Test Monitoring Center
6555 Penn Avenue
Pittsburgh, PA 15206-4489
(412) 365-1000

MEMORANDUM: 02-069

DATE: September 16, 2002

TO: Mr. Frank Gotto, Chair D02.B07 High Temperature Foam Surveillance Panel

FROM: Tom Schofield

SUBJECT: D6082 Round-Robin Results: Proposed Reference Oil TMC 66

A D6082 High Temperature Foam round-robin matrix was completed by participating TMC monitored labs, under the auspices of the ASTM D02.B07 High Temperature Foam Surveillance Panel, on proposed TMC reference oil 66. Screener tests on oil 66 gave expectations of severe performance with respect to the current API SL passing limit of 100 ml Static Foam Tendency (Immediately Before Air Disconnect). The failing (severe) oil would be expected to compliment the current passing D6082 reference oil, TMC 1007, and replace TMC 1002 which was discontinued as a reference oil because of its inappropriately severe and imprecise performance. The round robin was expected to provide data to propose initial performance targets and acceptance bands on oil 66.

The round-robin test results for the proposed new D6082 reference oil, TMC 66, have been reported to the TMC by the participating laboratories. The matrix consisted of four TMC monitored laboratories each running a sample of TMC 66 in duplicate using the D6082 test method for a total of eight results.

The individual test results are included in the attached table. Table 1 is a summary of the reported results:

Table 1
TMC Oil 66 D6082 Round-Robin Summary

	n	FTIB	FS1M
Max	--	400	0
Avg	8	256.25	0
s_R	8	107.03	0
s_r	8	13.69	0
Min	--	120	0

FTIB = Foam Tendency Immediately Before Air Disconnect, ml
FS1M = Foam Stability 1 Minute After Air Disconnect, ml

Unfortunately, the range of data is unreasonably broad and standard deviation of reproducibility (s_R; between labs) is exceptionally poor (even when compared to TMC oil 1002 which was deactivated as a TMC D6082 reference oil due to a high level of variability in the test results). It's interesting to note that the standard deviation of repeatability (s_r; within labs) is quite good for the matrix. This shows that the duplicate results obtained by each of the labs were very repeatable, but the labs could not agree on a performance level (all four labs reported results that are significantly (95% confidence) different from each other).

The TMC's opinion is that the round-robin data is too variable to be used for setting any realistic acceptance bands on TMC oil 66. Using a 95% confidence treatment of the results (mean +/- 1.960 s_R), the acceptance range for Foam Tendency Immediately Before Disconnect would be 46 to 466 ml. This would not provide a useful range to allow discrimination from oil 1007 (range 28 to 103), or to verify a lab's ability to discriminate between an API SL category passing and failing oil. All four labs did, however, show TMC 66 to exceed the API SL category D6082 limit of 100 ml Static Foam Tendency.

The very large lab-to-lab differences coupled with the good repeatability within labs raises questions about whether or not the labs are performing the test in the same way. In particular, are the labs reading the foam levels in the same way? I suggest that the technicians who ran the tests be brought together to discuss their techniques in running these samples, trying to home in on the operational differences that may have produced such disparate results.

Tom Schofield
ASTM Test Monitoring Center
6555 Penn Avenue
Pittsburgh, PA 15206
Voice: 412-365-1011
Fax: 412-365-1049
Email: tms@astmtmc.cmu.edu

TMS/tms

Attachment

c: D02.B07 (D6082) High Temperature Foam Surveillance Panel
D02.B07 (D6082) High Temperature Foam Mailing List
D02.B07 (D6082) High Temperature Foam Participants
Dr. John Zalar, TMC
ftp://www.astmtmc.cmu.edu/docs/bench/d6082/memos/mem02-069

Distribution: Email

D6082 Round-Robin Test Results for Proposed Reference Oil TMC 66
(September 2002 Study)

LTMSLAB	LTMSAPP	TESTKEY	LTMSDATE	LTMSTIME	IND	FTIB	FTIByi	FS1M	BAROPRES	BLENDCAL	DIFPORE	DIFPERM
G	2	45687	20020813	16:11	66	190	-0.619	0	743.8	22779	20	5060
G	2	45662	20020813	16:20	66	200	-0.526	0	743.8	22779	20	5060
A	2	45664	20020820	14:15	66	370	1.063	0	740.0	23800	21	4078
A	2	45688	20020820	14:20	66	400	1.343	0	740.0	23800	20	4194
B	1	45663	20020822	13:09	66	140	-1.086	0	743.5	21800	22	4336
B	1	45689	20020822	13:09	66	120	-1.273	0	743.4	21800	21	4999
I	1	45661	20020903	11:30	66	320	0.596	0	-----	22000	23	4061
I	1	45686	20020903	11:30	66	310	0.502	0	-----	22000	23	3685
				Max		**400**		**0**				
				Avg		**256.25**		**0**				
				sR		**107.03**		**0**				
				Min		**120**		**0**				