

## ATDS Emission Lab Test Report

for Exhaust Emission Test Procedures according

Date:

2022-04-27

Start Time: 10:45:15

Test Number:

Test Vehicle:

EPA1066

Test Legislation: Test Cycle:

HWFET+HWFET

Test Purpose: Test Cell: Order Number: Certification iGEM-V-TC1

Remark:

TEST 1 AS RECEIVED

QUALITY ASSURANCE	
INSPECTED BY:	_
DATE: 2022-04-28	
COMMENTS: OK	

## **General Data**

Test Name				
Test Name	Test Number	ONT3_003225		
Test Type	Test Name			
Test Type	Test Cell	<del></del>		
Legislation   EPA1066   Requirements (Modal)   CERTIFICATION   CORTIFICATION   CORTIFICATION	· · · · · · · · · · · · · · · · · · ·			
Requirements (Bag)	- ·	<del>-</del>		
Requirements (Modal)   CERTIFICATION   Date   2012-04-27   CH4 Response Factor   1.186		•		
Date         2022-04-27         CH₄ Response Factor         1.186           Test Start         10:45:15         Odometer Position mill         118799           Start Time Cycle         2022-04-27 11 13-05-(000)         Delay Time Method           Test End         11:44:10         Delay Time Method           Driver         REDACTED         Air Condition         OFF           Driver         REDACTED         Particle Measurement         USUAL           Shiftable         Auto         Particle Measurement         USUAL           Flow Stream         ModalDirty         Stream         Wolder         Very Calibrated Ranges         Autorange           Remark         7EST 1 AS RECEIVED         Tengine Family         FCRXT03.05PV-1054           Wehicle Data         3182 FCRXT03.05PV-1054         Engine Family         FCRXT03.05PV           Vehicle Model         REDACTED         Engine Family         FCRXT03.05PV           Order Number         3182 FCRXT03.05PV-1054         Engine Family         FCRXT03.05PV           Order Number         3182 FCRXT03.05PV-1054         Transmission         Automatic           Evaporative Family         3182 FCRXT03.05PV-1054         Engine Code         Code           Dyno Type         SVOR         Inertia [III]				
Test Start			CH, Response Factor	1 186
Start Time Cycle   2022-04-27 11   13-05-(000)   Delay Time Method   11-44-10   Operator   REDACTED   REDACTED   Particle Measurement   USUAL	Test Start			
Test End   11:44:10   REDACTED   REDACTED   Particle Measurement   USUAL				118/99
Operator   REDACTED   Air Condition   OFF	•	, , ,	Delay Time Method	
Driver Shiftable         REDACTED Auto         Particle Measurement         USUAL           Flow Stream Calibrated Ranges Remark         Moda/Dirty         Judorange         Judorange           Remark         7EST 1 AS RECEIVED         Displacement         3.0L           Wehicle Data         3182_FCRXT03.05PV-1054         Forextota.05PV-1054           Manufacturer Vehicle Model Order Namber         REDACTED Repair Programmity Forextota.05PV-1054         Engine Family Forextota.05PV Programmity Forextota.05PV Programmity Forextota.05PV-1054           Test Group Test Group Evaporative Family         3182_FCRXT03.05PV-1054         Transmission Regime Code           Dyno Data         3182         Forextota.05PV-1054         Transmission Regime Code           Dyno Type         SVOR Inertia (Ib) Regime Code         6000.00         C (Ibitrimpha]           Street Load         50.570         0.04400         0.038470         0.038470           Road Load         12.400         0.21500         0.034900           Fuel Type         DIESEL         Fuel Temperature (IC) Puel Puel Puel Puel Puel Puel Puel Puel			A in Commediation	~ ~ ~
Shiftable   Auto   ModalDirty   autorange   Remark   TEST 1 AS RECEIVED				
Property   Property			Particle Measurement	USUAL
Calibrated Ranges Remark   TEST 1 AS RECEIVED				
Remark   TEST 1 AS RECEIVED		•		
Vehicle Data         3182_FCRXT03.05PV-1054           Manufacturer Vehicle Model Order Number Order Number 3192 Stage Family Page Family Pa		•		
Manufacturer   Vehicle Model   REDACTED   Engine Family   FCRXT03.05PV   Manufacturer   Ram   Test Group   3182   Transmission   Engine Code   Transmission   Automatic   Engine Code   Transmission   Engine Code   Engine Code   Transmission   Engine Code   Engine	Remark	TEST 1 AS RECEIVED		
Vehicle Model Order Number   3182	Vehicle Data	3182_FCRXT03.05PV-10	054	
Vehicle Model Order Number   3182				
Vehicle Model Order Number         REDACTED 3182         Engine Family Manufacturer         FCRXT03.05PV Ram           Test Group Evaporative Family         3182_FCRXT03.05PV-1054         Transmission Engine Code         Automatic           Dyno Data         3182         Transmission Engine Code         6000.00           Dyno Type         SVOR A [lbf]         Inertia [lb]         6000.00           B [lbf/mph]         C [lbf/mph2]           Street Load         50.570         0.04400         0.038470           Road Load         12.400         0.21500         0.034900           Fuel Data         Diesel-FL0821BE10         Fuel Temperature [¹°]         15.00           Fuel Analyze Date         Fuel Density [ksgf]         0.8550           Fuel Manufacturer         Net Heat. Val. [8TU/lb]         18295           Fuel Tank Number         Carb. Weight Frac.         0.8650           Fuel Charge         HC Ratio         1.8742           Remarks:         OC Ratio         -1.0000           Weather Limit Data           Temp Min [deg F]         68.00         Dew Point Max [deg F]         100.00           Temp Max [deg F]         86.00         Pressure Min [mbar]         800.0           Dew Point Min [ldeg F] <td>Manufacturer</td> <td>1500</td> <td>Displacement</td> <td>3.<i>0L</i>.</td>	Manufacturer	1500	Displacement	3. <i>0L</i> .
Order Number         3182	Vehicle Model	REDACTED		
Evaporative Family   Engine Code	Order Number	3182	Manufacturer	
Dyno Data   3182	· ·	3182_FCRXT03.05PV-1054	Transmission	Automatic
Dyno Type	Evaporative Family		Engine Code	
Street Load   50.570   0.04400   0.038470   0.034900	Dyno Data	3182		
Street Load   50.570   0.04400   0.038470   0.034900	Dyno Type	SVOR	Inertia <sup>[lb]</sup>	6000.00
Street Load         50.570         0.04400         0.038470           Road Load         12.400         0.21500         0.034900           Fuel Data           Fuel Type         DIESEL         Fuel Temperature [*C]         15.00           Fuel Analyze Date         Fuel Density [kg/l]         0.8550           Fuel Manufacturer         Net Heat. Val. [BTU/lb]         18295           Fuel Tank Number         Carb. Weight Frac.         0.8650           Fuel Charge         HC Ratio         1.8742           Remarks:         OC Ratio         -1.0000           Weather Limit Data           Temp Max [deg F]         68.00         Dew Point Max [deg F]         100.00           Temp Max [deg F]         86.00         Pressure Min [mbar]         800.0           Dew Point Min [deg F]         15.01         Pressure Max [mbar]         1100.0           Fan Speed Data         RoadSpeed           F1 [%]         F2 [%/mph]         F3 [%/mph2]	, ,,			
Road Load   12.400   0.21500   0.034900	Street Load		<del></del>	•
Fuel Type         DIESEL         Fuel Temperature [°C]         15.00           Fuel Analyze Date         Fuel Density [kg/l]         0.8550           Fuel Manufacturer         Net Heat. Val. [BTU/lb]         18295           Fuel Tank Number         Carb. Weight Frac.         0.8650           Fuel Charge         HC Ratio         1.8742           Remarks:         OC Ratio         -1.0000           Weather Limit Data           Temp Min [deg F]         68.00         Dew Point Max [deg F]         100.00           Temp Max [deg F]         86.00         Pressure Min [mbar]         800.0           Dew Point Min [deg F]         15.01         Pressure Max [mbar]         1100.0           Fan Speed Data         RoadSpeed				
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Fuel Tank Number         Carb. Weight Frac.         0.8650           Fuel Charge         HC Ratio         1.8742           Remarks:         OC Ratio         -1.0000           Weather Limit Data           Temp Min [deg F]         68.00         Dew Point Max [deg F]         100.00           Temp Max [deg F]         86.00         Pressure Min [mbar]         800.0           Dew Point Min [deg F]         15.01         Pressure Max [mbar]         1100.0           Fan Speed Data         RoadSpeed           F1 [%]         F2 [%/mph]         F3 [%/mph2]				
Fuel Charge Remarks:         HC Ratio         1.8742 -1.0000           Weather Limit Data           Temp Min [deg F]         68.00         Dew Point Max [deg F]         100.00           Temp Max [deg F]         86.00         Pressure Min [mbar]         800.0           Dew Point Min [deg F]         15.01         Pressure Max [mbar]         1100.0           Fan Speed Data         RoadSpeed           F1 [%]         F2 [%/mph]         F3 [%/mph2]				
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Weather Limit Data           Temp Min [deg F]         68.00         Dew Point Max [deg F]         100.00           Temp Max [deg F]         86.00         Pressure Min [mbar]         800.0           Dew Point Min [deg F]         15.01         Pressure Max [mbar]         1100.0           Fan Speed Data         RoadSpeed           F1 [%]         F2 [%/mph]         F3 [%/mph2]	· · · · · · · · · · · · · · · · · · ·			
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Temp Max [deg F]         86.00         Pressure Min [mbar]         800.0           Dew Point Min [deg F]         15.01         Pressure Max [mbar]         1100.0           Fan Speed Data         RoadSpeed           F1 [%]         F2 [%/mph]         F3 [%/mph2]	weather Limit Data			
Temp Max [deg F]         86.00         Pressure Min [mbar]         800.0           Dew Point Min [deg F]         15.01         Pressure Max [mbar]         1100.0           Fan Speed Data         RoadSpeed           F1 [%]         F2 [%/mph]         F3 [%/mph2]	Temp Min [deg F]	68.00	Dew Point Max [deg F]	100 00
Dew Point Min [deg F]         15.01         Pressure Max [mbar]         1100.0           Fan Speed Data         RoadSpeed           F1 [%]         F2 [%/mph]         F3 [%/mph2]				
Fan Speed Data         RoadSpeed           F1 [%]         F2 [%/mph]         F3 [%/mph2]		UU. VU	LICOSUIC IMILL	000.0
F1 <sup>[%]</sup> F2 <sup>[%/mph]</sup> F3 <sup>[%/mph2]</sup>			Procesure May [mbar]	4400.0
10	Dew Point Min [deg F]	15.01	Pressure Max <sup>[mbar]</sup>	1100.0
	Dew Point Min [deg F]	15.01	Pressure Max <sup>[mbar]</sup>	1100.0
	Dew Point Min [deg F]  Fan Speed Data	15.01 RoadSpeed		1100.0

Test Data Test Number	HWFET_H ONT3_000			Operator Driver	REDAC REDA	TED		Speed Ta Shift Tabl		Date: Cold Start	2022-04-27
Vehicle	RED	ACTED		Dyno				Fuel		Test 7	iming
Vehicle # Model	RED	ACTED		Inertia <sup>(b)</sup> A <sup>(b)</sup> B <sup>(b)(mph)</sup>	6000.00 12.400 0,21500			Diesel-F Fuel type Density	L0821BE10 DIESEL 0.8550	Start Time End Time	10:45:15 11:44:10
Year Displacement:	2015				0.034900			NHV CWF	18295 <i>0.8650</i>	Soak Time	
Engine Family Trans Odometer <sup>fmiej</sup>	FCRXT03.0 Automatic 118799	5PV		Flow Stream Remark	ModalDirty TEST 1 AS	y RECEIVED					
Bag Analysis PHASE 1	THC <sup>[ppmC]</sup>	e e linom)	1941	(opp)	(npm)	(nnm)"	/noml				
Range Zero Read Span Read Sample Mass. Mass per Dist.  PSS Massflow Particles [g/h]	100 0.00 93.11 -1.32 0.000 0.0000	CO <sup>[ppm]</sup> 500 0.0 464.90 0.24 0.038 0.0037	CO <sub>2</sub> <sup>[%]</sup> 4 0.0 3.717 1.155 2836.135 276.173  PSS Mas	NO <sub>x</sub> <sup>[ppm]</sup> 30 0.0 28.290 0.017 0.004 0.0004 s per Dist. [g	N2O <sup>[ppm]</sup>	CH <sub>4</sub> <sup>(spm)</sup> 30 0.0 27.650 0.211 0.019 0.0018	-1.575 0.000 0.0000		Temp, <sup>(rf)</sup> Press, <sup>(nhs)</sup> RH <sup>(rk)</sup> AH <sup>(grk)</sup> Dist, <sup>(mi)</sup> NO <sub>X</sub> Corr. Dr. Viola. Crank <sup>[s]</sup>	81.98 28.96 30.08 7.195 10.27 0.8963 0	Volume <sup>(ex)</sup> 4708 D.F. 11.17 Ph. Start <sup>[s]</sup> 779.3 Ph. End <sup>[s]</sup> 1544.2 Ph. Length <sup>[s]</sup> 784.0 Bag An. Dei 631 Vio. Durat. <sup>[s]</sup> 0.0 FE [ <sup>mido(gail</sup> ] 36.8
Total Result	THC <sup>[g/mile]</sup>	CO[g/mile]	CO2 <sup>[g/mile</sup>	NOX <sup>[g/m:te]</sup>	N2O <sup>(g/mile)</sup>	CUA[g/mile	NMHC <sup>[g/mile]</sup>		HC+NO <sub>x</sub> [i	/mile)	Fuel Economy
Mass per Dist. Mass per Dist. (rounded)	0.0000 0.0000	0.0037 0.0037	276.17 276.2	0.0004 0.0004	1420"	0.0018 0.0018	0.0000 0.0000		0.0004 0.0004	-	mile/gal 36.85 Dist. <sup>[mi]</sup> 10.27

Test Data: HWFET\_HWFET Operator: REDACTED Date: 2022-04-27 Test Number: ONT3\_003225 **REDACTED** Driver: **Driver Violations** <u>P1</u> <u>11</u> Phase1 Number of Violations 0 0 0 Duration of Violations (s) 0.0 0.0 0.0 Violation Violation Violation Scheduled Max Speed Number Phase Begin End Duration Deviation Speed (s) (s) (s) (mph) (mph) No Violations In This Test

0.0

Phase 1 Analyzer Adjust

	Range Number	Range	Zero Value	Zero Set Value	Zero Offset	Span Value	Span Set Value	Span Offset	ReZero Value
		ppm	ppm	ppm	%	ppm	ppm	%	ppm
CO <sub>2</sub> (%)	2	4	0.00	0.00	0.00	3.72	3.72	0.00	0.00
CO	1	500	0.00	0.00	0.00	464.90	464.90	0.00	0.01
NO <sub>x</sub>	1	30	-0.01	0.00	-0.02	28.29	28.30	-0.03	0.01
THC (ppmC1)	2	30	-0.08	0.00	-0.25	28.00	28.02	-0.07	0.00
CH₄	1	30	0.00	0.00	0.00	27.65	27.65	0.00	0.00
Analyzer Cl	nec <u>k</u> Range Number	Range	Zero Value	Zero Set Value	Zero Drift	Span Value	Span Set Value	Span Drift	
		ppm	ppm	ppm	%	ppm	ppm	%	
CO <sub>2</sub> (%)	2	4	0.00	0.00	-0.01	3.72	3.72	-0.03	
co	1	500	0.02	0.00	0.00	464.72	464.90	-0.04	
NO <sub>x</sub>	1	30	0.00	0.00	-0.03	28.22	28.30	-0.23	
	_	30	0.00	0.00	0.25	27.85	28.02	-0.49	
THC (ppmC1)	2	30	0.00	0.00	0.20	21.00	20.02	-U. <del>-r</del> 3	

Operator

**REDACTED** 

Driver

**REDACTED** 

Customer:

3182

Test Purpose: Conditioning:

Certification

Legislation:

EPA1066

Requirements (Bag) CERTIFICATION

Test Intent:

Emission Standards Default

VIN

TEST 1 AS RECEIVED

**REDACTED** 

DYNO	Data

Road Load

Street Load

Inertia [lb]

6000.00 55.158

A [N] B [N/km/h]

0.59426

224.947

0.12162

C [N/km2/h2]

0.059940

0.066071

Distance (m)	Phase1	Phase2	Phase3	Phase4	Weighted
Target Driven	16506.54 16523.58				16506.54 16523.58
Distance Rating (%)	0.1032				0.1032
Cycle Energy (MJ)	40.00				
Target Driven	12.37 12.25				12.37 12.25
Distance per Energy Cycle (m/MJ)					
Target	12.37				1333.93
Driven	12.25				1348.52
Road Load Work Fraction					
Target	0.7412				0.7412
Driven	0.7540				0.7540
Inertial Work (MJ)					
Target	3.20				3.20
Driven	3.01				3.01
Inertial Work Fraction					
Target	0.2588				0.2588
Driven	0.2460				0.2460
Inertial Work Rating (%)	-5.8478				-5.8478
Absolute Speed Change (m/s)					
Target	130.69				130.69
Driven	124.27				124.27
Absolute Speed Change Rating (%)	-4.9119				-4.9119
Energy Rating (%)	-0.9799				-0.9799
Energy Economy Rating (%)	-1.0938				-1.0938

Operator

REDACTED

Driver

REDACTED

Customer:

Requirements (Bag)

3182 CERTIFICATION

Test Purpose: Certification Conditioning:

Legislatioi EPA1066 Emission Default

Overall Status

Passed

Phase 1

Test Record #: ONT3\_003225

Vehicle ID:

**REDACTED** 

		Average	Min	Max	Low Limit	Upper Limit	Status
General			331171		LOVY LIMIT	Opper Linin	Status
Cell Temperature	(°C)	27.76	26.70	28.50	20.00	30.00	Passed
Barometer	(mbar)	980.60	980.50	980.60	800.00	1100.00	Passed
Dew Point Temperature	(°C)	8.65	8.20	8.90	-9,44	37.78	Passed
Specific Humidity Test Cell	(gr/lb)	50.36	48.75	51.18	38.50	87.50	Passed
Dilution Air Temperature	(°C)	36.36	36.05	36.55	15.00	52.00	Passed
Weighted Test Dilution Factor	(-)	11,17			7.00	20.00	Passed
Dilution Factor	(-)	11.17			7.00	20.00	Passed
Fuel Economy	(mpg)	36.85			10.00	50.00	Passed
Zero Offset	(%)	-	-0.25	0.00	-2.00	2.00	Passed
Span Offset	(%)	-	-0.07	0.00	-2.00	2.00	Passed
Zero Check Drift	(%)	-	-0.03	0.25	-2.00	2.00	Passed
Span Check Drift	, ,	•	-0.49	-0.03	-2.00	2.00	Passed
Bag vs. Modal Validation (CO2)	(%)	n.a.	-	**	-10.00	10.00	Passed
<b>Ambient Concentrations</b>							
HC	(ppm)	6.86			2.00	10.00	Passed
$NO_x$	(ppm)	0.07			-0.10	10.00	Passed
CO	(ppm)	0.64			0.00	15.00	Passed
CO <sub>2</sub>	(ppm)	495.31			300.00	650.00	Passed
CH₄	(ppm)	2.20			1,30	10.00	Passed
N2O	(ppm)	2.20			0.20		rasseu
	(ppiii)				0.20	0.50	
PM Filter Parameters							
Particulate Filter Temperature	(°C)	50.05	46.55	51.95	42.00	60.00	Passed
Filter Face Velocity	(cm/s)	90.08			0.00	100.00	Passed
Particulate Result Validation	(ug)	2.50			1.00	600.00	Passed
Test-Cycle Specific Validations							
Phase Distance	(miles)	10.27			10.05	10.46	Passed
Sample Phase Time	(s)	764.0			762.9	766.9	Passed
Duration Phase 1	(s)	764.90					NA
Crank Time Phase1	(s)	0.00			0	5	Passed
Crank Time Phase3	(s)				0	5	
Crank Counts		0			0	1	Passed
Shutdown Time Phase 1					0	5	
Shutdown Time Phase 3					0	5	
Hot Soak Time	(s)				540.00	660.00	
Test Hold Counts		0					Passed
Duration Test Hold	(s)	0.00			0	60	Passed