**ENVIRONMENTAL PROTECTION AGENCY**

**40 CFR Parts 9, 59, 60, 85, 86, 88, 89, 90, 91, 92, 94, 1027, 1033, 1036, 1037, 1039, 1042, 1043, 1045, 1048, 1051, 1054, 1060, 1065, 1066, 1068, and 1074**

**[EPA–HQ–OAR–2019–0307; FRL–10018–52–OAR]**

**RIN 2060–AU62**

## Improvements for Heavy-Duty Engine and Vehicle Test Procedures, and Other Technical Amendments

*Corrections*

In rule document 2021–05306, appearing on pages 34308–34590, in the issue of Tuesday, June 29, 2021, make the following corrections:

**§ 1036.301 [Corrected]**

■ 1. On page 34380, in the first column, in the sixth line above Table 1, ''Mreduction'' should read ''$M_{\text{reduction}}$''.

**§ 1036.540 [Corrected]**

■ 2. On page 34396, in the first column, at the top of the page, before (i) insert:

''(3) Run GEM for each simulated vehicle configuration as follows:''

**§ 1037.528 [Corrected]**

■ 3. On page 34474, in the third column, after amendatory instruction 152, the section heading should read:

**§ 1037.528 Coastdown procedures for calculating drag area ($C_dA$).**

**§ 1037.540 [Corrected]**

■ 4. On page 34477, in the second column, in the tenth line below Eq. 1037.540–2, ''$\bar{p}_{\text{circuit-2}}$'' should read ''$p_{\text{circuit-2}}$''

**§ 1037.550 [Corrected]**

■ 5. On page 34479, in the third column in paragraph (f)(4), ''$k\alpha_B = 4.0$'' should read ''$k_{a\text{B}} = 4.0$''.

■ 6. On page 34481, in Table 1 of § 1037.550, in the first column, in the first line, ''Slope, $a;_1$'' should read ''Slope, $a_1$''.

**§ 1037.560 [Corrected]**

■ 7. On page 34485, in the first column, paragraph (f) introductory text should read:

(f) Calculate the mean power loss, $\overline{P}_{\text{loss}}$, at each test point as follows:

■ 8. On the same page, in the second column, (f)(2) should read:

(2) Calculate $\overline{P}_{\text{loss}}$ as the mean power loss from all measurements at a given test point.

■ 9. On the same page, in the third column (f)(3) should read:

(3) The following example illustrates a calculation of $\overline{P}_{\text{loss}}$:

* * * * *

■ 10. On the same page, in the first column paragraph (g) introductory text should read:

(g) Create a table with the mean power loss, $\overline{P}_{\text{loss}}$, corresponding to each test point for input into GEM. Express wheel angular speed in r/min to one decimal place; express output torque in N·m to two decimal places; express power loss in kW to four decimal places.

■ 11. On the same page, in the third column, (h)(3) should read:

(3) Determine $\overline{P}_{\text{loss}}$ of untested axles for each speed and torque setpoint based on a linear relationship between your declared power loss and axle ratio as follows:

* * * * *

■ 12. On page 34486, in the first column, (h)(4) should read:

(4) Select declared values of $\overline{P}_{\text{loss}}$ for untested configurations that are at or above the values you determined in paragraph (h)(3) of this section.

**§ 1037.565 [Corrected]**

■ 13. On page 34487, in the first column, paragraph (f) introductory text should read:

(f) Calculate the mean power loss, $\overline{P}_{\text{loss}}$, at each operating condition as follows:

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■ 14. On the same page, in the second column, the definition for $\bar{f}_{\text{nout}}$ and paragraph (f)(2) introductory text should read as follows:

$\bar{f}_{\text{nout}}$ = mean output shaft speed from paragraph (e)(6) of this section in rad/s. Let $\bar{f}_{\text{nout}} = 0$ for all tests with the transmission in neutral. See paragraph (f)(2) of this section for calculating $\bar{f}_{\text{nout}}$ as a function of $\bar{f}_{\text{nin}}$ instead of measuring $f_{\text{nout}}$.

(2) For transmissions that are configured to not allow slip, you may calculate $\bar{f}_{\text{nout}}$ based on the gear ratio using the following equation:

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■ 15. On the same page, in the third column, paragraph (f)(3), paragraph (f)(4) introductory text, and the eighth line after paragraph (f)(4) introductory text should read as follows:

(3) Calculate $\overline{P}_{\text{loss}}$ as the mean power loss from all measurements at a given operating condition.

(4) The following example illustrates a calculation of $\overline{P}_{\text{loss}}$:

* * * * *

$\overline{P}_{\text{loss},3} = 4292 \text{ W} = 4.292 \text{ kW}$

* * * * *

■ 16. On page 34488, in the first column, lines 1–3 from the top of the page should read:

(g) Create a table with the mean power loss, $\overline{P}_{\text{loss}}$, corresponding to each operating condition for input into GEM.

**§ 1037.570 [Corrected]**

■ 17. On page 34489, beginning in the second column, lines 17–20 from the top should read as follows:

(e) Calculate the mean torque ratio, $\overline{\mu}$, at each tested speed ratio, $v$, as follows:

(1) Calculate $\bar{\mu}$ at each tested speed ratio as follows:

■ 18. On the same page, in the same column, in the 6th through 10 lines after Eq. 1037.570–1, paragraphs (e)(2) and (3) introductory text should read as follows:

(2) Calculate $\overline{\mu}$ as the average of the two values of $\bar{\mu}$ at each tested speed ratio.

(3) The following example illustrates a calculation of $\overline{\mu}$:

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■ 19. On the same page, in the third column, paragraphs (f) introductory text, (f)(1) introductory text, (f)(2), and (f)(3) introductory text should read as follows:

(f) Calculate the mean capacity factor, $\overline{K}$, at each tested speed ratio, $v$, as follows:

(1) Calculate $\overline{K}$ at each tested speed ratio as follows:

* * * * *

(2) Calculate $\overline{K}$ as the average of the two values of $\overline{K}$ at each tested speed ratio.

(3) The following example illustrates a calculation of $\overline{K}$:

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■ 20. On the same page, in the first column, beginning in the 7th line from the bottom, paragraph (g) should read as follows:

(g) Create a table of GEM inputs showing $\overline{\mu}$ and $\overline{K}$ at each tested speed ratio, $v$. Express $\overline{\mu}$ to two decimal places; express $\overline{K}$ to one decimal place; express $v$ to two decimal places.

**§ 1037.805 [Corrected]**

■ 21. On page 34493, in Table 2 to § 1037.805—Symbols for Quantities, in the first column,

■ a. line 7 should read: $a_g$

■ b. line 8 should read: $a_0$

■ c. line 9 should read: $a_1$

■ 22. On page 34494, in the second column, in Table 3 to § 1037.805—Superscripts, in the first column, the second and third lines should read:

Double overbar (such as $\overline{y}$)

**§ 1065.307 [Corrected]**

■ 23. On page 34538, in the first column, in (c)(13), the first sentence should read as follows:

(13) Use the arithmetic means, $\bar{y}_i$, and reference values, $y_{refi}$, to calculate least-squares linear regression parameters and statistical values to compare to the minimum performance criteria specified in Table 1 of this section.

■ 24. On page 34539, in the second column, in paragraph (e)(3), (v) and (vi) should read as follows:

(v) For linearity verification of a fuel flow rate meter, $\dot{m}_{max}$ is the manufacturer's specified maximum fuel rate of the lowest-power engine expected during testing.

(vi) For linearity verification of a DEF flow rate meter, $\dot{m}_{max}$ is 10% of the manufacturer's specified maximum fuel rate of the lowest-power DEF-using engine expected during testing.

**§ 1065.530 [Corrected]**

■ 25. On page 34547, in the first column, paragraph (g)(5) should read as follows:

(g) * * *

(5) If you perform carbon balance error verification, verify carbon balance error as specified in the standard-setting part and § 1065.543. Calculate and report the three carbon balance error quantities for each test interval; carbon mass absolute error for a test interval ($\varepsilon_{aC}$), carbon mass rate absolute error for a test interval ($\varepsilon_{aCrate}$), and carbon mass relative error for a test interval ($\varepsilon_{rC}$). For duty cycles with multiple test intervals, you may calculate and report the composite carbon mass relative error, $\varepsilon_{rCcomp}$, for the whole duty cycle. If you report $\varepsilon_{rCcomp}$, you must still calculate and report $\varepsilon_{aC}$, $\varepsilon_{aCrate}$, and $\varepsilon_{rC}$ for each test interval.

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**§ 1065.543 [Corrected]**

■ 26. On page 34547, in the second column, paragraph (b)(1) should read:

(b) * * *

(1) Calculate carbon balance error quantities as described in § 1065.643. The three quantities for individual test intervals are carbon mass absolute error, $\varepsilon_{aC}$, carbon mass rate absolute error, $\varepsilon_{aCrate}$, and carbon mass relative error, $\varepsilon_{rC}$. Determine $\varepsilon_{aC}$, $\varepsilon_{aCrate}$, and $\varepsilon_{rC}$ for all test intervals. You may determine composite carbon mass relative error, $\varepsilon_{rCcomp}$, as a fourth quantity that optionally applies for duty cycles with multiple test intervals.

■ 27. On the same page, in the same column, Eq. 1065.543–1 should read:

$$L_{\dot{o}aC} = c \cdot P_{max}$$

■ 28. On the same page, in the third column, Eq. 1065.543–2 should read:

$$L_{\dot{o}aCrate} = d \cdot P_{max}$$

■ 29. On the same page, in the same column, lines 12–17 should read:

$$L_{\dot{o}aCrate} = 0.31 \cdot 230.0 = 71.300 \text{ g/hr}$$

(iii) The carbon mass relative error limit, $L_{erC}$, is 0.020 for comparision to the absolute value of $\varepsilon_{rC}$, and optionally the absolute value of $\varepsilon_{rCcomp}$.

**§ 1065.602 [Corrected]**

■ 30. On page 34554, in the third column, in (l)(1)(ii), in the 8th line down, ''pumping, $\overline{P}$'' should read ''pumping, $\overline{P}_{frict}$.''

**§ 1065.643 [Corrected]**

■ 31. On page 34559, in the first column, Eq. 1065.643–7 should read:

$$\dot{o}_{aC} = m_{Cexh} - m_{Cfluid} - m_{Cair}$$

■ 32. On page the same page, in the third column, Eq. 1065.643–8 should read:

$$\dot{o}_{aCrate} = \frac{\dot{o}_{aC}}{t}$$

■ 33. On the same page, beginning in the same column, *Example:* for Eq. 1065.643–8 should read:

$\varepsilon_{aC} = -6.7$ g

$t = 1202.2$ s = 0.3339 hr

$$\dot{o}_{aCrate} = \frac{-6.7}{0.3339} = -20.065 \text{ g/hr}$$

■ 34. On the same page, in the second column, Eq. 1065.643–9 should read:

$$\dot{o}_{rC} = \frac{\dot{o}_{aC}}{m_{Cfluid} + m_{Cair}}$$

■ 35. On the same page, beginning in the first column, *Example:* for Eq. 1065.643–9 should read:

$\varepsilon_{aC} = -6.7$ g

$m_{Cfliud} = 975.3$ g

$m_{Cair} = 278.6$ g

$$\dot{o}_{rC} = \frac{-6.7}{975.3 + 278.6} = -0.0053$$

■ 36. On page 34560, at the top of the page, Eq. 1065.643–10 should read:

$$\dot{o}_{rCcomp} = \frac{\sum_{i=1}^{N} WF_i \cdot \frac{\left(m_{Cexhi} - m_{Cfluidi} - m_{Cairi}\right)}{t_i}}{\sum_{i=1}^{N} WF_i \cdot \frac{\left(m_{Cfluidi} + m_{Cairi}\right)}{t_i}}$$

■ 37. On the same page, in the first column, the formula before (iii) should read:

$$\dot{o}_{rCcomp} = \frac{\frac{1}{7} \cdot \frac{\left(1255.3 - 977.8 - 280.2\right)}{1} + \frac{6}{7} \cdot \frac{\left(1247.2 - 975.3 - 278.6\right)}{1}}{\frac{1}{7} \cdot \frac{\left(977.8 + 280.2\right)}{1} + \frac{6}{7} \cdot \frac{\left(975.3 + 278.6\right)}{1}} = -0.0049$$

■ 38. On the same page, in the same column, the formula before amendatory instruction 353 should read:

$$\dot{o}_{rCcomp} = \frac{0.85 \cdot \left( \frac{2.873 - 2.864 - 0.023}{123} \right) + 0.15 \cdot \left( \frac{0.125 - 0.095 - 0.024}{306} \right)}{0.85 \cdot \left( \frac{2.864 + 0.023}{123} \right) + 0.15 \cdot \left( \frac{0.095 + 0.024}{306} \right)} = -0.0047$$

**§ 1065.650 [Corrected]**

■ 39. On page 34561, in the third column, the fourth line after Eq. 1065.650–8 should read:

$\bar{n}_{dexh}$ = 57.692 mol/s

■ 40. On page 34563, in the first column, the ninth through eleventh lines after Eq. 1065.650–19 should read:

$\overline{P}$ = mean steady-state power over the test interval as described in paragraph (e) of this section.

**§ 1065.655 [Corrected]**

■ 41. On page the same page, in Table 1 of § 1065.655, delete column 1 and 2 headings and insert first entry to read as follows:

TABLE 1 OF § 1065.655—SYMBOLS AND SUBSCRIPTS FOR CHEMICAL BALANCE EQUATIONS

| | |
|---|---|
| $X_{dil/exh}$ ..... | amount of dilution gas or excess air per mole of exhaust. |

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**§ 1065.1005 [Corrected]**

■ 42. On page 34576, in Table 1 of § 1065.1005, in the Symbol column, the first line should read ''α''.

**§ 1066.1005 [Corrected]**

■ 43. On page 34585, in Table 1 of § 1066.1005, in the Symbol column, the fifth line should read ''$A_m$''

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