



Test Monitoring Center

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

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

MEMORANDUM: 13-039

DATE: May 29, 2013

TO: Yong-Li McFarland,
Chairman, Engine Oil Water Tolerance Surveillance Panel

FROM: Michael T. Kasimirsky *Michael T. Kasimirsky*

SUBJECT: Water Treatment Level Experiment Results

On February 7, 2013, the EOWT Surveillance Panel held a teleconference to discuss a potential error in Test Method D 6794 regarding the calculation of water treatment levels used in the method. The test method calls for only varying the amount of water used to treat the test oil, which results in concentration levels that do not exactly match the stated treatment levels. To reach the stated water treatment levels, both the water and oil amounts would need to be varied during the sample preparation phase of the method. The primary purpose of this exercise is to determine if this variation in the water treatment level has an impact on test severity.

To investigate this issue, the Surveillance Panel approved a motion to conduct a matrix of donated EOWT runs in the industry. These runs would consist of four sets of four oils run at each test lab. Two sets of four runs would be made using the current water treatment procedures, while two sets of four runs would be made by varying both the water and oil amounts to meet the exact, stated concentration levels. All runs would be made on reference oil 77-1.

To date, the Test Monitoring Center has received 48 test results from three different laboratories as part of this exercise. The results of these runs are shown in Table 2, attached.

These results were analyzed to determine if there were any differences between the two groups of data. The two groups of data were compared both overall as well as by water treatment level for differences. The results of that analysis are shown in Table 1, below:

| Water Treatment Level | Probability > F |
|-----------------------|-----------------|
| 0.6% | 0.8495 |
| 1.0% | 0.3604 |
| 2.0% | 0.8259 |
| 3.0% | 0.3653 |
| All Data | 0.4492 |

Memo 13-039

Page 2

The data in Table 1 shows that there are no significant differences between the results obtained by either water treatment method. The “Probability > F” column in Table 1 would have to be less than 0.05 to show that there are significant differences, at a 95% confidence level, between the results obtained by either water treatment method. If you have any questions regarding the matrix or the result, please feel free to contact me.

MTK/mtk/mem13-039.docx

c: EOWT Surveillance Panel
<ftp://ftp.astmtmc.cmu.edu/docs/bench/eowt/memos/mem13-039.mtk.pdf>

Distribution: email

Table 1: Individual Test Results

| TESTKEY | LAB | IND | VAL | LTMSTDATE | LTMSTIME | DTERPT | TREAT | CFA | CFAYI | COM1 | COM2 | COM3 | COM4 |
|------------|-----|------|-----|-----------|----------|----------|-------|--------|--------------|-------|---------|------|--------|
| 91882-EOWT | A | 77-1 | NI | 20130228 | 13:26 | 20130401 | 0.6 | -26.35 | -1.807065217 | BOTH | CHANGED | | WCTEST |
| 91878-EOWT | A | 77-1 | MI | 20130228 | 13:36 | 20130401 | 0.6 | -28.24 | -2.320652174 | BOTH | CHANGED | CFAM | WCTEST |
| 91874-EOWT | A | 77-1 | NI | 20130228 | 13:48 | 20130401 | 0.6 | -25.66 | -1.619565217 | WATER | CHANGED | | WCTEST |
| 91870-EOWT | A | 77-1 | NI | 20130228 | 14:01 | 20130401 | 0.6 | -24.13 | -1.203804348 | WATER | CHANGED | | WCTEST |
| 91883-EOWT | A | 77-1 | NI | 20130228 | 12:49 | 20130401 | 1.0 | -16.53 | -0.727488152 | BOTH | CHANGED | | WCTEST |
| 91879-EOWT | A | 77-1 | NI | 20130228 | 12:59 | 20130401 | 1.0 | -16.41 | -0.699052133 | BOTH | CHANGED | | WCTEST |
| 91875-EOWT | A | 77-1 | NI | 20130228 | 13:08 | 20130401 | 1.0 | -18.6 | -1.218009479 | WATER | CHANGED | | WCTEST |
| 91871-EOWT | A | 77-1 | NI | 20130228 | 13:17 | 20130401 | 1.0 | -16.23 | -0.656398104 | WATER | CHANGED | | WCTEST |
| 91884-EOWT | A | 77-1 | NI | 20130228 | 14:17 | 20130401 | 2.0 | -18.12 | -0.849753695 | BOTH | CHANGED | | WCTEST |
| 91880-EOWT | A | 77-1 | NI | 20130228 | 14:29 | 20130401 | 2.0 | -16.61 | -0.477832512 | BOTH | CHANGED | | WCTEST |
| 91876-EOWT | A | 77-1 | NI | 20130228 | 14:43 | 20130401 | 2.0 | -19.53 | -1.197044335 | WATER | CHANGED | | WCTEST |
| 91872-EOWT | A | 77-1 | NI | 20130228 | 14:57 | 20130401 | 2.0 | -19.16 | -1.10591133 | WATER | CHANGED | | WCTEST |
| 91885-EOWT | A | 77-1 | NI | 20130228 | 13:30 | 20130401 | 3.0 | -18.83 | -0.942396313 | BOTH | CHANGED | | WCTEST |
| 91881-EOWT | A | 77-1 | NI | 20130228 | 13:39 | 20130401 | 3.0 | -18.85 | -0.947004608 | BOTH | CHANGED | | WCTEST |
| 91877-EOWT | A | 77-1 | NI | 20130228 | 13:50 | 20130401 | 3.0 | -16.87 | -0.49078341 | WATER | CHANGED | | WCTEST |
| 91873-EOWT | A | 77-1 | NI | 20130228 | 14:00 | 20130401 | 3.0 | -17.59 | -0.656682028 | WATER | CHANGED | | WCTEST |
| 94366-EOWT | B | 77-1 | NI | 20130517 | 15:42 | 20130517 | 0.6 | -22.31 | -0.70923913 | BOTH | CHANGED | | WCTEST |
| 94380-EOWT | B | 77-1 | NI | 20130517 | 15:42 | 20130517 | 0.6 | -21.69 | -0.54076087 | BOTH | CHANGED | | WCTEST |
| 94362-EOWT | B | 77-1 | NI | 20130510 | 15:46 | 20130510 | 0.6 | -22.82 | -0.847826087 | WATER | CHANGED | | WCTEST |
| 94370-EOWT | B | 77-1 | NI | 20130510 | 15:46 | 20130510 | 0.6 | -23.08 | -0.918478261 | WATER | CHANGED | | WCTEST |
| 94367-EOWT | B | 77-1 | NI | 20130517 | 15:42 | 20130517 | 1.0 | -14.43 | -0.22985782 | BOTH | CHANGED | | WCTEST |
| 94381-EOWT | B | 77-1 | NI | 20130517 | 15:42 | 20130517 | 1.0 | -14.46 | -0.236966825 | BOTH | CHANGED | | WCTEST |
| 94363-EOWT | B | 77-1 | NI | 20130510 | 15:46 | 20130510 | 1.0 | -10.09 | 0.798578199 | WATER | CHANGED | | WCTEST |
| 94371-EOWT | B | 77-1 | NI | 20130510 | 15:46 | 20130510 | 1.0 | -15.27 | -0.428909953 | WATER | CHANGED | | WCTEST |
| 94368-EOWT | B | 77-1 | NI | 20130517 | 15:42 | 20130517 | 2.0 | -14.28 | 0.096059113 | BOTH | CHANGED | | WCTEST |
| 94382-EOWT | B | 77-1 | NI | 20130517 | 15:42 | 20130517 | 2.0 | -14.41 | 0.064039409 | BOTH | CHANGED | | WCTEST |
| 94364-EOWT | B | 77-1 | NI | 20130510 | 15:46 | 20130510 | 2.0 | -13.29 | 0.339901478 | WATER | CHANGED | | WCTEST |
| 94372-EOWT | B | 77-1 | NI | 20130510 | 15:46 | 20130510 | 2.0 | -14.6 | 0.017241379 | WATER | CHANGED | | WCTEST |
| 94369-EOWT | B | 77-1 | NI | 20130517 | 15:42 | 20130517 | 3.0 | -13.99 | 0.17281106 | BOTH | CHANGED | | WCTEST |
| 94383-EOWT | B | 77-1 | NI | 20130517 | 15:42 | 20130517 | 3.0 | -13.95 | 0.18202765 | BOTH | CHANGED | | WCTEST |
| 94365-EOWT | B | 77-1 | NI | 20130510 | 15:46 | 20130510 | 3.0 | -16.99 | -0.51843318 | WATER | CHANGED | | WCTEST |
| 94373-EOWT | B | 77-1 | NI | 20130510 | 15:46 | 20130510 | 3.0 | -15.21 | -0.108294931 | WATER | CHANGED | | WCTEST |
| 92400-EOWT | G | 77-1 | NI | 20130220 | 17:00 | 20130221 | 0.6 | -14.29 | 1.470108696 | BOTH | CHANGED | | WCTEST |
| 92404-EOWT | G | 77-1 | NI | 20130220 | 17:00 | 20130221 | 0.6 | -18.2 | 0.407608696 | BOTH | CHANGED | | WCTEST |
| 92392-EOWT | G | 77-1 | NI | 20130220 | 17:00 | 20130221 | 0.6 | -17.72 | 0.538043478 | WATER | CHANGED | | WCTEST |
| 92396-EOWT | G | 77-1 | NI | 20130220 | 17:00 | 20130221 | 0.6 | -14.48 | 1.418478261 | WATER | CHANGED | | WCTEST |
| 92401-EOWT | G | 77-1 | NI | 20130220 | 17:00 | 20130221 | 1.0 | -16.84 | -0.800947867 | BOTH | CHANGED | | WCTEST |
| 92405-EOWT | G | 77-1 | NI | 20130220 | 17:00 | 20130221 | 1.0 | -17.25 | -0.898104265 | BOTH | CHANGED | | WCTEST |
| 92393-EOWT | G | 77-1 | NI | 20130220 | 17:00 | 20130221 | 1.0 | -13.06 | 0.09478673 | WATER | CHANGED | | WCTEST |
| 92397-EOWT | G | 77-1 | NI | 20130220 | 17:00 | 20130221 | 1.0 | -15.27 | -0.428909953 | WATER | CHANGED | | WCTEST |
| 92402-EOWT | G | 77-1 | NI | 20130220 | 17:00 | 20130221 | 2.0 | -11.13 | 0.871921182 | BOTH | CHANGED | | WCTEST |
| 92406-EOWT | G | 77-1 | NI | 20130220 | 17:00 | 20130221 | 2.0 | -14.18 | 0.120689655 | BOTH | CHANGED | | WCTEST |
| 92394-EOWT | G | 77-1 | NI | 20130220 | 17:00 | 20130221 | 2.0 | -8.85 | 1.433497537 | WATER | CHANGED | | WCTEST |
| 92398-EOWT | G | 77-1 | NI | 20130220 | 17:00 | 20130221 | 2.0 | -10.54 | 1.017241379 | WATER | CHANGED | | WCTEST |
| 92403-EOWT | G | 77-1 | NI | 20130220 | 17:00 | 20130221 | 3.0 | -14.5 | 0.055299539 | BOTH | CHANGED | | WCTEST |
| 92407-EOWT | G | 77-1 | NI | 20130220 | 17:00 | 20130221 | 3.0 | -17.35 | -0.601382488 | BOTH | CHANGED | | WCTEST |
| 92395-EOWT | G | 77-1 | NI | 20130220 | 17:00 | 20130221 | 3.0 | -12.23 | 0.578341014 | WATER | CHANGED | | WCTEST |
| 92399-EOWT | G | 77-1 | NI | 20130220 | 17:00 | 20130221 | 3.0 | -8.97 | 1.329493088 | WATER | CHANGED | | WCTEST |