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Revision: C Step 7, text modified to put more emphasis on the 1800 rpm 05/22/2019
 & time=15.33 minutes requirements.

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

<i>NOTICE TO SERVICE CENTERS</i>	
<i>Verify vehicle eligibility by checking warranty bulletin status with SAP or via ONLINE WARRANTY SYSTEM available on Service / Warranty tab of Prevost website.</i>	
H3-41, H3-45 coaches Model Year : 2017 - 2019	GHG17 or OBD18 compliant vehicles From 2PCH33494 <u>HC713735</u> up to 2PCH33492 <u>KC710467</u> (not incl.)
H3-45 VIP motorhomes Model Year : 2017 - 2019	
X3-45 coaches Model Year : 2017 - 2019	GHG17 or OBD18 compliant vehicles From 4RKG33491 <u>H9737417</u> up to 4RKG33490 <u>K9737576</u> (not incl.)
X3-45 coaches Model Year : 2017 - 2019	GHG17 or OBD18 compliant vehicles From 2PCCS3495 <u>HC736180</u> up to 2PCCS3498 <u>KC736407</u> (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 <u>H5184392</u> up to 3CET2V926 <u>K5194709</u> incl.

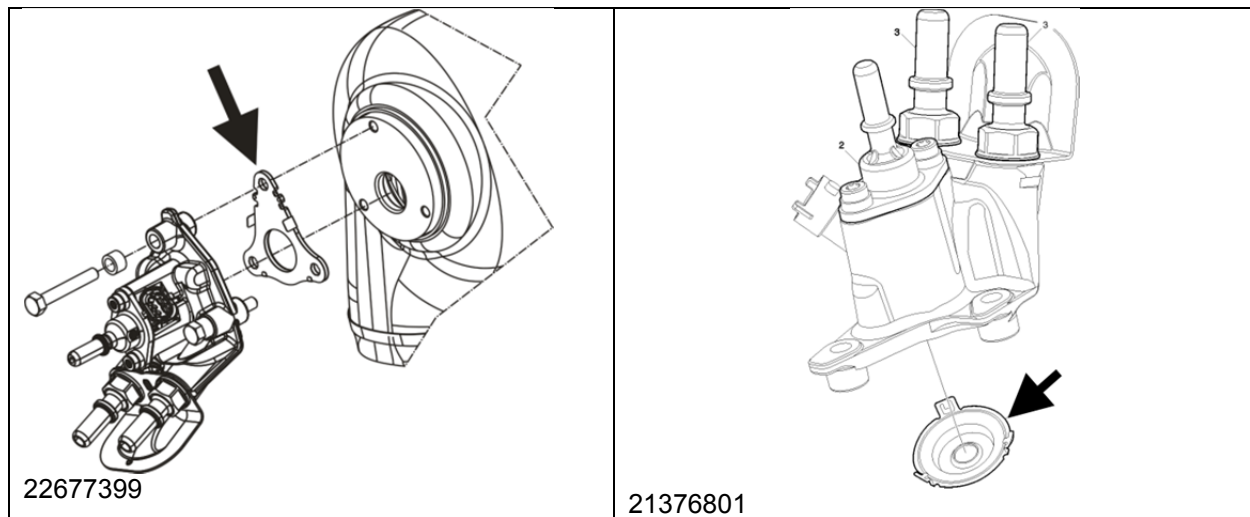
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MATERIAL

Part required

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



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


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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.

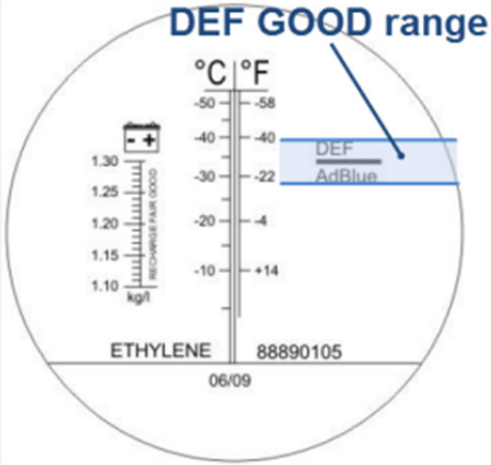
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PART 1

Vehicle identification		
H3	<input type="checkbox"/>	V.I.N (short) : _ _ - _ _ _ _ _
X3	<input type="checkbox"/>	
9700	<input type="checkbox"/>	

OPERATIONS TO BE PERFORMED IN ADVANCE BY THE SERVICE ADVISOR
<p>Ask the customer whether he/she noticed an abnormal consumption of oil or coolant.</p> <p>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.</p> <p>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</p>
NOTE/RESULTS:

#	checklist	INITIALS & DATE
1	<p>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.</p> <p>Confirm that code P20EE is present (whether active or inactive). If P20EE is <u>not</u> present, do not continue with this checklist.</p> <p style="text-align: center;">➡ Is the code P20EE present? YES <input type="checkbox"/> NO <input type="checkbox"/></p>	
NOTE/RESULTS:		
2	<p>Take a screen capture of the last five SCR efficiency evaluations (Test screen 2589-08-03-05), attach to the repair order.</p> <p style="text-align: center;">Are the last five SCR efficiency values below 80%? YES <input type="checkbox"/> NO <input type="checkbox"/></p>	
NOTE/RESULTS:		
3	<p>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.</p> <p>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.</p> <p style="text-align: center;">➡ Leaks were found? YES <input type="checkbox"/> NO <input type="checkbox"/></p>	
NOTE/RESULTS:		
4	<p>Remove DEF doser and perform all dosing amount tests (Test screen 2589-08-03-05) and record the results below.</p> <p>Expected values: small dosing = 49 - 60 ml large dosing = 196 - 240 ml</p> <p style="text-align: center;">Dosing amount: small _____ ml large _____ ml</p> <p style="text-align: center;">➡ Are the results from the DEF dosing amount tests normal? YES <input type="checkbox"/> NO <input type="checkbox"/></p>	
NOTE/RESULTS:		

5	<p>Test the concentration of DEF and record the result below. Tool: refractometer # 88890105.</p> <div style="text-align: center;">  </div> <p>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.</p> <p style="text-align: center;"> ➔ Is the DEF of proper concentration? YES <input type="checkbox"/> NO <input type="checkbox"/> </p>	
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NOTE/RESULTS:

6	<p>Check inside the flex pipe downstream of the DEF injector for any accumulation of solid (<i>crystallized</i>) 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.</p> <p style="text-align: center;"> ➔ Is there solid (crystallized) DEF in the flex pipe? YES <input type="checkbox"/> NO <input type="checkbox"/> </p>	
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NOTE/RESULTS:

7 Perform a **NOx Conversion Test**. Read the following instructions.

Instructions

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

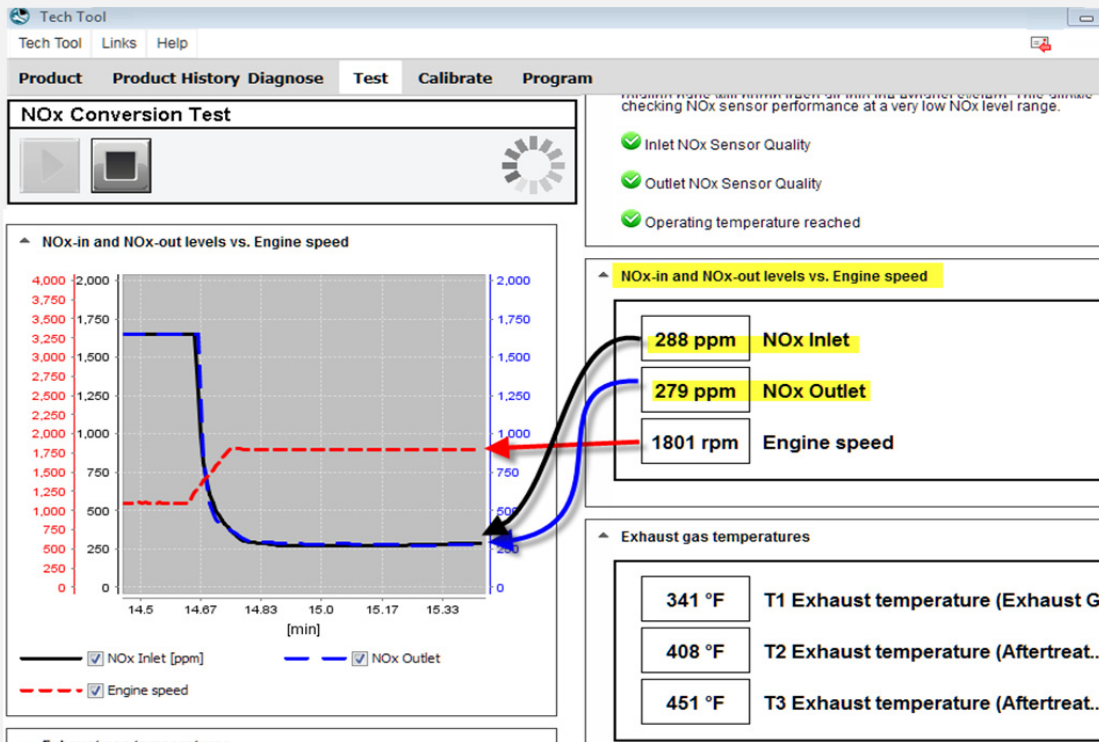
Most important part of this test is to check and compare the inlet and outlet NOx sensor ppm levels at high speed (near 1800 rpm), just before shutdown. **Take a screen capture at 1800 rpm at time 15.33 minutes**

If both NOx sensor ppm levels are **close to each other** at that point as shown on the image below, then both NOx sensors are good.

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

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

Replace the defective sensor¹ if applicable and then perform a new NOx sensor test once again to make sure that the replacement sensor is good.



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

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

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

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NOTE/RESULTS:

8 **If all 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.

Conditions

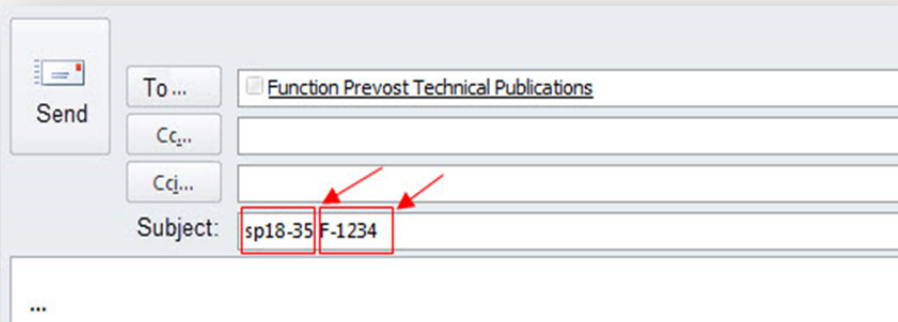
- 1) Engine is free from major component failure/performance issues
- 2) Both original NOx sensors are good
- 3) DEF dosing amount tests showed normal values
- 4) DEF concentration within GOOD range
- 5) Last five SCR efficiency values were all below 80% (results from step 2)

All five conditions satisfied, bulletin ended at step 8 (no need to perform sulfur regeneration nor a road test):



Authorization for the replacement of the SCR converter. 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": SP18-35 and the short V.I.N. as in the example below...

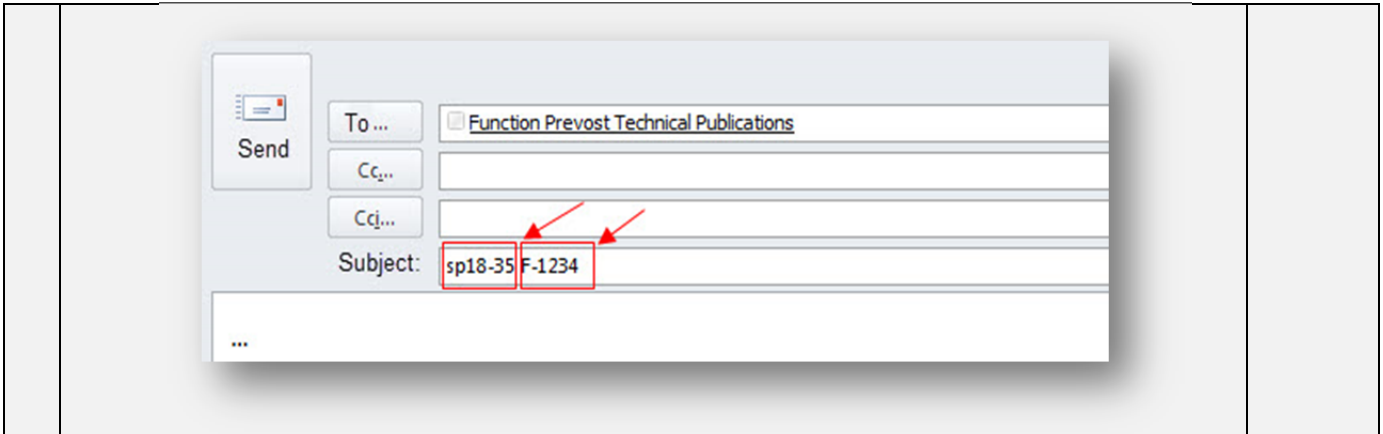


NOTE/RESULTS:

PART 2

#	checklist	INITIALS AND DATE
1	Perform <u>one</u> Sulfur Regeneration (Test screen 2589-08-03-02).	
NOTE/RESULTS:		
2	Do a test drive of at least 1 hour to 1 ½ hour at highway speed (45 minutes in each direction).	
NOTE/RESULTS:		
3	<p>Connect PTT and take a screen shot of the last five (5) SCR efficiency evaluations (Test screen 2589-08-03-05).</p> <p>a) Make sure that the EMS has been able to carry out a new evaluation (see example below showing the latest evaluation on top of the previous evaluations).</p> <p>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.</p> <p><input type="checkbox"/> EMS could not carry out a new evaluation Outside temp: _____ °</p> <p>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.</p> <p>c) Authorization for the replacement of the SCR converter. 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: <i>technicalpublications_prev@volvo.com</i></p> <p>Please indicate in the "subject line": <u>SP18-35</u> and the <u>short V.I.N.</u> as in the example below...</p>	

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NOTE/RESULTS:

Example of SCR performance test

Before the road test

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

DTC P20EE or P103C

Test Values - NOx/SCR Monitor Data

80 %	Minimum fault limit
91 %	Evaluation (Most recent)
80 %	Evaluation 2
81 %	Evaluation 3
80 %	Evaluation 4
81 %	Evaluation (Oldest)

DTC P20EE or P103C

Test Values - NOx/SCR Monitor Data

80 %	Minimum fault limit
105 %	Evaluation (Most recent)
91 %	Evaluation 2
80 %	Evaluation 3
81 %	Evaluation 4
80 %	Evaluation (Oldest)

ADDITIONAL NOTES/RESULTS:

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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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