

Engine Family Data

United States US Environmental Protection Agency Office of Transportation and Air Quality

Manufacturer Production Line Testing Report for Locomotive Engines

Last Revision: September 2010 Version Number: 4.2

Submission Date

					7								 D I D. I . C A . I N. C.	OMB N
Manufacturer:						Engine Family:					,	Current Quarter:	Paperwork Reduction Act Notice	OMB No. 2060-0392
PLT Test Contac	t:					Projected Annual Pr							The public reporting and recordkeeping burden for this collection of information is estimated to average 17 hours per response for manufacturers and 8 hours per	Approval Expires on
Email Address:						Total Engine Sample		a :		0			response for remanufacturers. Send comments on the Agency's need for this	5/31/2011
Phone #:						Minimum Required		Size:	- .				information, the accuracy of the provided burden estimates, and any suggested	EPA Form 5900-135
Cycle:						Production Period	From:		To:				methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Collection Strategies Division, U.S.	
Manufacture Typ						Sample Size Stat	us:			OPEN			Environmental Protection Agency (2822T), 1200 Pennsylvania Ave., NW,	
Engine Fuel Typ	e:												Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed Form 5900-135 to this address.	
Applicable Tier:						Notes:							So not some the completed form 5500 200 to this dedicase.	
						Follow-ups to failed to		ded in the "Total E	Engine Sample S	Size."				
						Please select the app	licable tier.							
Compliance	Summary													
		NOx			PM			СО			НС		Comments:	
			Compliance						Compliance			Compliance		
	Final Result	Standard/FEL		Final Result	Standard/FEL	Compliance Status	Final Result	Standard		Final Result	Standard	Status		
Test Engine #1														
Test Engine #2														
Test Engine #3														
Test Engine #4														
Test Engine #5													Test Location and Description	
COMPLIANCE	STATUS:	OPEN												



Manufacturer Production Line Testing Report for Locomotive Engines

Basic Information: Test Engine #3			
Manufacturer: PLT Test Contact: Email Address: Phone #: Test Location & description:	Engine Family: Total Production: Date of Start of Model Year Production: Date of End of Model Year Production: Date of End of Model Year Production: Deterioration Factor Tyte:	Current HOX Result Current PM Result Current HOX Result	OMB No. 2060-0392 Approval Expires on 5/31/2011 EPA Form 5900-135
	Engine #1 Testing Completed?	Units Units Units	
Comments:		NOX DEFActor PM DeFActor C O DEFActor HC DEFActor DE FACTOR Type DEFACTOR Type DEFACTOR Type DEFACTOR Type HC FACTOR Type HC Green Engine Factor HC Green Engine Factor	

PLT Engine Test Results: Test Engine #1

Cala Final	Total				Foot	ina Facina	Duild	Green Engine	Green Engine Factor Determination Method	Service Hours	Service	Service	NOv toitial	Rounded	NOv Final	Det. NOx	DM toitiol	Rounded	DM Final	Det. PM	CO Initial	Rounded	COFinal	Det. CO	HC Initial	Rounded	HC Final	Det. HC	December Failed			
Result?	Number	Test Date	Test Time	Test Qtr Eng	ne ID Mai	ke Configuration	Date	Applied?	Determination Method	Accumulation	Location	Procedure	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Test (if applicable)	Remedy	Repairs	Comments
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Manufacturer Production Line Testing Report for Locomotive Engines

Basic Information: Test Engine #2			
Manufacturer: PLT Test Contact: Email Address: Phone 6: Test Location & description:	Engine Family: Date of Start of Model Year Production: Date of Start of Model Year Production: Date of End of Model Year Production: Engine #2 Testing Completed?	Current NOx Result	OMB No. 2060-0392 Approval Expires on 5/31/2011 EPA Form 5900-135
Comments:		MOX. Del Factor PM Del Factor CO Del Factor CO Del Factor Del Factor OPP Del Fact	

PLT Engine Test Results: Test Eng	ine #2
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									Green Engine		Service Hours	Service	Service		Rounded		Det. NOx		Rounded		Det. PM		Rounded		Det. CO		Rounded		Det. HC				
Calc Final Result?	Test Number	Test Date	Test Time	Test Qtr	Engine ID	Engine Make	Engine Configuration	Build Date	Factor Applied?	Green Engine Factor Determination Method	(or miles) Accumulation	Hours Location	Acc. Procedure	NOx Initial Result	NOx Initial Result	NOx Final Result	Final Result	PM Initial Result	PM Initial Result	PM Final Result	Final Result	CO Initial Result	CO Initial Result	CO Final Result	Final Result	HC Initial Result	HC Initial Result	HC Final Result	Final Result	Reason for Failed Test (if applicable)	Remedy	Repairs	Comments
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Manufacturer Production Line Testing Report for Locomotive Engines

Basic Information: Test Engine #3			
Manufacturer: PLT Test Contact: Email Address: Phone #:	English Family: Table Prediction Date of Start of Model Year Production: Date of End of Model Year Production:	Current HOx Result Current PM Result Current CO Result Current HC Result	OMB No. 2060-0392 Approval Expires on 5/31/2011 EPA Form 5900-135
Test Location & description: Comments:	Engine #3 Testing Completed?	Running Change? Running Change? PM Standard FEL Units HC Standard FEL Units Un	
		NOX Green Engine Factor PM Green Engine Factor CO Green Engine Factor MC Green Engine Factor	

PLT Engine Test Results: Test Engine #3

								l	Green Engine		Service Hours	Service	Service		Rounded		Det. NOx		Rounded		Det. PM		Rounded		Det. CO		Rounded		Det. HC				no
Calc Final Result?	Test Number	Test Date	Test Time	Test Qtr	Engine ID	Engine Make	Engine Configuration	- Build Date	Factor Applied?	Green Engine Factor Determination Method	(or miles) Accumulation	Hours Location	Acc. Procedure	NOx Initial Result	NOx Initial Result	NOx Final Result	Final Result	PM Initial Result	PM Initial Result	PM Final Result	Final Result	CO Initial Result	Result	Result	Result	Result	Result	Result	Final Result	Test (if applicable)	Remedy	Repairs	Comments
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Manufacturer Production Line Testing Report for Locomotive Engines

Basic Information: Test Engine #4			
Manufacturer: PLT Test Contact: Email Address: Phone #: Test Location & description:	Engine annity Total Production: Date of Start of Model Year Production: Date of Start of Model Year Production: Engine 44 Testing Completed?	Units Units Units	OMB No. 2060-0392 Approval Expires on 501/2011 EPA Form 5900-135
Comments:		NOX DEF Factor PM DEF Factor CO DEF Factor HC DEF Factor DEF Factor Type DEF Factor Type DEF Factor Type CO Green Engine Factor CO Green Engine Factor HC Green Engine Factor DEF Factor Type HC Factor Type HC Factor Type HC Green Engine Factor HC Green	

PLT Engine Test Results: Test Engine #4

Part	Calc Final	Test				Engine	Engine	Build	Green Engine Factor	Green Engine Factor	Service Hours (or miles)	Service Hours	Service Acc.	NOx Initial	Rounded NOx Initial	NOx Final	Det. NOx Final	PM Initial	Rounded PM Initial	PM Final	Det. PM Final	CO Initial	Rounded CO Initial	CO Final	Det. CO Final	HC Initial	Rounded HC Initial	HC Final	Det. HC Final	Reason for Failed				
	Result?	Number	Test Date	Test Time Test Q	tr Engine ID	Make	Configuration	Date	Applied?	Determination Method	Accumulation	Location	Procedure	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Test (if applicable)	Remedy	Repairs	Com	nments
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Manufacturer Production Line Testing Report for Locomotive Engines

Basic Information: Test Engine #5			
Manufacturer: PLT Test Contact: Email Address: Phone #: Test Location & description:	Engine Family: Total Productions:	Current NOx Result Current PM Result Current CO Result Current HC Result Running Change? Running Change? (Nos Standard or FEL PM Standard of FEL Units Units	OMB No. 2060-0392 Approval Expires on 5/31/2011 EPA Form 5900-135
Comments:		MOL Det Factor Det Factor Det Factor Det Factor Yupe CO Green Engine Factor Det Factor Yupe HC Factor Yupe	

PLT En	gine Test	Results:	Test Eng	jine #5
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									Green Engine		Service Hours	Service	Service		Rounded		Det. NOx		Rounded		Det. PM		Rounded		Det. CO				Det. HC				
Calc Final Result?	Test Number	Test Date	Test Time	Test Qtr	Engine ID	Engine Make	Engine Configuration	Build Date	Factor Applied?	Green Engine Factor Determination Method	(or miles) Accumulation	Hours Location	Acc. Procedure	NOx Initial Result	NOx Initial Result	NOx Final Result	Final Result	PM Initial Result	PM Initial Result	PM Final Result	Final Result	CO Initial Result	CO Initial Result	CO Final Result	Final Result	HC Initial Result	Rounded HC Initial Result	HC Final Result	Final Result	Reason for Failed Test (if applicable)	Remedy	Repairs	Comments
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Basic Information: Invalid	d Tests			
Manufacturer: PLT Test Contact: Email Address: Phone #: Test Location & description:		Engine Family: Total Production: Date of Start of Model Year Production: Date of End of Model Year Production:		OMB No. 2060-0392 Approval Expires on 5/31/2011 EPA Form 5900-135
Comments:				
Invalid PLT Engine Test F	Results			

	Test Number	Test Date	Test Time	Test Qtr	Engine ID	Engine Make	Engine Configuration	Build Date	Green Engine Factor Applied?	Green Engine Factor Determination Method	Service Hours (or miles) Accumulation	Service Hours Location	Service Acc. Procedure	NOx Final Result	PM Final Result	CO Final result	HC Final result	Reason for Invalid Test	Additional Comments
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Manufacturer Notes	
Please provide any additional notes here.	

OMB No. 2060-0392 Approval Expires on 5/31/2011 EPA Form 5900-135



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Manufacturer Data Submission Template -- INSTRUCTIONS

I. About

This template allows locomotive engine manufacturers to submit production line testing (PLT) data in a simple, consistent format. Based on the information entered by the submitter, the template performs the required calculation of the final test result and displays the current status of the test.

It is intended that a copy of this template be created for each engine family for which the reporting of PLT results is required. The engine family name should be included in the submission file name. These data must be submitted on a quarterly basis. It is intended that one copy of a template be maintained per engine family, per year. For instance, the file submitted for the second quarter will contain all test results previously submitted for the first quarter with the results from the second quarter added on. The template provides a field to indicate the associated quarter at the engine test level.

The template is organized into several worksheets, including a "Summary" worksheet that includes both preliminary information as entered by the manufacturer and overall compliance information based on the actual PLT data entered in subsequent worksheets (i.e., "Test Engine #1" through "Test Engine #5"). There are two additional worksheets to allow for the submittal of invalid test results and any other relevant notes that the manufacturer would like to submit with the test results. In all of the worksheets, only values in cells that are white may be modified - the shaded cells contain either labels or calculated values.

Before entering data in this template, international users should ensure that the settings for number handling are consistent with the template. Number handling settings that currently specify the use of a comma for the decimal separator and a period for the thousands separator must be temporarily modified to avoid errors within the automatic calculations. To modify the number handling settings, the users with Excel 2003 should go to the "Tools" menu and select "Options." In the window that appears, the "International" tab should be selected. At the top of this tab there will be a section at the top entitled "Number handling"; the check mark in the "Use system separators" box found within this section should be removed. At this point, a period should be inserted for the decimal separator and a comma should be inserted for the thousands separator. Users with Excel 2007 can get to the appropriate screen by clicking on the Microsoft Office Button, clicking on "Excel Options", and then going to the "Advanced" tab.

Please note that if a given engine family has results for both the Line-Haul and the Switch cycles, two separate Excel files must be filled out and submitted.

II. Entering General Information

Before entering data into the Test Engine worksheets, some information on the manufacturer and the engine family name being tested should be entered into the worksheet labeled "Summary." The top portion of this worksheet includes spaces to enter general information about the PLT test. These fields include:

- Manufacturer contact information (manufacturer name, contact, email, and phone);
- Engine Family identifier;
- Projected annual production volume;
- Indication whether the test results are for the Line-Haul or Switch cycle;
- Indication whether the engines being tested are freshly manufactured or remanufactured;
- Date of start of MY production;
- Date of end of MY production; and
- Engine Fuel Type: Diesel, Gaseous Fuel, Alcohol, or Other. Once this selection has been made, and a tier has been selected (see following paragraph) a note will appear indicating which type of hydrocarbon emission (NMHC, NMHCE, THCE, or THC) should be entered as part of the HC test results.

There is also a field for selecting the applicable tier. If tier 4 is selected, then another field will appear asking the user if combined HC+NOx results and a combined HC+NOx standard/FEL are being used. If "Y" is specified, then the "NOx" headings will be replaced with "HC+NOx" headings throughout the template, the "HC" columns will be removed from the summary table, and the HC data entry cells will be shaded out for all of the test engine worksheets in order to indicate that no data should be entered in these.

In addition to these fields, there is a field at the top right of the "Summary" worksheet where the current quarter can be specified. Based on the quarter chosen, a set of fields will appear where actual quarter-by-quarter production values should be entered. At the bottom right are fields for entering comments and the test location.

The top portion of this worksheet will automatically calculate and display the total engine sample size, the minimum required sample size, and the sample size status. The total engine sample size is calculated based on the number of test engines for which test data have been entered. This calculation does not include any additional engines tested as a part of the follow-up that is required when an engine fails a test (see 40 CFR 92.507). The required minimum sample size is calculated based on the amount entered in the Total Production field, and will be the lesser of 5 engines or the rounded amount of 1% of Total Production. The sample size status can be either "OPEN," "OK," or "Too Small" and is calculated based on the following criteria:

- If test data have not yet been entered, or if the projected production volume has not been specified, the sample size status is displayed as "OPEN."
- If the total engine sample size is greater than or equal to the minimum required sample size, the sample size status is displayed as "OK."
- If the total engine sample size is less than the minimum required sample size, the sample size status is displayed as "Too Small."

Note that the lower portion of this worksheet (described in Section IV, "Compliance Summary") contains the overall PLT results for the engine family and will be populated based on the results entered in the Test Engine worksheets.

III. Entering PLT Engine Test Results

Each PLT result is comprised of one or more tests of individual engines within the engine family being tested. Following the "Summary" worksheet, there are five worksheets labeled "Test Engine #1" through "Test Engine #5." Within one or more of these five worksheets, the engine-specific test data can be entered. The required sample size for each engine family is the lesser of 5 engines or the rounded amount of 1% of Total Production.

For each individual engine tested, a separate worksheet should be used (Note: the same worksheet should be used for test results from the two follow-up engines that must be tested if an engine fails). The "Test Engine #1" worksheet has a field (in cell N10) where the Deterioration Factor Type must be specified as either additive or multiplicative. Once this is specified, it will automatically be displayed in the "Det Factor Type" fields for all parameters in all 5 test engine worksheets. The "Test Engine #2" through "Test Engine #5" worksheets have fields where running changes can be entered for NOx (cell R16) and PM (cell V16). These fields become available for use when the value for "Running Change?" (cell R15 for NOx and cell V15 for PM) is set to "Y".

The fields that are included in all 5 test engine worksheets are:

- NOx Standard or FEL (required);
- NOx Units (required);
- NOx Deterioration Factor (required);
- NOx Deterioration Factor Type (populated based on Deterioration Factor Type entry in "Test Engine #1" worksheet);
- NOx Green Engine Factor (only fill in if applicable);
- PM Standard or FEL (required);
- PM Units (required);
- PM Deterioration Factor (required);
- PM Deterioration Factor Type (populated based on Deterioration Factor Type entry in "Test Engine #1" worksheet); and
- PM Green Engine Factor (only fill in if applicable).
- CO Standard or FEL (required);
- CO Units (required);
- CO Deterioration Factor (required);
- CO Deterioration Factor Type (populated based on Deterioration Factor Type entry in "Test Engine #1" worksheet);
- CO Green Engine Factor (only fill in if applicable);
- HC Standard or FEL (required);
- HC Units (required);
- HC Deterioration Factor (required);
- HC Deterioration Factor Type (populated based on Deterioration Factor Type entry in "Test Engine #1" worksheet); and
- HC Green Engine Factor (only fill in if applicable on the individual test engine worksheets).

The Standards/FELs, Units, and Deterioration Factors should only be entered in the worksheet labeled "Test Engine #1"; once this is done the values will automatically populate the corresponding cells in the "Test Engine #2" through "Test Engine #5" worksheets. If a running change for NOx or PM is specified on a given test engine worksheet, then this value will be used in the compliance calculations for that engine and for all subsequent engines. In addition, the subsequent test engine worksheets will display the running change in the appropriate "Standard/FEL" cell. Please note that if a running change has been mistakenly entered and the user does not wish for it to be used in the template, it is not enough to set the value of "Running Change?" to "N"; the actual numeric value must be deleted.

The actual test results should be entered starting in row 21 with specific engine tests entered in the order in which they occur. The worksheet allows multiple test results ("initial results") to be entered for an individual engine. The "Final Result" cells are only populated for a given row when "Y" is selected in the "Calc Final Result?" field. For example, if an individual engine has been subjected to three separate tests, the initial results for each parameter would be entered on three consecutive rows, with "Y" indicated in the corresponding "Calc Final Result?" field on the third row. In cases where an engine only has a single test result, the parameter-specific data would be entered in the initial result fields and "Y" would be entered in the "Calc Final Result?" field on that same row.

If an engine fails a test, follow-up tests should be performed on two additional engines and the results from these tests should be entered within the same worksheet, on consecutive rows directly following the results associated with the failed engine. Once again, it is possible to enter multiple initial results for each engine, as previously described. For both the initial engine and any follow-up engines it is very important that test data be entered starting on the first row and that rows should not be skipped as results are entered.

The following data fields are available for each engine test:

- Calc Final Result (required);
- Test Number (required this should be numeric and sequential);

- Test Date (required);
- Test Time (required);
- Test Quarter (required);
- Engine ID (required);
- Engine Make:
- Test Engine Configuration (required);
- · Build Date (required);
- Green Engine Factor Applied? (required);
- Green Engine Factor Determination Method? (enter if "Green Engine Factor Applied" is "Y");
- Service Hours or Miles Accumulation (required; enter N/A if Green Engine Factor is used);
- Service Hours Location (required; enter N/A if Green Engine Factor is used);
- Service Accumulation Procedure (required; enter N/A if Green Engine Factor is used);
- NOx Initial Result (required);
- Rounded NOx Initial Result (automatic calculation);
- NOx Final Result (automatic calculation; averages rounded initial results and then rounds);
- NOx Final Deteriorated Result (automatic calculation; applies NOx Deterioration Factor to NOx final result and then rounds);
- PM Initial Result (required);
- Rounded PM Initial Result (automatic calculation);
- PM Final Result (automatic calculation; averages rounded initial results, and then rounds);
- PM Final Deteriorated Result (automatic calculation; applies PM Deterioration Factor to PM final result and then rounds);
- CO Initial Result (required);
- Rounded CO Initial Result (automatic calculation);
- CO Final Result (automatic calculation; averages rounded initial results, and then rounds);
- CO Final Deteriorated Result (automatic calculation; applies CO Deterioration Factor to CO final result and then rounds);
- HC Initial Result (required);
- Rounded HC Initial Result (automatic calculation);
- HC Final Result (automatic calculation; averages rounded initial results, and then rounds);
- HC Final Deteriorated Result (automatic calculation; applies HC Deterioration Factor to HC final result and then rounds);
- Reason for Failed Test;
- Remedy;
- · Repairs; and
- Test Comments.

The parameter specific final results within each Test Engine worksheet will be displayed above the corresponding final result column. Once all the tests for a worksheet have been entered, "Y" should be selected for the "Engine Testing Completed Cell" (cell N11). Entering data for all the required fields described above will ensure that the calculated values are included in the final compliance calculations (see Section IV).

Note that the five Test Engine worksheets should only include valid test results. If there are any invalid test results, these should be entered in the "Invalid Tests" worksheet. Any additional notes or information relevant to the PLT information for the engine family should be included in the "Notes" worksheet.

IV. Compliance Summary

The lower portion of the "Summary" worksheet (below the general information entered previously, as described in Section II) includes the summary compliance information for the engine family's PLT tests as entered in the Test Engine worksheets. This section provides a determination of the current status of the PLT results for the entire engine family. The test results will indicate one of the following three status options: FAIL, PASS, or OPEN. This status will be indicated both for each Test Engine as well as for the entire engine family below the engine-specific results.

• FAIL: The engine-specific PLT test as indicated in each Test Engine worksheet will be in a failing status if the Average NOx Final Result, the Average PM Final Result, the Average CO Final Result, or the Average HC Final Result exceeds the Standard or FEL to which the engine family is certified. This final result used in the "Summary" worksheet includes an average of each final test result within the Test Engine worksheet (including as a single result, the

average of any failed initial test and the two required follow-up tests). The overall PLT results for the entire engine family will be in a failing status if any one of the Test Engine results shows a failed status for NOx or PM.

- PASS: The engine-specific PLT test as indicated in each Test Engine worksheet will be in a passing status if the Average NOx Final Result, the Average PM Final Result, the Average CO Final Result, or the Average HC Final Result is at or below the Standard or FEL to which the engine family is certified. This final result used in the "Summary" worksheet includes an average of each final test result within the Test Engine worksheet (including as a single result, the average of any failed initial test and the two required follow-up tests). The overall PLT results for the entire engine family will be in a passing status if all of the Test Engine results show a passing status for NOx and PM.
- OPEN: The PLT test will remain in an open status if it has not yet reached a fail or pass status. This would apply in cases where there is insufficient data or information to determine whether the engine family is in compliance with the standard or FEL (based on the PLT results). For example, if the sample size requirement has not been met, the test will remain in an open status.

V. Troubleshooting

If odd or unexpected results are displayed in the "Summary" worksheet, the following items can be checked:

- Has a projected production volume been specified on the "Summary" worksheet?
- Is "Y" indicated for the "Engine Testing Completed?" field for each completed "Test Engine" tab?
- Are all engine tests entered sequentially without skipping rows?
- Has the "Calc Final Result" cell been set to "Y" for rows in which a final result is to be calculated?
- Are there any data that have been inadvertently omitted within any of the required data fields? The PLT results will not be displayed unless there is an entry in all required fields.

Paperwork Reduction Act Notice

The public reporting and recordkeeping burden for this collection of information is estimated to average 17 hours per response for manufacturers and 8 hours per response for remanufacturers. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed Form 5900-135 to this address.

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