



Test Monitoring Center

@ Carnegie Mellon University
6555 Penn Avenue, Pittsburgh, PA 15206, USA

<http://astmtmc.cmu.edu>
412-365-1000

T-12 Information Letter 16-1
Sequence No. 18
March 14, 2016

ASTM consensus has not been obtained on this information letter. An appropriate ASTM ballot will be issued in order to achieve such consensus.

TO: Mack Mailing List
SUBJECT: Updated VUYP Hardware Correction Factors and New Delta Lead Correction Factors

On March 2, 2016 via teleconference, the Mack Test Surveillance panel approved correction factors for Average Liner Wear (ALW), Average Top Ring Weight Loss (ATRWL) and Oil Consumption for the 'VUYP' hardware combination with either A, B, or C batch pistons. These correction factors are in effect for all tests using 'VUYP' hardware with A, B, or C batch pistons (VUYPA or VUYPB). Accordingly, sections 11.6.2.1, 11.6.3.1 and 11.6.6.1 have been revised and are attached.

In addition the Mack Test Surveillance Panel approved new correction factors for Delta Lead at End of Test and Delta Lead from 250-300 hours. These new correction factors apply to all hardware batches for tests starting on or after February 25th 2016. Accordingly, sections 11.6.4.4 and 11.6.5.1 have been revised and are attached.

Greg Shank
Manager
Volvo Group Truck Technology
Powertrain Engineering

Frank M. Farber
Director
ASTM Test Monitoring Center

Attachment
c: ftp://ftp.astmtmc.cmu.edu/docs/diesel/mack/procedure_and_ils/T-12/il16-1.pdf

Distribution: Email

(Revises D7422-15a as amended by IL 15-2)

11.6.2.1 Correction Factor for Average Top Ring Mass Loss

- (1) For all tests using the STWN hardware combination that completed on or before May 18, 2011, multiply the average top ring mass loss from 11.6.2 by 0.95 to get the final average top ring mass loss result.
- (2) For all tests using the STWN hardware combination that completed on or after May 19, 2011 and started before June 5, 2012, multiply the average top ring mass loss from 11.6.2 by 0.92 to get the final average top ring mass loss result.
- (3) For all tests using the STWN hardware combination that started on or after June 5, 2012, multiply the average top ring mass loss from 11.6.2 by 0.705 to get the final average top ring mass loss result.
- (4) For all tests using the UUXO hardware combination multiply the average top ring mass loss from 11.6.2 by 0.849 to get the final average top ring mass loss result.
- (5) For all tests using the VUXO hardware combination that started on or after August 27th 2014, multiply the average top ring mass loss from 11.6.2 by 0.719 to get the final average top ring mass loss result.
- (6) For all tests using the VUXO hardware combination with batch A or B pistons (VUXOA or VUXOB) that started on or after August 4th 2015, multiply the average top ring mass loss from 11.6.2 by 0.912 to get the final average top ring mass loss result.
- (7) For all tests using the VUYP hardware combination with batch A, B or C pistons (VUYPA, VUYPB or VUYPC) multiply the average top ring mass loss from 11.6.2 by 0.912 to get the final average top ring mass loss result.

Report the data on the appropriate form.

11.6.3.1 Correction Factor for Average Cylinder Liner Wear

- (1) For all tests using Batch R piston ring and cylinder liner hardware, multiply the average cylinder liner wear from 11.6.3 by 0.58 to get the final average cylinder liner wear result.
- (2) For all tests using the SWTN hardware combination that completed on or before May 18, 2011, multiply the average cylinder liner wear from 11.6.3 by 0.86 to get the final average cylinder liner wear result.
- (3) For all tests using the STWN hardware combination that completed on or after May 19, 2011 and started before June 5, 2012, multiply the average cylinder liner wear from 11.6.3 by 0.83 to get the final average cylinder liner wear result. For all tests using the STWN hardware combination that started on or after June 5, 2012, multiply the average cylinder liner wear from 11.6.3 by 0.946 to get the final average cylinder liner wear result.
- (4) For all tests using the UUXO hardware combination multiply the average cylinder liner wear from 11.6.3 by 0.566 to get the final average cylinder liner wear result.
- (5) For all tests using the VUXO hardware combination that started on or after August 27th 2014, multiply the average cylinder liner wear from 11.6.3 by 0.818 to get the final average cylinder liner wear result.
- (6) For all tests using the VUXO hardware combination with batch A or B pistons (VUXOA or VUXOB) that started on or after August 4th 2015, multiply the average cylinder liner wear from 11.6.3 by 0.953 to get the final average cylinder liner wear result.

- (7) For all tests using the VUYP hardware combination with batch A, B or C pistons (VUYPA, VUYPB or VUYPC) multiply the average cylinder liner wear from 11.6.3 by 0.970 to get the final average cylinder liner wear result. Report the data on the appropriate form.

11.6.4.4 Correction Factor for ΔLead at EOT

- (1) For all tests using the STWN hardware combination that completed on or before May 18, 2011, determine the final ΔLead at EOT result by applying the correction factor of 0.95 according to the following equation:

$$\Delta\text{Lead}_{\text{Final}} = \exp[(\ln(\Delta\text{Lead}) \times 0.95)] \quad (3)$$

Where:

$\Delta\text{Lead}_{\text{Final}}$ = final ΔLead at EOT

ΔLead = value calculated per 11.6.4.3, equation (2)

- (2) For all tests using the STWN hardware combination that completed on or after May 19, 2011 and started before June 5, 2012, determine the final ΔLead at EOT result by applying the correction factor of 0.92 according to the following equation:

$$\Delta\text{Lead}_{\text{Final}} = \exp[(\ln(\Delta\text{Lead}) \times 0.92)] \quad (4)$$

Where:

$\Delta\text{Lead}_{\text{Final}}$ = final ΔLead at EOT

ΔLead = value calculated per 11.6.4.3, equation (2)

- (3) For all tests using the STWN hardware combination that started on or after June 5, 2012, determine the final ΔLead at EOT result by applying the correction factor of 0.923 according to the following equation:

$$\Delta\text{Lead}_{\text{Final}} = \exp[(\ln(\Delta\text{Lead}) \times 0.923)] \quad (5)$$

Where:

$\Delta\text{Lead}_{\text{Final}}$ = final ΔLead at EOT

ΔLead = value calculated per 11.6.4.3, equation (2)

- (4) For all tests using the UUXO hardware combination determine the final ΔLead at EOT result by applying the correction factor of 0.797 according to the following equation:

$$\Delta\text{Lead}_{\text{Final}} = \exp[(\ln(\Delta\text{Lead}) \times 0.797)] \quad (6)$$

Where:

$\Delta\text{Lead}_{\text{Final}}$ = final ΔLead at EOT

ΔLead = value calculated per 11.6.4.3, equation (2)

- (5) For all tests using the VUXO hardware combination that started on or after August 27th 2014, determine the final ΔLead at EOT result by applying the correction factor of 0.813 according to the following equation:

$$\Delta\text{Lead}_{\text{Final}} = \exp[(\ln(\Delta\text{Lead}) \times 0.813)] \quad (6)$$

Where:

$\Delta\text{Lead}_{\text{Final}}$ = final ΔLead at EOT

ΔLead = value calculated per 11.6.4.3, equation (2)

- (6) For all tests using the VUXO hardware combination with batch A or B pistons (VUXOA or VUXOB) that started on or after August 4th 2015, determine the final ΔLead at EOT result by applying the correction factor of 0.954 according to the following equation:

$$\Delta\text{Lead}_{\text{Final}} = \exp[(\ln(\Delta\text{Lead}) \times 0.954)] \quad (6)$$

Where:

$\Delta\text{Lead}_{\text{Final}}$ = final ΔLead at EOT

ΔLead = value calculated per 11.6.4.3, equation (2)

- (7) For all tests starting on or after February 25th 2016, determine the final ΔLead at EOT result by applying the correction factor calculated according to the following equations:

If $\text{OC}_{100-300} > 65.0$

$$\Delta\text{Lead}_{\text{Final}} = \exp[(\ln(\Delta\text{Lead}) + (65.0 - \text{OC}_{100-300}) \times 0.03088)] \quad (7)$$

If $\text{OC}_{100-300} \leq 65.0$

$$\Delta\text{Lead}_{\text{Final}} = \Delta\text{Lead} \quad (8)$$

Where:

$\Delta\text{Lead}_{\text{Final}}$ = final ΔLead at EOT

ΔLead = value calculated per 11.6.4.3, equation (2)

$\text{OC}_{100-300}$ = average oil consumption calculated in 11.6.6

Report the data on the appropriate form.

11.6.5.1 Correction Factor for ΔLead (250 to 300) h

- (1) For all tests using the STWN hardware combination that completed on or before May 18, 2011, determine the final ΔLead (250 to 300) h result by applying the correction factor of 1.03 according to the following equation:

$$\Delta\text{Lead (250-300)}_{\text{Final}} = \exp[(\ln(\Delta\text{Lead 250-300}) \times 1.03)] \quad (9)$$

Where:

$\Delta\text{Lead (250-300)}_{\text{Final}}$ = final ΔLead (250 to 300) h

$\Delta\text{Lead (250-300)}$ = value calculated per 11.6.5

- (2) For all tests using the STWN hardware combination that completed on or after May 19, 2011 and started before June 5, 2012, determine the final ΔLead (250 to 300) h result by applying the correction factor of 0.93 according to the following equation:

$$\Delta\text{Lead (250-300)}_{\text{Final}} = \exp[(\ln(\Delta\text{Lead 250-300}) \times 0.93)] \quad (10)$$

Where:

$\Delta\text{Lead (250-300)}_{\text{Final}}$ = final ΔLead (250 to 300) h

$\Delta\text{Lead (250-300)}$ = value calculated per 11.6.5

- (3) For all tests using the STWN hardware combination that started on or after June 5, 2012, determine the final ΔLead (250 to 300) h result by applying the correction factor of 0.956 according to the following equation:

$$\Delta\text{Lead (250-300)}_{\text{Final}} = \exp[(\ln(\Delta\text{Lead 250-300}) \times 0.956)] \quad (11)$$

Where:

$\Delta\text{Lead (250-300)}_{\text{Final}}$ = final ΔLead (250 to 300) h

$\Delta\text{Lead (250-300)}$ = value calculated per 11.6.5

- (4) For all tests using the UUXO hardware combination determine the final ΔLead (250 to 300) h result by applying the correction factor of 0.700 according to the following equation:

$$\Delta\text{Lead (250-300)}_{\text{Final}} = \exp[(\ln(\Delta\text{Lead 250-300}) \times 0.700)] \quad (12)$$

Where:

$\Delta\text{Lead (250-300)}_{\text{Final}}$ = final ΔLead (250 to 300) h

$\Delta\text{Lead (250-300)}$ = value calculated per 11.6.5

- (5) For all tests using the VUXO hardware combination that started on or after August 27th 2014, determine the final ΔLead (250 to 300) h result by applying the correction factor of 0.710 according to the following equation:

$$\Delta\text{Lead (250-300)}_{\text{Final}} = \exp[(\ln(\Delta\text{Lead 250-300}) \times 0.710)] \quad (13)$$

Where:

$\Delta\text{Lead (250-300)}_{\text{Final}}$ = final ΔLead (250 to 300) h

$\Delta\text{Lead (250-300)}$ = value calculated per 11.6.5

- (6) For all tests using the VUXO hardware combination with batch A or B pistons (VUXOA or VUXOB) that started on or after August 4th 2015, determine the final ΔLead (250 to 300) h result by applying the correction factor of 0.895 according to the following equation:

$$\Delta\text{Lead (250-300)}_{\text{Final}} = \exp[(\ln(\Delta\text{Lead 250-300}) \times 0.895)] \quad (14)$$

Where:

$\Delta\text{Lead (250-300)}_{\text{Final}}$ = final ΔLead (250 to 300) h

$\Delta\text{Lead (250-300)}$ = value calculated per 11.6.5

- (7) For all tests that started on or after February 25th 2016, determine the final ΔLead (250 to 300) h by applying the correction factor calculated according to the following equations:

If $\text{OC}_{100-300} > 65.0$

$$\Delta\text{Lead(250-300)}_{\text{Final}} = \exp[(\ln(\Delta\text{Lead(250-300)}) + (65.0 - \text{OC}_{100-300}) \times 0.04021)] \quad (15)$$

If $\text{OC}_{100-300} \leq 65.0$

$$\Delta\text{Lead}_{\text{Final}} = \Delta\text{Lead} \quad (16)$$

Where:

$\Delta\text{Lead (250-300)}_{\text{Final}}$ = final ΔLead (250 to 300) h

$\Delta\text{Lead (250-300)}$ = value calculated per 11.6.5

$\text{OC}_{100-300}$ = average oil consumption calculated from 11.6.6

Report the data on the appropriate form.

11.6.6.1 Correction Factor for Oil Consumption

- (1) For all tests using the STWN hardware combination that completed on or before May 18, 2011, determine the final oil consumption result by applying the correction factor of 0.96 according to the following equation:

$$OC = \exp[(\ln(OC_{100-300}) \times 0.96)] \quad (16)$$

Where:

OC = final oil consumption

OC₁₀₀₋₃₀₀ = average oil consumption from 11.6.6

- (2) For all tests using the STWN hardware combination that completed on or after May 19, 2011 and started before June 5, 2012, determine the final oil consumption result by applying the correction factor of 0.95 according to the following equation:

$$OC = \exp[(\ln(OC_{100-300}) \times 0.95)] \quad (17)$$

Where:

OC = final oil consumption

OC₁₀₀₋₃₀₀ = average oil consumption from 11.6.6

- (3) For all tests using the STWN hardware combination that started on or after June 5, 2012, determine the final oil consumption result by applying the correction factor of 0.961 according to the following equation:

$$OC = \exp[(\ln(OC_{100-300}) \times 0.961)] \quad (18)$$

Where:

OC = final oil consumption

OC₁₀₀₋₃₀₀ = average oil consumption from 11.6.6

- (4) For all tests using the UUXO hardware combination determine the final oil consumption result by applying the correction factor of 0.916 according to the following equation:

$$OC = \exp[(\ln(OC_{100-300}) \times 0.916)] \quad (14)$$

Where:

OC = final oil consumption

OC₁₀₀₋₃₀₀ = average oil consumption from 11.6.6

- (5) For all tests using the VUXO hardware combination that started on or after August 27th 2014, determine the final oil consumption result by applying the correction factor of 0.913 according to the following equation:

$$OC = \exp[(\ln(OC_{100-300}) \times 0.913)] \quad (14)$$

Where:

OC = final oil consumption

OC₁₀₀₋₃₀₀ = average oil consumption from 11.6.6

- (6) For all tests using the VUXO hardware combination with batch A or B pistons (VUXOA or VUXOB) that started on or after August 4th 2015, determine the final oil consumption result by applying the correction factor of 0.942 according to the following equation:

$$OC = \exp[(\ln(OC_{100-300}) \times 0.942)] \quad (14)$$

Where:

OC = final oil consumption

OC₁₀₀₋₃₀₀ = average oil consumption from 11.6.6

- (7) For all tests using the VUYP hardware combination with batch A, B or C pistons (VUYPA, VUYPB or VUYPC) determine the final oil consumption result by applying the correction factor of 0.940 according to the following equation:

$$OC = \exp[(\ln(OC_{100-300}) \times 0.940)] \quad (14)$$

Where:

OC = final oil consumption

OC₁₀₀₋₃₀₀ = average oil consumption from 11.6.6

Report the data on the appropriate form.