

NVFEL Laboratory Test Data
Final Laboratory Test Results

CVS

Test Number: 2014-0071-009

Vehicle ID: E350 BLUETEC

Test Information



Test Date: 2/28/2014
Key Start / Hot Soak: 12:45:17 / 09:22
Fuel Container ID: F00022
Fuel Type: 19 Cert Diesel 7-15 ppm Sulfur
Test Procedure: 1
Calculation Method: Diesel
Pretest Remarks:

MFR Name: MERCEDES BENZ
MFR Codes: 200 MBX
Config #: 00
Transmission: AUTO
Shift Schedule: A09980005
Beginning Odometer: 000000.0 MI
Drive Schedule: ftp4bag
Soak Period: 26.4 hours

Bag Data

	<u>N2O</u> (ppm)	<u>THC / IntTHC</u> (ppmC)	<u>CO</u> (ppm)	<u>NOx</u> (ppm)	<u>CO2</u> (%)	<u>CH4</u> (ppm)	<u>NonMeth HC</u> (ppmC)
Phase 1							
Sample	0.994	11.571 / 11.853	21.203	2.148	1.050	5.774	
Ambient	0.335	3.378	0.274	0.025	0.046	2.019	
Net Concentration	0.686	8.458 / 8.740	20.950	2.125	1.008	3.914	4.533

Remarks:

Phase 2

Sample	0.871	5.061 / 4.992	0.663	0.041	0.583	3.004	
Ambient	0.336	4.013	0.208	0.020	0.045	2.029	
Net Concentration	0.550	1.223 / 1.154	0.464	0.022	0.540	1.063	0.011

Remarks:

Phase 3

Sample	1.067	4.684 / 4.671	0.665	0.324	0.801	2.627	
Ambient	0.334	4.130	0.160	0.016	0.045	2.010	
Net Concentration	0.753	0.801 / 0.789	0.514	0.309	0.758	0.737	-0.003

Remarks:

Phase 4

Sample	1.024	4.919 / 4.921	0.539	0.042	0.562	2.633	
Ambient	0.335	3.317	0.230	0.020	0.045	2.012	
Net Concentration	0.704	1.742 / 1.744	0.319	0.023	0.519	0.705	0.986

Remarks: This test has particulate results.

Results

	<u>N2O</u> (gpm)	<u>THC / IntTHC</u> (gpm)	<u>CO</u> (gpm)	<u>NOx</u> (gpm)	<u>CO2</u> (gpm)	<u>CH4</u> (gpm)	<u>NMHC</u> (gpm)	<u>Vol MPG</u> (mpg)
Phase 1	0.028	- / 0.114	0.551	0.081	416.5	0.059	0.059	24.497
Phase 2	0.036	- / 0.024	0.020	0.001	357.0	0.026	0.000	28.656
Phase 3	0.031	- / 0.010	0.014	0.012	314.7	0.011	0.000	32.510
Phase 4	0.046	- / 0.139	0.013	0.001	342.7	0.017	0.021	29.846
Weighted	0.03627	0.04252	0.12636	0.02067	353.493	0.02601	0.01836	

Fuel Economy

	<u>Diesel MPG</u>
Phase 1	24.36
Phase 2	28.50
Phase 3	32.33
Phase 4	29.68
Weighted	28.80

Dyno Settings

Dyno #: D329 - RWD
Inertia: 4500
EPA Set Co A: 16.62
EPA Set Co B: -0.4083
EPA Set Co C: 0.02307

Emiss-Bench: Mexa 7200dle



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<u>Results</u>	<u>N2O</u> (grams)	<u>THC / IntTHC</u> (grams)	<u>CO</u> (grams)	<u>NOx</u> (grams)	<u>CO2</u> (grams)	<u>CH4</u> (grams)	<u>NMHC</u> (grams)	<u>Meth Response</u>
Phase 1	0.101	- / 0.407	1.971	0.288	1490.2	0.211	0.211	1.075
Phase 2	0.139	- / 0.092	0.075	0.005	1369.2	0.098	0.001	
Phase 3	0.112	- / 0.037	0.049	0.042	1125.3	0.040	0.000	
Phase 4	0.178	- / 0.001	0.051	0.005	1314.6	0.065	0.079	

Test Conditions

	<u>Phase 1</u>	<u>Phase 2</u>	<u>Phase 3</u>	<u>Phase 4</u>
Barometer (inHg)	29.32	29.31	29.31	29.30
Avg Cell Temp (degF)	74.01	74.03	74.04	74.09
Dew Point (degF)	45.98	44.62	44.17	45.66
Specific Humidity (grains/lbm)	46.91	44.53	43.77	46.39
NOx Corr Factor	0.8834	0.8747	0.8720	0.8815
CO2 Dilution Factor	12.723	22.946	16.722	23.82
CFV Vmix (scf @68F)	2824.82	4845.53	2835.41	4842.70
Total CVS Vmix (scf@68F)	2853.48	4894.63	2863.93	4891.71
CVS Flow Rate Avg (scfm)	334.10	330.38	334.83	333.86

Fan Placement: One Small Fan - Up - Front

Phase Time (secs)	507.30	870.00	508.10	870.30
Distance (miles)	3.578	3.835	3.576	3.836
Bag Analysis Time (secs)	927.1	122.1	929.3	133.0

	<u>FTP B1</u>	<u>FTP B2</u>	<u>FTP B3</u>	<u>FTP B4</u>	<u>FTP-W</u>	<u>FTP4-W</u>
IWR % diff	-3.562	-1.402	-1.741	-1.541	-1.932	-1.974
ASCR % diff	-2.505	-0.877	-0.903	-0.819	-1.146	-1.125
EER	-1.562	-1.152	-0.756	-1.192	-1.120	-1.132

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Test Information



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Key Start: 12:45:17 / 09:22
Fuel Container ID: F00022
Fuel Type: 19 Cert Diesel 7-15 ppm Sulfur
Test Procedure: 1
Calculation Method: Diesel
Pretest Remarks:

MFR Name: MERCEDES BENZ
MFR Codes: 200 MBX
Config #: 00
Transmission: AUTO
Shift Schedule: A09980005
Beginning Odometer: 000000.0 MI
Drive Schedule: ftp4bag
Soak Period: 26.4 hours

All filter weights are corrected for buoyancy.

Particulate	Filter Sampler	Filter No.	Tare (Pre Wt)	Gross (Post Wt)	Net Wt mg	Total Mass mg	Total Mass mg / mi	Filter comment
Phase 1	A	777801	142.1206	142.1249	0.00425	1.268	0.354	
	B	777802	141.2591	141.2617	0.00265	0.791	0.221	
	C	777803	142.0352	142.0353	0.00005	0.014	0.004	
Remarks:								
Phase 2	A	777804	142.5793	142.5799	0.00055	0.163	0.042	
	B	777805	142.3458	142.3500	0.00425	1.271	0.331	
	C	777806	141.5508	141.5509	0.00015	0.045	0.012	
Remarks:								
Phase 3	A	777807	143.5543	143.5554	0.00104	0.313	0.088	
	B	777808	143.2898	143.2898	0.00000	0.000	0.000	
	C	777809	141.0511	141.0499	0.00000	0.000	0.000	
Remarks:								
Phase 4	A	777810	142.0020	142.0037	0.00175	0.523	0.136	
	B	777811	142.5207	142.5234	0.00275	0.821	0.214	
	C	777812	143.0605	143.0637	0.00325	0.975	0.254	
Remarks: <u>This test has particulate results.</u>								

Average Results

	Net Wt mg	Total Mass mg	Total Mass mg / mi
Phase 1	0.00232	0.691	0.193
Phase 2	0.00165	0.493	0.129
Phase 3	0.00035	0.313	0.088
Phase 4	0.00258	0.773	0.202

All filter weights are corrected for buoyancy.

0.036268194 All Filters:

0.15223

Reference Filter Stability Check

2% of Avg Net or 0.01 mg	No.	Tare (Pre Wt)	Gross (Post Wt)	Net Wt mg	Stability Check PASS/FAIL	Dyno #: D329 - RWD
0.01	1	142.21793	142.21498	-0.00296	PASS	Inertia: 4500
	2	143.46003	143.45927	-0.00076	PASS	EPA Set Co A: 16.62
						EPA Set Co B: -0.4083
						EPA Set Co C: 0.02307

Emissions Bench Mexa 7200die



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WEIGHING CHAMBER		<u>Buoyancy</u>	<u>Operator</u>	<u>Chamber Temp</u>	<u>Dew Point</u>	<u>Barometer</u>	<u>Last Change in Status</u>
	Timestamp	Factor	(id)	(°F)	(°F)	("Hg)	Status @ timestamp
Pre-test	2/28/14 7:45	1.0011223	022298	72.2	49.3	29.32	NORM @ 02/27/14 19:45:33
Post-test	2/28/14 17:00	1.0011170	022298	72.3	49.1	29.18	NORM @ 02/27/14 19:45:33

<u>Test Conditions</u>	<u>Phase 1</u>	<u>Phase 2</u>	<u>Phase 3</u>	<u>Phase 4</u>
Barometer (inHg)	29.32	29.31	29.31	29.30
Avg Cell Temp (degF)	74.01	74.03	74.04	74.09
Dew Point (degF)	45.98	44.62	44.17	45.66
Specific Humidity (grains/lbm)	46.91	44.53	43.77	46.39
NOx Corr Factor	0.8834	0.8747	0.8720	0.8815
Dilution Factor	12.72	22.95	16.72	23.82
CFV Vmix (scf @68F)	2824.82	4845.53	2835.41	4842.70
Sample Volume A (scf @68F)	9.571	16.398	9.509	16.364
Sample Volume B (scf @68F)	9.572	16.365	9.499	16.364
Sample Volume C (scf @68F)	9.512	16.337	9.505	16.281
Sample Volume D (scf @68F)				
Sample Volume Average (scf @68F)	9.552	16.367	9.504	16.336
Total PM Vmix (scf @68F)	2853.48	4894.63	2863.93	4891.70922
Phase Time (sec)	507.30	870.00	508.10	870.30
Distance (miles)	3.578	3.835	3.576	3.836
PSU Probe A (degC)				
PSU Probe B (degC)				
PSU Probe C (degC)				
PSU Dil Air A (degC)	44.6	42.8	40.6	41.0
PSU Dil Air B (degC)	41.3	40.7	40.8	40.0
PSU Dil Air C (degC)	41.7	41.4	40.5	40.2
PSU Filter A (degC)	45.7	46.8	46.6	46.8
PSU Filter B (degC)	45.8	46.5	45.5	47.0
PSU Filter C (degC)	45.5	46.4	46.4	46.3
PSU Dil Flow A (lpm)	20.1	19.8	19.9	20.0
PSU Dil Flow B (lpm)	20.1	19.8	19.9	20.0
PSU Dil Flow C (lpm)	20.1	19.9	19.9	20.1
PSU A Proportionality				
PSU B Proportionality				
PSU C Proportionality				

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Test Number: 2014-0071-010

Vehicle ID: E350 BLUETEC

Test Information



Test Date: 2/28/2014
 Key Start: 14:17:08
 Fuel Container ID: F00022
 Fuel Type: 19 Cert Diesel 7-15 ppm Sulfur
 Test Procedure: 3
 Calculation Method: Diesel
 Pretest Remarks:

MFR Name: MERCEDES BENZ
 MFR Codes: 200 MBX
 Config #: 00
 Transmission: AUTO
 Shift Schedule: A09980011
 Beginning Odometer: 000000.0 MI
 Drive Schedule: hwfet_hwfet

Bag Data

	<u>N2O</u> (ppm)	<u>THC / IntTHC</u> (ppmC)	<u>CO</u> (ppm)	<u>NOx</u> (ppm)	<u>CO2</u> (%)	<u>CH4</u> (ppm)	<u>NonMeth HC</u> (ppmC)
Phase 1							
Sample	2.246	12.638 / 12.691	1.202	0.074	1.366	2.727	
Ambient	0.340	14.119	0.000	0.022	0.046	2.006	
Net Concentration	1.940	-0.040 / 0.013	1.202	0.055	1.325	0.926	-0.982

Remarks:

Phase 2

Sample
 Ambient
 Net Concentration

Remarks:

Phase 3

Sample
 Ambient
 Net Concentration

Remarks:

Phase 4

Sample
 Ambient
 Net Concentration

Remarks: This test has particulate results.

Results

	<u>N2O</u> (gpm)	<u>THC / IntTHC</u> (gpm)	<u>CO</u> (gpm)	<u>NOx</u> (gpm)	<u>CO2</u> (gpm)	<u>CH4</u> (gpm)	<u>NMHC</u> (gpm)	<u>Vol MPG</u> (mpg)
Phase 1	0.031	- / 0.000	0.012	0.001	208.7	0.005	0.000	49.036

Fuel Economy

Phase 1 Diesel MPG 48.76

Dyno Settings

Dyno #: D329 - RWD
 Inertia: 4500
 EPA Set Co A: 16.62
 EPA Set Co B: -0.4083
 EPA Set Co C: 0.02307

Emiss-Bench: Mexa 7200dle



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Results	N2O (grams)	THC / IntTHC (grams)	CO (grams)	NOx (grams)	CO2 (grams)	CH4 (grams)	NMHC (grams)	Meth Response
Phase 1	0.312	- / 0.001	0.123	0.008	2133.7	0.054	0.000	1.075

Test Conditions

	<u>Phase 1</u>	<u>Phase 2</u>	<u>Phase 3</u>	<u>Phase 4</u>
Barometer (inHg)	29.26			
Avg Cell Temp (degF)	74.08			
Dew Point (degF)	46.04			
Specific Humidity (grains/lbm)	47.11			
NOx Corr Factor	0.8841			
CO2 Dilution Factor	9.799			
CFV Vmix (scf @68F)	3065.00			
Total CVS Vmix (scf@68F)	3107.85			
CVS Flow Rate Avg (scfm)	240.36			

Fan Placement: One Small Fan - Up - Front

Phase Time (secs)	765.10
Distance (miles)	10.226
Bag Analysis Time (secs)	58.8

	<u>HWY</u>
IWR % diff	-3.515
ASCR % diff	-2.925
EER	-0.818

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 Fuel Container ID: F00022
 Fuel Type: 19 Cert Diesel 7-15 ppm Sulfur
 Test Procedure: 3
 Calculation Method: Diesel
 Pretest Remarks:

MFR Name: MERCEDES BENZ
 MFR Codes: 200 MBX
 Config #: 00
 Transmission: AUTO
 Shift Schedule: A09980011
 Beginning Odometer: 000000.0 MI
 Drive Schedule: hwfet_hwfet

All filter weights are corrected for buoyancy.

<u>Particulate</u>	<u>Filter Sampler</u>	<u>Filter No.</u>	<u>Tare (Pre Wt)</u>	<u>Gross (Post Wt)</u>	<u>Net Wt mg</u>	<u>Total Mass mg</u>	<u>Total Mass mg / mi</u>	<u>Filter comment</u>
Phase 1	A	777823	142.1390	142.1406	0.00156	0.339	0.033	
	B	777824	143.9502	143.9516	0.00145	0.315	0.031	
	C	777825	144.7217	144.7239	0.00214	0.466	0.046	
	Remarks:							
Phase 2								
	Remarks:							
Phase 3								
	Remarks:							
Phase 4								
	Remarks: <u>This test has particulate results.</u>							

Average Results

	<u>Net Wt mg</u>	<u>Total Mass mg</u>	<u>Total Mass mg / mi</u>
Phase 1	0.00172	0.373	0.036

All filter weights are corrected for buoyancy.

Reference Filter Stability Check

<u>2% of Avg Net or 0.01 mg</u>	<u>No.</u>	<u>Tare (Pre Wt)</u>	<u>Gross (Post Wt)</u>	<u>Net Wt mg</u>	<u>Stability Check PASS/FAIL</u>	<u>Dyno #: D329 - RWD</u>
0.01	1	142.21792	142.21507	-0.00285	PASS	Inertia: 4500
	2	143.46002	143.46006	0.00005	PASS	EPA Set Co A: 16.62
						EPA Set Co B: -0.4083
						EPA Set Co C: 0.02307

Emissions Bench Mexa 7200dle



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WEIGHING CHAMBER	Buoyancy	Operator	Chamber Temp	Dew Point	Barometer	Last Change in Status	
Timestamp	Factor	(id)	(°F)	(°F)	(°Hg)	Status @ timestamp	
Pre-test	2/28/14 8:38	1.0011222	022298	72.4	49.2	29.33	NORM @ 02/27/14 19:45:33
Post-test	2/28/14 17:45	1.0011170	022298	72.3	48.9	29.18	NORM @ 02/27/14 19:45:33

Test Conditions	Phase 1	Phase 2	Phase 3	Phase 4
Barometer (inHg)	29.26			
Avg Cell Temp (degF)	74.08			
Dew Point (degF)	46.04			
Specific Humidity (grains/lbm)	47.11			
NOx Corr Factor	0.8841			
Dilution Factor	9.80			
CFV Vmix (scf @68F)	3065.00			
Sample Volume A (scf @68F)	14.284			
Sample Volume B (scf @68F)	14.277			
Sample Volume C (scf @68F)	14.291			
Sample Volume D (scf @68F)				
Sample Volume Average (scf @68F)	14.284			
Total PM Vmix (scf @68F)	3107.85			
Phase Time (sec)	765.10			
Distance (miles)	10.226			
PSU Probe A (degC)				
PSU Probe B (degC)				
PSU Probe C (degC)				
PSU Dil Air A (degC)	41.7			
PSU Dil Air B (degC)	40.2			
PSU Dil Air C (degC)	41.0			
PSU Filter A (degC)	46.9			
PSU Filter B (degC)	46.1			
PSU Filter C (degC)	46.5			
PSU Dil Flow A (lpm)	19.8			
PSU Dil Flow B (lpm)	19.8			
PSU Dil Flow C (lpm)	19.8			
PSU A Proportionality				
PSU B Proportionality				
PSU C Proportionality				

SUGGESTED CITATION: 2013 Mercedes E350 BlueTEC Vehicle Diesel Fuel – Test Data Package. Version 2018-07. Ann Arbor, MI: US EPA, National Vehicle and Fuel Emissions Laboratory, National Center for Advanced Technology, 2018.