



ATDS Emission Lab Test Report

for Exhaust Emission Test Procedures according

Date:	2022-04-27	Start Time:	11:47:40
Test Number:	ONT3_003226	End Time:	12:41:28
Test Vehicle:	3182_FCRXT03.05PV-1054		
Test Legislation:	EPA1066		
Test Cycle:	US06+US06		
Test Purpose:	Certification		
Test Cell:	IGEM-V-TC1		
Order Number:	3182		
Remark:	TEST 1 AS RECEIVED		

QA QUALITY ASSURANCE
REDACTED

INSPECTED BY: _____

DATE: 2022-04-28

COMMENTS: OK

General Data

Test Number	ONT3_003226		
Test Name	US06_US06		
Test Cell	iGEM-V-TC1		
Test Type	US06_US06		
Legislation	EPA1066		
Requirements (Bag)	CERTIFICATION		
Requirements (Modal)	CERTIFICATION		
Date	2022-04-27	CH ₄ Response Factor	1.186
Test Start	11:47:40	Odometer Position ^[mi]	118820
Start Time Cycle	2022-04-27 12 13-17-(000)	Delay Time Method	
Test End	12:41:28		
Operator	REDACTED	Air Condition	OFF
Driver	REDACTED	Particle Measurement	USUAL
Shifttable	Auto		
Flow Stream	ModalDirty		
Calibrated Ranges	autorange		
Remark	TEST 1 AS RECEIVED		

Vehicle Data **3182_FCRXT03.05PV-1054**

Manufacturer	1500	Displacement	3.0L
Vehicle Model	REDACTED	Engine Family	FCRXT03.05PV
Order Number	3182	Manufacturer	Ram
Test Group	3182_FCRXT03.05PV-1054	Transmission	Automatic
Evaporative Family		Engine Code	

Dyno Data **3182**

Dyno Type	SVOR	Inertia ^[lb]	6000.00
	A ^[lb]	B ^[lb/mph]	C ^[lb/mph²]
Street Load	50.570	0.04400	0.038470
Road Load	12.400	0.21500	0.034900

Fuel Data **Diesel-FL0821BE10**

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**

F1 [%]	F2 [%/mph]	F3 [%/mph ²]
5	0.745999992	0.0031

Test Data US06_US06 Operator **REDACTED** Speed Table Date: 2022-04-27
Test Number ONT3_003226 Driver Shift Table Auto Cold Start

Vehicle	REDACTED	Dyno	Fuel	Test Timing
Vehicle #	REDACTED	Inertia [lb]	Diesel-FL0821BE10	Start Time 11:47:40
Model	1500	A [lb]	Fuel type DIESEL	End Time 12:41:28
Year	2015	B [lb/imp]	Density 0.8550	
Displacement:		C [lb/imp ²]	NHV 18295	Soak Time
Engine Family	FCRXT03.05PV		CWF 0.8650	
Trans	Automatic	Flow Stream	Modal/Dirty	
Odometer [mile]	118820	Remark	TEST 1 AS RECEIVED	

Bag Analysis

PHASE 1	THC [ppmC]	CO [ppm]	CO ₂ [%]	NO _x [ppm]	N ₂ O [ppm]	CH ₄ [ppm]	NMHC [ppm]	Temp. [°F]	Volume [scf]
Range	100	500	4	30		30		82.55	7941
Zero Read	0.01	0.0	0.0	0.0		0.0		28.94	14.50
Span Read	93.12	464.90	3.716	28.310		27.650		29.54	690.4
Sample	-1.43	0.19	0.876	2.209		0.094	-1.541	7.200	1286.9
Mass.	0.000	0.051	3616.778	0.854		0.014	0.000	8.01	595.8
Mass per Dist.	0.0000	0.0063	451.703	0.1067		0.0018	0.0000	0.8965	630
PSS Massflow Particles [g/h]	0.0237							0	0.0
			PSS Mass per Dist. [g/mile]					0.00	22.5

Total Result

actual	THC [g/mile]	CO [g/mile]	CO ₂ [g/mile]	NO _x [g/mile]	N ₂ O [g/mile]	CH ₄ [g/mile]	NMHC [g/mile]	HC+NO _x [g/mile]	Fuel Economy
Mass per Dist.	0.0000	0.0063	451.70	0.1067		0.0018	0.0000	0.1067	22.53
Mass per Dist. (rounded)	0.0000	0.0063	451.7	0.1067		0.0018	0.0000	0.1067	8.01
Mass per Dist. - Particulate PSS	0.0005								

CVS Data	Cycle data		Environmental Data		
Dilution Factor (Bag)	14.50	Vio. Dur. ^[s]	0.0	Rel. Hum. ^[%]	29.54
Dilution Factor (Modal)	14.19	Number	0	Ab. Hum. ^[g/abs]	7.20
CVS Volume ^[scf]	7940.53	Act. Dist. ^[mi]	8.07	Pressure ^[inHg]	28.94
CVS Flow ^[scfm]	799.65			Temp. ^[°F]	82.55
CVS Inlet Pressure	28.49			Temp. Min. ^[°F]	77.36
CVS Inlet Temp. ^[°F]	120.94			Temp. Max. ^[°F]	86.00
CVS Inlet Temp. Min. ^[°F]	103.55			NO _x Corr. F	0.8965
CVS Inlet Temp. Max. ^[°F]	138.83				

Particulate

Gravimetric Particulate Results	Filter Set Name		
Primary Filter Particle Mass ^[ug]	9.40	PSS Gas Temp [°F]	120.94
Secondary Filter Particle Mass ^[ug]	0.00	Avg PSS Filter Temp [°F]	122.39
Massflow Particles [g/h]	0.0237	Avg Tunnel Temp [°F]	122.39
Mass per Dist. [g/mile]	0.0005	Max Tunnel Temp [°F]	124.97
Particulate Sampling Time [s]	595.80	Filter Face Velocity (Avg) [cm/s]	90.87
Tunnel Probe Volume [scf 68degF]	0.54	Filter Face Velocity (Max) [cm/s]	92.83
Total PSS Volume [scf 68degF]	225.58		

Particulate Count Results

Particle Number [p]
Number per Dist. [p/mile]

Bag

Concentrations	THC ^[ppmC]	CO ^[ppm]	CO ₂ ^[%]	NO _x ^[ppm]	N ₂ O ^[ppm]	CH ₄ ^[ppm]	NMHC ^[ppm]
Range	100	500	4	30		30	
Sniff	0.000	0.599	0.923	2.265		0.912	
Zero Read	0.006	-0.021	0.000	0.001		0.000	
Zero Offset ^[%]	0.080	0.003	0.011	0.002		0.044	
Span Read	93.120	464.900	3.716	28.310		27.650	
Span Offset ^[%]	-0.161	-0.047	-0.067	-0.227		-0.133	
Sample	0.000	0.697	0.924	2.261		2.121	
Std. Dev.	0.000						
Ambient	6.513	0.542	0.051	0.057		2.177	
Std. Dev.	0.000						
Corrected	-1.429	0.193	0.876	2.209		0.094	-1.541
Mass	THC^[g]	CO^[g]	CO₂^[g]	NO_x^[g]	N₂O^[g]	CH₄^[g]	NMHC^[g]
Uncorrected	0.0000	0.0507	3616.778	0.8542		0.0142	0.0000
Corrected	0.0000	0.0507	3616.778	0.8542		0.0142	0.0000
Mass per distance	THC^[g/mile]	CO^[g/mile]	CO₂^[g/mile]	NO_x^[g/mile]	N₂O^[g/mile]	CH₄^[g/mile]	NMHC^[g/mile]
Corrected for Lost Sample Mass	0.0000	0.0063	451.703	0.1067		0.0018	0.0000
Fuel Consumption							
Fuel Consumption ^[g]	1150.376	Fuel Consumption ^[l/100km]		10.441			
Fuel Consumption ^[l]	1.345	Fuel Economy ^[mile/gal]		22.527			

Diluted Modal

Concentrations	THC ^[ppmC]	CO ^[ppm]	CO ₂ ^[%]	NO _x ^[ppm]	N ₂ O ^[ppm]	CH ₄ ^[ppm]
Sample	-	0.718	0.944	2.300		2.083
Ambient (bag)	6.513	0.542	0.051	0.057		2.177
Corrected	-1.429	0.215	0.897	2.248		0.060
Mass	THC^[g]	CO^[g]	CO₂^[g]	NO_x^[g]	N₂O^[g]	CH₄^[g]
Uncorrected	0.000	0.056	3700.742	0.869		0.009
Corrected	0.000	0.056	3700.742	0.869		0.009
Mass per distance	THC^[g/mile]	CO^[g/mile]	CO₂^[g/mile]	NO_x^[g/mile]	N₂O^[g/mile]	CH₄^[g/mile]
Corrected	0.000	0.007	462.189	0.108		
Fuel Consumption						
Fuel Consumption ^[g]	1150.376	Fuel Consumption ^[l/100km]		10.684		
Fuel Consumption ^[l]	1.345	Fuel Economy ^[mile/gal]		22.016		

Correlation for Mass per distance

	THC ^[%]	CO ^[%]	CO ₂ ^[%]	NO _x ^[%]	N ₂ O ^[%]	CH ₄ ^[%]
Bag to Diluted	#DIV/0!	-10.16	-2.27	-1.67	#DIV/0!	#DIV/0!

Test Data: US06_US06
Test Number: ONT3_003226

Operator: REDACTED
Driver: REDACTED

Date: 2022-04-27

Driver Violations

	<u>P1</u>	<u>I1</u>	<u>Phase1</u>
Number of Violations	0	0	0
Duration of Violations	(s) 0.0	0.0	0.0

Number	Phase	Violation Begin (s)	Violation End (s)	Violation Duration (s)	Scheduled Speed (mph)	Max Speed Deviation (mph)
No Violations In This Test				0.0		

Phase 1

Analyzer Adjust

	Range Number	Range ppm	Zero Value ppm	Zero Set Value ppm	Zero Offset %	Span Value ppm	Span Set Value ppm	Span Offset %	ReZero Value ppm
CO ₂ (%)	2	4	0.00	0.00	0.00	3.72	3.72	-0.03	0.00
CO	1	500	-0.02	0.00	0.00	464.90	464.90	0.00	0.03
NO _x	1	30	0.00	0.00	0.00	28.31	28.30	0.03	0.00
THC (ppmC1)	2	30	-0.08	0.00	-0.25	28.00	28.02	-0.07	0.00
CH ₄	1	30	0.00	0.00	0.00	27.65	27.65	0.00	0.14

Analyzer Check

	Range Number	Range ppm	Zero Value ppm	Zero Set Value ppm	Zero Drift %	Span Value ppm	Span Set Value ppm	Span Drift %
CO ₂ (%)	2	4	0.00	0.00	-0.01	3.71	3.72	-0.04
CO	1	500	0.01	0.00	0.00	464.66	464.90	-0.05
NO _x	1	30	0.00	0.00	0.00	28.23	28.30	-0.26
THC (ppmC1)	2	30	0.00	0.00	0.25	27.85	28.02	-0.51
CH ₄	1	30	0.01	0.00	-0.43	27.61	27.65	-0.13

Operator **REDACTED**

Driver **REDACTED**

Customer : 3182

Test Purpose: Certification

Legislation: EPA1066

Requirements (Bag) CERTIFICATION

Conditioning:

Emission Standards Default

Test Intent:

TEST 1 AS RECEIVED

VIN **REDACTED**

DYNO Data

	Road Load	Street Load
Inertia ^[lb]	6000.00	
A ^[N]	55.158	224.947
B ^[N/km/h]	0.59426	0.12162
C ^[N/km2/h2]	0.059940	0.066071

	Phase1	Phase2	Phase3	Phase4	Weighted
Distance (m)					
Target	12887.55				12887.55
Driven	12883.73				12883.73
Distance Rating (%)	-0.0296				-0.0296
Cycle Energy (MJ)					
Target	15.77				15.77
Driven	15.62				15.62
Distance per Energy Cycle (m/MJ)					
Target	15.77				817.21
Driven	15.62				824.83
Road Load Work Fraction					
Target	0.5441				0.5441
Driven	0.5678				0.5678
Inertial Work (MJ)					
Target	7.19				7.19
Driven	6.75				6.75
Inertial Work Fraction					
Target	0.4559				0.4559
Driven	0.4322				0.4322
Inertial Work Rating (%)	-6.0891				-6.0891
Absolute Speed Change (m/s)					
Target	360.03				360.03
Driven	349.01				349.01
Absolute Speed Change Rating (%)	-3.0598				-3.0598
Energy Rating (%)	-0.9535				-0.9535
Energy Economy Rating (%)	-0.9328				-0.9328

Operator **REDACTED** Driver **REDACTED** Customer : 3182
 Test Purpose: Certification Legislation: EPA1066 Requirements (Bag) CERTIFICATION
 Conditioning: Emission : Default

Overall Status **Passed**

Phase 1

Test Record #: ONT3_003226

Vehicle ID: **REDACTED**

	<u>Average</u>	<u>Min</u>	<u>Max</u>	<u>Low Limit</u>	<u>Upper Limit</u>	<u>Status</u>
General						
Cell Temperature (°C)	28.08	25.20	30.00	20.00	30.00	Passed
Barometer (mbar)	980.05	980.00	980.10	800.00	1100.00	Passed
Dew Point Temperature (°C)	8.61	7.90	9.10	-9.44	37.78	Passed
Specific Humidity Test Cell (gr/lb)	50.40	47.88	52.10	38.50	87.50	Passed
Dilution Air Temperature (°C)	36.07	35.65	36.35	15.00	52.00	Passed
Weighted Test Dilution Factor (-)	14.50			7.00	20.00	Passed
Dilution Factor (-)	14.50			7.00	20.00	Passed
Fuel Economy (mpg)	22.53			10.00	50.00	Passed
Zero Offset (%)	-	-0.25	0.00	-2.00	2.00	Passed
Span Offset (%)	-	-0.07	0.03	-2.00	2.00	Passed
Zero Check Drift (%)	-	-0.43	0.25	-2.00	2.00	Passed
Span Check Drift (%)	-	-0.51	-0.04	-2.00	2.00	Passed
Bag vs. Modal Validation (CO2) (%)	n.a.	-	-	-10.00	10.00	Passed
Ambient Concentrations						
HC (ppm)	6.51			2.00	10.00	Passed
NO _x (ppm)	0.06			-0.10	10.00	Passed
CO (ppm)	0.54			0.00	15.00	Passed
CO ₂ (ppm)	513.30			300.00	650.00	Passed
CH ₄ (ppm)	2.18			1.30	10.00	Passed
N2O (ppm)				0.20	0.50	Passed
PM Filter Parameters						
Particulate Filter Temperature (°C)	50.21	46.35	51.65	42.00	60.00	Passed
Filter Face Velocity (cm/s)	90.87			0.00	100.00	Passed
Particulate Result Validation (ug)	9.40			1.00	600.00	Passed
Test-Cycle Specific Validations						
Phase Distance (miles)	8.01			7.85	8.17	Passed
Sample Phase Time (s)	595.8			594.5	598.5	Passed
Duration Phase 1 (s)	596.50					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