



Test Monitoring Center

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MEMORANDUM: 02-098

DATE: October 22, 2002

TO: Mr. Mark Devlin, Chair D02.B07 Gelation Index Surveillance Panel

FROM: Tom Schofield

SUBJECT: D5133 (Gelation Index) Round-Robin Results: Proposed Reference Oil 1009

A D5133 Gelation Index (GI) round-robin matrix was completed by participating TMC monitored labs, under the auspices of the ASTM D02.B07 Gelation Index Surveillance Panel, on proposed TMC reference oil 1009. Oil 1009 is formulated to meet the newer ILSAC GF-3 (API SL) specifications and it was proposed that the oil might supplement the current slate of GI reference oils, or even replace one or two current reference oils. The round-robin was run to provide data to evaluate the oil and to propose initial performance targets.

The matrix consisted of eight TMC monitored laboratories, each running oil 1009 in duplicate using the D5133 test method, for a total of 16 results. The individual test results are included in the attached table. Table 1 is a summary of the round-robin results.

Table 1
TMC Oil 1009 D5133 Round-Robin Summary

	n	GT	GI
Max	--	-6.0	8.8
Mean	16	-15.1	7.3
s_R	16	2.95	0.68
s_r	16	1.64	0.31
Min	--	-17.0	6.4

GT = Gelation Temperature, °C

GI = Gelation Index

The TMC's data analysis shows Lab B as providing results significantly (95% confidence) different from the other seven labs, however, Lab B's data does not test as unreasonable (outlier) on Gelation Index (but does have one outlier result on Gelation Temperature) and, therefore, all reported matrix data has been included in the Table 1 summary. There were no other anomalies noted with the data set.

The GI standard deviation of reproducibility (s_R) for 1009 is reasonable when compared to the TMC's current reference oils, and is comparable to that of TMC 58 (target GI mean 5.8, target s_R 0.69). Proposed acceptance bands for 1009 would be a GI range of 6.0 - 8.6, based on a 95% confidence treatment of the data (GI mean \pm 1.96 s_R).

The TMC holds no opinion or recommendation on whether or not 1009 should be added to the current slate of GI reference oils, or if it should replace any of the current reference oils. The performance targets of the current GI reference oils are listed in Table 2 along with the proposed targets for TMC 1009 for comparison. The D4485 GI specification for SL category oils is 12, max.

Table 2
Current D5133 Gelation Index Reference Oil Targets
and Proposed Targets for Oil 1009

Oil Code	Parameter	n	Mean	sR	Acceptance Bands	
					Lower	Upper
1009	Gelation Index	16	7.3	0.68	6.0	8.6
52	Gelation Index	35	4.5	0.24	4.0	5.0
53	Gelation Index	37	44.7	4.64	35.6	53.8
58	Gelation Index	17	5.8	0.69	4.4	7.2
62	Gelation Index	35	17.0	3.90	9.4	24.6

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Attachment

c: D02.B07 GI (D5133) Mailing List
D02.B07 GI (D5133) Participants
Dr. John Zalar, TMC
<ftp://www.astmtmc.cmu.edu/docs/bench/gi/memos/mem02-098.pdf>

Distribution: Email

D5133 Gelation Index Round-Robin Results for Proposed Reference Oil TMC 1009
(October 2002 Study)

LTM SLAB	LTM SAPP	LTM SDATE	IND	GELT	GELI	VAL	COM3	VIS5G	VIS10G	VIS20G	VIS30G	VIS40G
U	2	20020815	1009	-16	7.6	AG	1009RR02	-16.3	-20.2	-26.7	-30.5	-32.9
U	2	20020815	1009	-16	7.4	AG	1009RR02	-16.3	-20.0	-26.5	-30.3	-32.7
G	1	20020815	1009	-17	6.8	AG	1009RR02	-16.9	-21.0	-27.3	-30.9	-33.2
G	1	20020815	1009	-16	7.1	AG	1009RR02	-16.8	-20.9	-27.3	-31.0	-33.4
A	1	20020816	1009	-16	7.0	AG	1009RR02	-16.7	-20.7	-26.9	-30.5	-32.8
A	1	20020816	1009	-16	7.1	AG	1009RR02	-16.7	-20.7	-26.8	-30.4	-32.7
H	1	20020819	1009	-17	7.1	AG	1009RR02	-16.7	-20.4	-26.6	-30.3	-32.7
H	1	20020819	1009	-17	7.4	AG	1009RR02	-16.8	-20.5	-26.6	-30.4	-32.8
I	1	20020823	1009	-12	8.0	AG	1009RR02	-16.5	-20.3	-26.6	-30.3	-32.8
I	1	20020823	1009	-16	6.9	AG	1009RR02	-16.2	-20.0	-26.7	-30.6	-33.2
D	2	20020821	1009	-17	7.0	AG	1009RR02	-16.5	-20.5	-27.0	-30.9	-33.3
D	2	20020823	1009	-16	7.1	AG	1009RR02	-16.5	-20.6	-27.1	-30.8	-33.1
S	1	20020826	1009	-16	6.6	AG	1009RR02	-16.4	-20.6	-27.0	-30.6	-32.8
S	1	20020826	1009	-16	6.4	AG	1009RR02	-16.4	-20.6	-27.0	-30.5	-32.8
B	3	20020918	1009	-6	8.8	AG	1009RR02	-16.3	-20.0	-26.1	-29.8	-32.1
B	3	20020918	1009	-11	8.7	AG	1009RR02	-15.8	-19.5	-25.7	-29.5	-31.9
			Max	-6.0	8.8							
			Avg	-15.1	7.3							
			sR	2.95	0.68							
			MIN	-17.0	6.4							