SEMA Emission Lab Test Report

for Exhaust Emission Test Procedures according

Date:	1/14/2020	**Time:**	17:42:43
Test Legislation:	EPA		
Test Cycle:	HWFET+HWFET		
Test Purpose:	Certification		
Test Name:	HWFET_HWFET		
Test Cell:	iGEMV_TC1		
Remark:	HWFET Derive Baseline		

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Date: 4/14/20

Accept_____ Reject_____

Signature:

General Data

Test Number	*HWFET_HWFET_20200114_06_TC1*		
Test Name	*HWFET_HWFET*		
Test Cell	*iGEMV_TC1*		
Test Type	*HWFET_HWFET*		
Legislation	*EPA*		
Requirements (Bag)	*CERTIFICATION*		
Date	*1/14/2020*	CH_4 Response Factor	
Test Start	*17:42:43*	Odometer Start[mile]	*78695*
Start Time Cycle	*2020-01-14 18|04-36-(000)*	Delay Time Method	*Default*
Test End	*18:41:18*		
Operator	*Art Herrera*	Air Condition	*YES*
Driver	*Rene Acosta*	Particle Measurement	OFF
Shifttable	Auto		
Flow Stream	*Bag Only Diesel*		
Calibrated Ranges	*autorange*		
Remark :	*HWFET Derive Baseline*		

Vehicle Data

Test Group	*Derive F-250*	Transmission	*Automatic*
Manufacturer	*Ford*	Drive Axle Weight[lb]	*0*
Model	*F-250*	Tank Position	
Model Year	*2011*	Tank Material	*Plastic*
VIN	*1FT7W2BT9BEA15523*	Tank Volume[gal]	*26.00*
License Plate	*HJHU73*	Evaporative Family	*N/A*
Order Number		Canister Volume[l]	*0.00*
Engine Family	*BFMXD06.761A*	Canister Working Capacity[g]	*0*
Engine Trim Level	*trimEng*	Tire Manufacturer	*CONTINENTAL*
Engine Code	*codeEng*	Tire Model	*CONTITRAC TR*
Displacement [l]	*6.700*	Tire Size	*275/70/18*
Number of Cylinders	*6*	Tire Pressure [psi]	*65*

Dyno Data

Dyno Type	*SREV*	A [lbf]	*61.4690*
Inertia [lb]	*9500.00*	B [lbf/mph]	*0.14073*
Simulation Coefficient N	*2*	C [lbf/mph2]	*0.049012*

Fuel Data *2007 Certification Diesel HD0521GP10*

Fuel Type	*DIESEL*	Fuel Temperature [°C]	*15.56*
Fuel Analyze Date		Fuel Density [kg/l]	*0.8542*
Fuel Manufacturer		Net Heat. Val. [BTU/lb]	*18325*
Fuel Tank Number		Carb. Weight Frac.	*0.8670*
Fuel Charge		HC Ratio	*1.8282*
Remarks:	*2007 Certification Diesel HD0521GP10*	OC Ratio	*0.0000*

Weather Limit Data

Test Data	HWFET_HWFET	Operator	Art Herrera	Speed Table		Date:	
Test Number	HWFET_HWFET_20200114_06_1	Driver	Rene Acosta	Shift Table	Auto	Cold Start	

Vehicle		**Dyno**		**Fuel**		**Test Timing**	
VIN	*1FT7W2BT9BEA15523*	Inertia [lb]	*9500.00*	2007 Certification Diesel HD0521GP10		Start Time	*17:42:43*
		A [lbf]	*61.469*	Fuel type	DIESEL	End Time	*18:41:18*
Model	F-250	B [lbf/mph]	*0.14073*	Density	*0.8542*		
Model Year	*2011*	C [lbf/mph2]	*0.049012*	NHV	18325	Soak Time	
Engine Family	BFMXD06.761A			CWF	*0.8670*		
Displacement [l]	*6.700*						
Transmission	*Automatic*						
Odometer Start [mile]	*78695*	Flow Stream	Bag Only Diesel				
Odometer End [mile]	*78715*	Remark	HWFET Derive Baseline				

Bag Analysis

PHASE 1	THC [ppmC]	CO [ppm]	CO_2 [%]	NO_x [ppm]	CH_4 [ppm]	NMHC [ppm]				
							Temp. [°F]	80.29	Volume [scf]	10995
Range	*200*	*250*	*2.000*	*30*	*60*		Press. [inHg]	29.21	D.F.	*15.15*
Zero Value	*0.00*	*0.2*	*0.0*	*0.0*	*0.0*		RH [%]	*35.11*	Ph. Start [s]	0.0
Span Value	*191.13*	*238.97*	*1.902*	*24.670*	*57.400*		AH [gr/kg]	*7.877*	Ph. End [s]	765.0
Sample	*0.22*	*-0.28*	*0.832*	*0.244*	*0.225*	*-0.035*	Dist. [mi]	*10.26*	Ph. Length [s]	765.1
Mass.	*0.040*	*0.000*	*4744.542*	*0.133*	*0.047*	*0.000*	NO_x Corr. F	*0.91*	Bag An. Del	*501*
Mass per Dist.	*0.0038*	*0.0000*	*462.288*	*0.0130*	*0.0046*	*0.0000*	Dr. Viola.	*0*	Vio. Durat. [s]	0.0
							Crank [s]	*0.0*	FE [mile/gal]	22.0

SPC Mass Particles [g] SPC Mass per Dist. [g/mile]

Total Result

actual	THC [g/mile]	CO [g/mile]	CO2 [g/mile]	NOX [g/mile]	CH4 [g/mile]	NMOG [g/mile]	NMHC [g/mile]	$NMHC+NO_x$ [g/mile]	*Fuel Economy*	
Mass per Dist.	0.0038	*0.0000*	*462.29*	*0.0130*	*0.0046*	*0.0000*	*0.0000*	0.013	mile/gal	*22.01*
Mass per Dist. (rounded)	0.0038	*0.0000*	*462.3*	*0.0130*	*0.0046*	*0.000*	*0.0000*	0.013	Dist. [mi]	*10.26*
Mass per Dist. - Parti SPC [mg/mile]										

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CVS Data		Cycle data		Environmental Data	
Dilution Factor (Bag)	15.15	Vio. Dur.[s]	0.0	Rel. Hum.[%]	35.11
Dilution Factor (Modal)		Number	0	Ab. Hum.[g/lbs]	7.88
CVS Volume[scf]	10994.93	Act. Dist.[mi]	10.26	Pressure[inHg]	29.21
CVS Flow[scfm]	862.33			Temp.[°F]	80.29
CVS Inlet Pressure	28.66			Temp. Min.[°F]	77.72
CVS Inlet Temp.[°F]	119.77			Temp. Max.[°F]	82.76
CVS Inlet Temp. Min.[°F]	111.79			NO_X Corr. F	0.91
CVS Inlet Temp. Max.[°F]	127.75				

Particulate

SPC Particulate Results			Avg	Max	Min
Primary Filter Particle Mass [ug]		Temp Air Particlulate Dil [deg F]			
Mass Particles [g]		Temp Gas Particulate [deg F]			
Massflow Particles [g/h]		Pressure Gas Particulate			
Mass per Dist. [g/mile]		Dilution Ratio			
Particulate Sampling Time [s]		Pressure Drop Pri Filter [mbar]			
Primary Filter ID	A1				
Filter Diameter [mm]	47				

Bag

Concentrations	THC[ppmC]	CO[ppm]	CO_2[%]	NO_X[ppm]	CH_4[ppm]	NMHC[ppm]
Range	200	250	2.000	30	60	
Sniff	0.000	0.718	0.885	0.375	2.810	
Zero Value	0.005	0.169	0.000	0.002	0.000	
Zero Offset[%]	0.067	0.012	-0.001	0.010	-0.018	
Span Value	191.125	238.971	1.902	24.670	57.400	
Span Offset[%]	-0.055	-0.013	-0.035	-0.188	-0.748	
Sample	4.152	-0.035	0.884	0.367	2.253	1.606
Std. Dev.	0.000	0.005	0.005	0.008	0.000	
Ambient	4.211	0.265	0.056	0.132	2.171	
Std. Dev.	0.007	0.006	0.002	0.010	0.000	
Corrected	0.219	-0.283	0.832	0.244	0.225	-0.035
Mass	**THC[g]**	**CO[g]**	**CO_2[g]**	**NO_X[g]**	**CH_4[g]**	**NMHC[g]**
Uncorrected	0.0395	0.0000	4744.542	0.1331	0.0468	0.0000
Corrected	0.0395	0.0000	4744.542	0.1331	0.0468	0.0000
Mass per distance	**THC[g/mile]**	**CO[g/mile]**	**CO_2[g/mile]**	**NO_X[g/mile]**	**CH_4[g/mile]**	**NMHC[g/mile]**
Corrected for Lost Sample Mass	0.0038	0.0000	462.288	0.0130	0.0046	0.0000

Fuel Consumption

Fuel Consumption[g]	1507.604	Fuel Consumption[l/100km]	10.686
Fuel Consumption[l]	1.765	**Fuel Economy[mile/gal]**	22.010

Test Data: HWFET_HWFET Operator: Art Herrera Date: 1/14/2020
Test Number: HWFET_HWFET_20200114_06_TC1 Driver: Rene Acosta

Driver Violations

		P	Phase 1
Number of Violations	-	0	0
Duration of Violations	(s)	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		

Test Record #: HWFET_HWFET_20200114_06_TC1

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_2	1	20000	-4.37	0.00	-0.02	19017.50	19010.00	0.04	-0.45
CO	1	250	0.17	0.00	0.07	238.97	239.00	-0.01	-0.08
NO_X	1	30	0.00	0.00	0.01	24.67	24.70	-0.10	0.01
THC (ppmC	2	200	0.00	0.00	0.00	191.13	191.10	0.01	0.21
CH_4	1	60	0.00	0.00	0.00	57.40	57.40	0.00	0.13
N2O				0.00					

Analyzer Check

	Range Number	Range	Zero Value	Zero Set Value	Zero Drift	Span Value	Span Set Value	Span Drift	2% Drift Validation
		ppm	ppm	ppm	%	ppm	ppm	%	
CO_2	1	20000	-0.27	0.00	0.00	19003.08	19010.00	-0.07	
CO	1	250	0.03	0.00	0.04	238.97	239.00	0.00	
NO_X	1	30	0.00	0.00	-0.02	24.64	24.70	-0.09	
THC (ppmC	2	200	0.13	0.00	-0.04	190.99	191.10	-0.07	
CH_4	1	60	-0.01	0.00	-0.24	56.95	57.40	-0.75	
N2O				0.00					

Emission Lab Test Report

Drive Cycle Energy Summary

Test Record #: HWFET_HWFET_20200114_06_TC1

Test Cycle HWFET+HWFET

Test Legislation EPA

Vehicle ID 1FT7W2BT9BEA15523

DYNO Data

	Road Load	Street Load
Inertia [lb]	*9500.00*	
A [lbf]	*61.469*	*80.650*
B [lbf/mph]	*0.14073*	*1.58910*
C [lbf/mph2]	*0.049012*	*0.038900*

	Phase1	Phase2	Phase3	Weighted
Distance				
Target	16506.54			
Driven	16515.22			
Distance Rating (%)	0.0526			
Cycle Energy (MJ)				
Target	20.94			
Driven	20.97			
Distance per Energy Cycle (m/MJ)				
Target	788.29			788.29
Driven	787.60			787.60
Road Load Work Fraction				
Target	0.7579			
Driven	0.7662			
Inertial Work (MJ)				
Target	5.07			5.07
Driven	4.90			4.90
Inertial Work Fraction				
Target	0.2421			
Driven	0.2338			
Inertial Work Rating	-3.2879			-3.2879
Absolute Speed Change (m/s2)				
Target	130.69			130.69
Driven	127.01			127.01
Absolute Speed Change Rating (%)	-2.8157			-2.8157
Energy Rating	0.0882			
Energy Economy Rating	0.0882			0.0882