 of this special bulletin is 2 hours

PART 1 & PART 2 completed

The time required to perform PART 1 & PART 2 is approximately 4 ¼ hours

OTHER

VBC Bulletin	N/A
Fail Code	04.04-1
Defect Code	9
Syst. Cond	B
Causal Part	21970125

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