

NVFEL Laboratory Test Data

CVS

Final Laboratory Test Results

Test Number: 2014-0071-006

Vehicle ID: E350 BLUETEC

Test Information



Test Date: 2/20/2014
Key Start / Hot Soak: 14:56:08 / 09:23
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: 22.4 hours

Bag Data

| | N2O (ppm) | THC / IntTHC (ppmC) | CO (ppm) | NOx (ppm) | CO2 (%) | CH4 (ppm) | NonMeth HC (ppmC) |
|-------------------|--------------|------------------------|-------------|--------------|------------|--------------|----------------------|
| Phase 1 | | | | | | | |
| Sample | 1.095 | 12.718 / 12.950 | 22.444 | 2.257 | 1.074 | 6.630 | |
| Ambient | 0.328 | 4.324 | 0.124 | 0.026 | 0.046 | 2.272 | |
| Net Concentration | 0.793 | 8.741 / 8.973 | 22.330 | 2.232 | 1.031 | 4.541 | 4.092 |

Remarks:

Phase 2

| | | | | | | | |
|-------------------|-------|---------------|-------|-------|-------|-------|--------|
| Sample | 0.989 | 5.165 / 5.135 | 0.515 | 0.035 | 0.598 | 3.244 | |
| Ambient | 0.328 | 4.143 | 0.077 | 0.018 | 0.046 | 2.234 | |
| Net Concentration | 0.676 | 1.206 / 1.177 | 0.442 | 0.018 | 0.555 | 1.110 | -0.016 |

Remarks:

Phase 3

| | | | | | | | |
|-------------------|-------|---------------|-------|-------|-------|-------|--------|
| Sample | 1.096 | 4.590 / 4.584 | 0.519 | 0.248 | 0.819 | 2.778 | |
| Ambient | 0.336 | 4.089 | 0.040 | 0.020 | 0.045 | 2.152 | |
| Net Concentration | 0.781 | 0.751 / 0.745 | 0.482 | 0.229 | 0.777 | 0.758 | -0.070 |

Remarks:

Phase 4

| | | | | | | | |
|-------------------|-------|---------------|-------|-------|-------|-------|--------|
| Sample | 1.055 | 4.734 / 4.741 | 0.424 | 0.042 | 0.575 | 2.930 | |
| Ambient | 0.335 | 4.309 | 0.104 | 0.021 | 0.046 | 2.270 | |
| Net Concentration | 0.734 | 0.610 / 0.617 | 0.324 | 0.022 | 0.531 | 0.757 | -0.197 |

Remarks: This test has particulate results.

Results

| | N2O (gpm) | THC / IntTHC (gpm) | CO (gpm) | NOx (gpm) | CO2 (gpm) | CH4 (gpm) | NMHC (gpm) | Vol MPG (mpg) |
|----------|--------------|-----------------------|-------------|--------------|--------------|--------------|---------------|------------------|
| Phase 1 | 0.032 | - / 0.114 | 0.574 | 0.085 | 416.6 | 0.067 | 0.052 | 24.486 |
| Phase 2 | 0.044 | - / 0.024 | 0.018 | 0.001 | 363.3 | 0.027 | 0.000 | 28.161 |
| Phase 3 | 0.032 | - / 0.010 | 0.012 | 0.009 | 316.4 | 0.011 | 0.000 | 32.339 |
| Phase 4 | 0.048 | - / 0.048 | 0.013 | 0.001 | 345.5 | 0.018 | 0.000 | 29.612 |
| Weighted | 0.03933 | 0.03553 | 0.13090 | 0.02070 | 356.217 | 0.02819 | 0.01084 | |

Fuel Economy

| | Diesel MPG |
|----------|------------|
| Phase 1 | 24.35 |
| Phase 2 | 28.00 |
| Phase 3 | 32.16 |
| Phase 4 | 29.45 |
| Weighted | 28.56 |

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 | THC / IntTHC | CO | NOx | CO2 | CH4 | NMHC | Meth Response |
|----------------|------------|---------------------|-----------|------------|------------|------------|-------------|----------------------|
| | (grams) | (grams) | (grams) | (grams) | (grams) | (grams) | (grams) | |
| Phase 1 | 0.115 | - / 0.408 | 2.052 | 0.303 | 1489.6 | 0.239 | 0.186 | 1.075 |
| Phase 2 | 0.169 | - / 0.093 | 0.070 | 0.004 | 1385.9 | 0.101 | 0.000 | |
| Phase 3 | 0.114 | - / 0.034 | 0.045 | 0.031 | 1129.2 | 0.040 | 0.000 | |
| Phase 4 | 0.183 | - / 0.001 | 0.051 | 0.005 | 1321.3 | 0.069 | 0.000 | |

Test Conditions

| | <u>Phase 1</u> | <u>Phase 2</u> | <u>Phase 3</u> | <u>Phase 4</u> |
|--------------------------------|----------------|----------------|----------------|----------------|
| Barometer (inHg) | 28.76 | 28.75 | 28.74 | 28.74 |
| Avg Cell Temp (degF) | 74.07 | 74.05 | 74.02 | 74.11 |
| Dew Point (degF) | 47.73 | 47.65 | 47.72 | 47.74 |
| Specific Humidity (grains/lbm) | 51.16 | 51.00 | 51.16 | 51.20 |
| NOx Corr Factor | 0.8992 | 0.8986 | 0.8992 | 0.8994 |
| CO2 Dilution Factor | 12.438 | 22.371 | 16.343 | 23.30 |
| CFV Vmix (scf @68F) | 2758.85 | 4772.42 | 2777.46 | 4757.24 |
| Total CVS Vmix (scf@68F) | 2787.64 | 4821.76 | 2805.94 | 4806.35 |
| CVS Flow Rate Avg (scfm) | 326.36 | 323.92 | 328.50 | 327.78 |

Fan Placement: One Small Fan - Up - Front

| | | | | |
|--------------------------|--------|--------|--------|--------|
| Phase Time (secs) | 507.20 | 874.00 | 507.30 | 870.80 |
| Distance (miles) | 3.575 | 3.815 | 3.569 | 3.824 |
| Bag Analysis Time (secs) | 931.6 | 121.6 | 928.7 | 132.9 |

| | <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 | -4.662 | -0.598 | -2.064 | 0.014 | -1.818 | -1.634 |
| ASCR % diff | -2.864 | -0.138 | -0.783 | 0.026 | -0.716 | -0.658 |
| EER | -0.864 | -0.266 | -0.675 | 0.262 | -0.500 | -0.354 |

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PARTICULATE

Test Information



Test Number: 2014-0071-006
Test Date: 2/20/2014
Key Start: 14:56:08 / 09:23
Fuel Container ID: F00022
Fuel Type: 19 Cert Diesel 7-15 ppm Sulfur
Test Procedure: 1
Calculation Method: Diesel
Pretest Remarks:

Vehicle ID: E350 BLUETEC
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: 22.4 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 | 777570 | 143.0557 | 143.0602 | 0.00452 | 1.310 | 0.366 | |
| | B | 777571 | 143.2353 | 143.2366 | 0.00131 | 0.381 | 0.106 | |
| | C | 777572 | 144.5273 | 144.5415 | 0.01412 | 4.108 | 1.149 | |
| Remarks: | | | | | | | | |
| Phase 2 | A | 777573 | 146.5459 | 146.5491 | 0.00319 | 0.933 | 0.245 | |
| | B | 777574 | 145.9783 | 145.9814 | 0.00309 | 0.907 | 0.238 | |
| | C | 777575 | 143.6972 | 143.6908 | 0.00000 | 0.000 | 0.000 | |
| Remarks: | | | | | | | | |
| Phase 3 | A | 777576 | 142.4012 | 142.4016 | 0.00042 | 0.122 | 0.034 | |
| | B | 777577 | 145.2016 | 145.2056 | 0.00400 | 1.179 | 0.330 | |
| | C | 777578 | 148.3533 | 148.3574 | 0.00418 | 1.242 | 0.348 | |
| Remarks: | | | | | | | | |
| Phase 4 | A | 777579 | 146.0385 | 146.0426 | 0.00409 | 1.201 | 0.314 | |
| | B | 777580 | 145.8961 | 145.8977 | 0.00159 | 0.468 | 0.122 | |
| | C | 777621 | 141.5099 | 141.5131 | 0.00322 | 0.947 | 0.248 | |
| Remarks: <u>This test has particulate results.</u> | | | | | | | | |

Average Results

| | Net Wt mg | Total Mass mg | Total Mass mg / mi |
|---------|-----------|---------------|--------------------|
| Phase 1 | 0.00665 | 1.933 | 0.541 |
| Phase 2 | 0.00209 | 0.920 | 0.241 |
| Phase 3 | 0.00286 | 0.848 | 0.238 |
| Phase 4 | 0.00297 | 0.872 | 0.228 |

All filter weights are corrected for buoyancy.

0.039330507 All Filters:

0.29856

Reference Filter Stability Check

| 2% of Avg Net or 0.01 mg | No. | Tare (Pre Wt) | Gross (Post Wt) | Net Wt mg | Stability Check | Dyno #: D329 - RWD |
|--------------------------|-----|---------------|-----------------|-----------|-----------------|-----------------------|
| 0.01 | 1 | 142.21268 | 142.21270 | 0.00002 | PASS/FAIL | Inertia: 4500 |
| | 2 | 143.45676 | 143.45797 | 0.00121 | PASS | EPA Set Co A: 16.62 |
| | | | | | PASS | EPA Set Co B: -0.4083 |
| | | | | | | EPA Set Co C: 0.02307 |

Emissions Bench Mexa 7200dle

**NVFEL Laboratory Test Data****PARTICULATE****Final Laboratory Test Results**

Test Number: 2014-0071-006

Vehicle ID: E350 BLUETEC

| <u>WEIGHING CHAMBER</u> | <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 | 2/20/14 12:13 | 1.0011037 | 022298 | 72.3 | 49.2 | 28.84 | NORM @ 02/19/14 14:40:10 |
| Post-test | 2/21/14 15:22 | 1.0010967 | 022298 | 71.9 | 49.7 | 28.64 | NORM @ 02/20/14 19:48:55 |

| Test Conditions | Phase 1 | Phase 2 | Phase 3 | Phase 4 |
|----------------------------------|----------------|----------------|----------------|----------------|
| Barometer (inHg) | 28.76 | 28.75 | 28.74 | 28.74 |
| Avg Cell Temp (degF) | 74.07 | 74.05 | 74.02 | 74.11 |
| Dew Point (degF) | 47.73 | 47.65 | 47.72 | 47.74 |
| Specific Humidity (grains/lbm) | 51.16 | 51.00 | 51.16 | 51.20 |
| NOx Corr Factor | 0.8992 | 0.8986 | 0.8992 | 0.8994 |
| Dilution Factor | 12.44 | 22.37 | 16.34 | 23.30 |
| CFV Vmix (scf @68F) | 2758.85 | 4772.42 | 2777.46 | 4757.24 |
| Sample Volume A (scf @68F) | 9.610 | 16.477 | 9.520 | 16.384 |
| Sample Volume B (scf @68F) | 9.600 | 16.455 | 9.517 | 16.359 |
| Sample Volume C (scf @68F) | 9.579 | 16.408 | 9.443 | 16.368 |
| Sample Volume D (scf @68F) | | | | |
| Sample Volume Average (scf @68F) | 9.596 | 16.447 | 9.493 | 16.370 |
| Total PM Vmix (scf @68F) | 2787.64 | 4821.76 | 2805.94 | 4806.350053 |
| Phase Time (sec) | 507.20 | 874.00 | 507.30 | 870.80 |
| Distance (miles) | 3.575 | 3.815 | 3.569 | 3.824 |
| PSU Probe A (degC) | | | | |
| PSU Probe B (degC) | | | | |
| PSU Probe C (degC) | | | | |
| PSU Dil Air A (degC) | 42.8 | 43.7 | 40.7 | 40.7 |
| PSU Dil Air B (degC) | 41.0 | 40.2 | 40.6 | 40.1 |
| PSU Dil Air C (degC) | 40.2 | 41.1 | 40.2 | 40.0 |
| PSU Filter A (degC) | 45.8 | 46.8 | 46.5 | 46.6 |
| PSU Filter B (degC) | 45.3 | 46.1 | 45.3 | 46.8 |
| PSU Filter C (degC) | 45.1 | 45.8 | 45.7 | 46.0 |
| PSU Dil Flow A (lpm) | 20.2 | 19.8 | 19.9 | 20.0 |
| PSU Dil Flow B (lpm) | 20.2 | 19.8 | 19.9 | 20.0 |
| PSU Dil Flow C (lpm) | 20.2 | 19.8 | 19.9 | 19.9 |
| 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.