

**HEAVY-DUTY ENGINE OIL CLASSIFICATION PANEL  
OF  
ASTM D02.B0.02  
July 11, 2001**

Holiday Inn – O'Hare International Hotel, Rosemont, IL

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**ACTION ITEMS**

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| <b>1. Issue "Exit" ballots</b>                          | <b>J. McGeehan</b>         |
| <b>2. Complete T-10 matrix statistical analysis</b>     | <b>T-10 Task Force</b>     |
| <b>3. Complete M-11 EGR matrix statistical analysis</b> | <b>M-11 EGR Task Force</b> |
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**MINUTES**

- 1.0 Call to Order
  - 1.1 Chairman Jim McGeehan called the meeting to order at 8:30 a.m. on July 11, 2001, in the Kitty Hawk room of the Holiday Inn – O'Hare International Hotel of Rosemont, IL. There were 12 members present or represented and there were approximately 21 guests present. The attendance list is shown as Attachment 2.
- 2.0 Agenda
  - 2.1 The published agenda (Attachment 1) was reviewed and additions agreed to: Tom Cousineau on 1R; Chris May on LOTRUO; Jai Bansal on used oil viscometrics.
- 3.0 Previous Meeting Minutes
  - 3.1 Lew Williams moved and Dwayne Tharp seconded that the minutes of the June 19, 2001, meeting in San Diego be approved as distributed to the members. The motion passed unanimously. Members and guests will be notified when the minutes are posted to the TMC website.
- 4.0 Membership
  - 4.1 There were no changes in membership (Attachment 3).
- 5.0 Chairman's Comments
  - 5.1 The next two meetings will start at 7:30 a.m. and continue to 4:30 p.m., so do not plan to leave early.

- 5.2 To facilitate presentation of the T-10 and M-11 statistical analyses, Dwayne Tharp and Jim Wells volunteered to bring digital projectors for the August meeting – after finding the hotel wanted \$500+ to rent one.
- 6.0 PC-9 Matrix Status
  - 6.1 Jeff Clark presented the PC-9 matrix test status for John Zalar (Attachment 4) and noted that all T-10 and M-11 EGR testing had completed. One of the nine first round 1R tests had suffered an operational problem during break-in and had not restarted yet, while the other eight had completed or were nearing completion. So, completion of the planned 1R matrix could not occur now until mid-Sept. at the earliest.
  - 6.2 Steve Kennedy reported that the ACC had verbally agreed to use funds originally earmarked for the 1Q matrix now for the 1R matrix. An addendum to the MOA is now circulating for signatures by all the stake-holders.
- 7.0 Mack T-10
  - 7.1 Greg Shank reported on the T-10 status (Attachment 5) and presented a “To Do” list (Attachment 6) for things that need to be done before the next HDEOCP meeting. He noted that the Task Force had agreed to start using intake and exhaust CO2 measurements to control EGR rate instead of the exhaust oxygen sensor. This should provide more consistent EGR mass flow rates between labs. The Task Force is looking for HDEOCP approval of the test at the Aug. 15<sup>th</sup> meeting, with registration hopefully to start in the 8/16 to 8/21 timeframe.
  - 7.2 Jim Rutherford presented a preliminary summary of the statistical analysis of T-10 matrix data available to date (Attachment 7). The Task Force decided to not use the data from the test on oil CMIR 38815 because of oil analysis and test result anomalies.
- 8.0 Cummins M-11 EGR
  - 8.1 Dave Stehouwer reported on the M-11 EGR and presented what Cummins is proposing as limits for the test (Attachment 8). “Beaded” (reworked) test filters must be used on all future reference tests and those tests must fall within an 8.0% to 9.0% soot window at 250 hours with a minimum of 4.6% average soot – calculated using all 13 oil samples. Future non-reference tests must achieve a minimum of 8.0% soot at 250 hours and the “average” soot must be 4.6% or higher. Dave also went over the “To Do” list (Attachment 9) of things that need to be done before the next HDEOCP meeting.
  - 8.2 Dennis Malandro reviewed the preliminary statistical analysis he had done using the available M-11 EGR matrix data (Attachment 10).
- 9.0 Caterpillar 1R
  - 9.1 Lew Williams presented an update on the 1R matrix design and test activities (Attachment 11).
  - 9.2 Ton Cousineau presented data from Ethyl (Attachment 12) illustrating their concern that using the 1P read across guidelines for the 1R may be counter productive and opposite of what is needed.
  - 9.3 Steve Kennedy remarked that he had some data that supported the Ethyl position.
  - 9.4 Tom and Steve to get their data to Ralph Cherrillo and the API BOI/VGRA Task Force will consider it and review the guidelines.
- 10.0 Mack T-8E
  - 10.1 Greg Shank restated Mack’s concern that today’s engines are more severe with regard to oil shear. Greg then made a motion that the Relative Viscosity calculation for PC-9 T-8E results be changed to use 100% of the D6278 shear value and the RV limit be set to 1.7.

Ralph Cherrillo seconded the motion. In the ensuing discussion, the motion was withdrawn and never voted on. It was decided to include this item as an "exit" ballot to the HDEOCP members.

#### 11.0 High Temperature, High Shear

- 11.1 Greg Shank opened the discussion with previously used slides of EMA's recommendation for a HTHS limit and wear versus HTHS (Attachment 13).
- 11.2 Steve Kennedy presented an ExxonMobil perspective on a 3.5 cP HTHS limit (Attachment 14) and how it would constrict the basestock / additive blend window. They would prefer the 3.5 limit, if adopted, be made a "non-critical" limit.
- 11.3 Pat Fetterman presented Infineum concerns with any proposed HTHS limit above 3.0 cP (Attachment 15).
- 11.4 Jim McGeehan presented data from SAE paper 932845 showing significant reductions in ring / liner wear rates with increasing HTHS (Attachment 16).
- 11.5 Ken Chao, Dave Stehouwer and Dwayne Tharp all expressed opinions that wear protection was more important to their companies than possible fuel economy benefits of lower viscosity within a grade.
- 11.6 Bill Kleiser made a motion that HTHS be considered a "non-critical" parameter for the PC-9 specification at 3.5 cP for fresh oil. Tom Cousineau seconded the motion which passed with 9 votes for, 2 against and 1 abstain. SAE specification (?) 3244 was cited as a reference for the definition of "non-critical".

#### 12.0 Used Oil Viscometrics

- 12.1 Chris May reported on the LOTRUO activities (Attachment 17) and asked that the remaining T-10 and M-11EGR samples be sent to him for analysis. His group recommends use of the standard MRV TP-1 test for evaluating the low temperature viscosity of used oils. SwRI is to send 75 hour T-10 samples to Chris May at Imperial Oil. There was discussion about soot dropout from samples and someone remarked they had checked samples for up to 3 years and found no dropout.
- 12.2 Jai Bansal presented data Infineum had acquired from field and engine tests of various oils (Attachment 18). They concluded that MRV TP-1 performance of a used oil is not predicted by the KV100 increase, relative viscosity or viscosity slope and that certain oils will exhibit potential for low temperature pumpability problems in the field.
- 12.3 Dave Stehouwer presented plots from a low temperature pumpability study using an operable engine and various sooted / fresh oils (Attachment 19). Based on that data, Cummins is proposing a limit of 25,000 cP at 5°C higher than the fresh oil "W" grade temperature, using the 75 hour T-10 sample (approximately 5% soot). Steve Kennedy asked that the modified MRV method be used if the sample exhibited yield stress. This proposal will be included in the upcoming "exit" ballot.

#### 13.0 Elastomers

- 13.1 Tom Boschert reported on the status of the elastomer compatibility specification (Attachments 20, 21, 22, 23) and indicated one reference oil was not going to be sufficient for the method. He also felt a "referee" body would be needed to rule on situations that were perhaps opposite the expected trend. He presented a chart of proposed limits (Attachment 24). This proposal will also be included in the upcoming "exit" ballot.

#### 14.0 Caterpillar 1N

- 14.1 Dwayne Tharp reported he has seen 1N data for one "PC-9" oil which had the following results:

WDN = 276	versus a CG-4 limit of	286 max.
TGF = 38	“ “ “	20 max.
TLHC= 8	“ “ “	3 max.
OC = 0.19	“ “ “	0.5 max.

This result is causing concern that oils formulated to pass the new tests may struggle to pass the 1N. Some discussion with regard to changing limits for the 1N in PC-9, but that raised backward compatibility concerns.

15.0 Next Meeting

15.1 Chairman McGeehan reviewed the next meeting times (7:30 – 4:30) and the forthcoming “exit” ballots. The “exit” ballots are to cover the carryover test items, elastomer compatibility, HTHS, T-8E and low temperature used oil viscosity.

16.0 Thanks

16.1 Appreciation was expressed to Chris May and Tom Boschert for all the work they have done on the low temperature viscosity measurement method and elastomer compatibility.

17.0 Adjournment

17.1 The meeting was adjourned at 12:49 p.m. on July 11, 2001.

Submitted by:

Jim Wells  
Secretary to the HDEOCP