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Sequence IIIF Information Letter 05-1
Sequence No. 17

January 3, 2005

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

TO: Sequence III Mailing List

SUBJECT: Revised Solvent Specifications
26-Hour Average Blowby Requirement
Engine Build Worksheet
Donated Reference Oil Test Programs/Calibration Period Length Adjustment
Updated Test Precision

This Information Letter addresses specific parts and procedures pertaining to quality, consistency, performance, and accountability of test parts as part of the ongoing effort by the panel to ensure continual process improvement of the Sequence IIIF test. This Information Letter references Test Method D6984-03.

Revised Solvent Specifications

At the November 17, 2004 meeting of the Sequence IIIF Surveillance Panel a motion was approved to revise the standard specification for solvent used in Sequence IIIF testing. The required material is mineral spirits meeting the Aromatic Content, Flash Point, and Color specifications for Type II, Class C mineral spirits listed in Specification D 235. Test laboratories are also required to obtain a Certificate of Analysis for each batch of solvent obtained. This change is effective on November 17, 2004. A revised Section 7.5.2 is attached.

26-Hour Average Blowby Requirement

At the November 17, 2004 meeting of the Sequence IIIF Surveillance Panel a motion was approved to eliminate the 26-hour average blowby specification from the Sequence IIIF test. This change is effective on November 17, 2004. Section 12.14.3 has been deleted as a result of this action.

Engine Build Worksheet

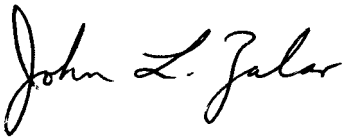
At the November 17, 2004 meeting of the Sequence IIIF Surveillance Panel a motion was approved to add an Engine Build Worksheet to Test Method D 6984. Laboratories are required to perform all the measurements listed on the worksheet and retain that data internally so that it can be provided electronically to the Test Monitoring Center upon request. This change is effective on November 17, 2004. A new Annex A10 is attached.

Donated Reference Oil Test Programs/Calibration Period Length Adjustment

On November 8, 2004, ASTM Subcommittee D02.B approved a recommendation from the Test Monitoring Board to revise test methods monitored by the Test Monitoring Center regarding the shortening or lengthening of reference oil calibration periods and surveillance panels' use of donated reference oil test programs. This revision provides consistent language for the procedures and clarification to the end users. Revised Sections 10.3.4, 10.3.4.1, 10.3.4.2, 10.3.4.3, 10.3.4.4, and 10.3.5 are attached.

Updated Test Precision

Test precision estimates have been updated based on results obtained on reference oils 1006-2, 1008-1, and 433-1. These estimates, shown in the attached Table 1, are current as of December 21, 2004.



Sidney L. Clark
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Attachments

c: ftp://ftp.astmtmc.cmu.edu/docs/gas/sequenceiii/procedure_and_ils/IIIF/IL05-1.pdf

Distribution: Electronic Mail

7.5.2 Use only mineral spirits[xx] meeting the specifications for Aromatic Content (0-2% vol), Flash Point (142°F/61°C, min) and Color (not darker than +25 on Saybolt Scale or 25 on Pt-Co Scale) from Specification D 235 for Type II, Class C mineral spirits. (**Warning** – Combustible. Health hazard.) Obtain a Certificate of Analysis for each batch of mineral spirits from the supplier.

[xx]Mineral spirits meeting the limited Specification D 235, Type II, Class C requirements are available from petroleum solvent suppliers.

10.3.4 Reference oil test frequency may be adjusted due to the following reasons:

10.3.4.1 *Procedural Deviations* – On occasions when a laboratory becomes aware of a significant deviation from the test method, such as might arise during an in-house review or a TMC inspection, the laboratory and the TMC shall agree on an appropriate course of action to remedy the deviation. This action may include the shortening of existing reference oil calibration periods.

10.3.4.2 *Parts and Fuel Shortages* – Under special circumstances, such as industry-wide parts or fuel shortages, the surveillance panel may direct the TMC to extend the time intervals between reference oil tests. These extensions shall not exceed one regular calibration period.

10.3.4.3 *Reference Oil Test Data Flow* – To ensure continuous severity and precision monitoring, calibration tests are conducted periodically throughout the year. There may be occasions when laboratories conduct a large portion of calibration tests in a short period of time. This could result in an unacceptably large time frame when very few calibration tests are conducted. The TMC can shorten or extend calibration periods as needed to provide a consistent flow of reference oil test data. Adjustments to calibration periods are made such that laboratories incur no net loss (or gain) in calibration status.

10.3.4.4 *Special Use of the Reference Oil Calibration System* – The surveillance panel has the option to use the reference oil system to evaluate changes that have potential impact on test severity and precision. This option is only taken when a program of donated tests is not feasible. The surveillance panel and the TMC shall develop a detailed plan for the test program. This plan requires all reference oil tests in the program to be completed as close to the same time as possible, so that no laboratory/stand calibration is left in an excessively long pending status. In order to maintain the integrity of the reference oil monitoring system, each reference oil test is conducted so as to be interpretable for stand calibration. To facilitate the required test scheduling, the surveillance panel may direct the TMC to lengthen and shorten reference oil calibration periods within laboratories such that the laboratories incur no net loss (or gain) in calibration status.

10.3.5 *Donated Reference Oil Test Programs* – The Surveillance Panel is charged with maintaining effective reference oil test severity and precision monitoring. During times of new parts introductions, new or re-blended reference oil additions, and procedural revisions, it may be necessary to evaluate the possible effects on severity and precision levels. The surveillance panel may choose to conduct a program of donated reference oil tests in those laboratories participating in the monitoring system, in order to quantify the effect of a particular change on severity and precision. Typically, the surveillance panel requests its panel members to volunteer enough reference oil test results to create a robust data set. Broad laboratory participation is needed to provide a representative sampling of the industry. To ensure the quality of the data obtained, donated tests are conducted on calibrated test stands. The surveillance panel shall arrange an appropriate number of donated tests and ensure completion of the test program in a timely manner.

{Delete 12.14.3}

{Renumber 12.14.4 to 12.14.3}

14.1 *Precision*—Test precision is established based on reference oil test results (for operationally valid tests) monitored by the TMC. Table 1 summarizes reference oil precision of the test method based on results obtained with TMC Reference Oils. Contact the TMC for current precision values.

TABLE 1 Test Precision [A]

Test Result[B]	Intermediate Precision [C]		Reproducibility [D]	
	$s_{i.p.}$ [E]	i.p.	s_R [E]	R
PVIS[F]	0.016755	0.046914	0.018435	0.051618
WPD	0.532	1.490	0.580	1.624
APV	0.220	0.616	0.224	0.627
PV60[F]	0.146264	0.409539	0.178110	0.498708

[A] Based on results obtained on ASTM reference oils 1006-2, 1008-1, and 433-1 from August 16, 2001 to December 6, 2004.
[B]

PVIS	=	Percent viscosity increase at 80 h, in transformed units. The results transformed using the transformation: $1/\sqrt{}$PVIS.
WPD	=	Weighted Piston Deposits, in merits.
APV	=	Average piston skirt varnish, in merits.
PV60	=	Percent viscosity increase at 60 h, in transformed units. The results transformed using the transformation: ln(PV60).

[C] See 14.1.1.
[D] See 14.1.2.
[E] s = standard deviation.
[F] This parameter is transformed, using the transformation shown in Footnote B. When comparing two test results on this parameter, first apply the transformation to each test result. Compare the absolute difference between the transformed results with the appropriate (intermediate precision or reproducibility) precision limit.

{Annexes A10 to A12 become Annexes A11 to A13, respectively}

A10. Engine Build Worksheet

A10.1 See figs. A10.1 and A10.2

SEQUENCE IIIF BUILD FORM

ENGINE ID :		LEFT HEAD ID :	
BLOCK CODE:		RIGHT HEAD ID :	
REBUILDER ID :		BEARING SERIAL NUMBER ID :	
DATE COMPLETED :		CRANKSHAFT ID :	
CAMSHAFT ID:		FRONT COVER ID :	
CONNECTING ROD TYPE (CAST or PM)		MANIFOLD ID :	
LIFTER SET ID :		BREATHER TUBE ID :	
LIFTER BATCH CODE :		OIL FILTER BATCH CODE :	
PISTON BATCH CODE :		KIT NUMBER:	
PISTON GRADE :			
RING BATCH CODE :			
RING GRADE :			
WRIST PIN BATCH CODE :			
PUSH ROD BATCH CODE :			
ROCKER ARM BATCH CODE :			

COMMENTS : _____

CYLINDER BORE MEASUREMENTS

STANDARD CALIBRATION READING : _____ (record all measurents in SI units unless noted otherwise)

LOCATION	TOP	MIDDLE	BOTTOM	TAPER	LOCATION	TOP	MIDDLE	BOTTOM	TAPER
CYLINDER	#1				CYLINDER	#2			
LONG DIA. (mm)					LONG DIA.				
TRANS. DIA. (mm)					TRANS. DIA.				
DELTA					DELTA				
	AVERAGE OUT :					AVERAGE OUT :			
	AVERAGE TAPER :					AVERAGE TAPER :			
	MICROFINISH, Ra:					MICROFINISH, Ra :			
CYLINDER	#3				CYLINDER	#4			
LONG DIA.					LONG DIA.				
TRANS. DIA.					TRANS. DIA.				
DELTA					DELTA				
	AVERAGE OUT :					AVERAGE OUT :			
	AVERAGE TAPER :					AVERAGE TAPER :			
	MICROFINISH, Ra :					MICROFINISH, Ra :			
CYLINDER	#5				CYLINDER	#6			
LONG DIA.					LONG DIA.				
TRANS. DIA.					TRANS. DIA.				
DELTA					DELTA				
	AVERAGE OUT :					AVERAGE OUT :			
	AVERAGE TAPER :					AVERAGE TAPER :			
	MICROFINISH, Ra :					MICROFINISH, Ra :			

Fig. A10.1 Sequence IIIF Engine Build Worksheet, Page 1

SEQUENCE IIIF BUILD FORM

ENGINE ID : _____ REBUILDER ID: _____

	COMPRESSION RING GAPS*		RING SIDE CLEARANCE		
CYLINDER	TOP, in.	2nd, in.	TOP .033-.079mm	2nd .033-.079mm	OIL .023-.201mm
1					
2					
3					
4					
5					
6					

*IIIF ring gap spec: top 0.042 ± 0.002 in., bottom 0.038 ± 0.002 in.
*IIIG ring gap spec: top 0.025 ± 0.002 in., bottom 0.042 ± 0.002 in.

CRANKSHAFT MEASUREMENTS

	CON ROD JOURNALS - SPEC: 57.1170 - 57.1475mm				MAIN JOURNALS - SPEC: 63.470 - 63.495mm		
JOURNAL #	HORIZ.	VERT.	OUT OF RD.	SIDE CL. .102-.508mm	HORIZ.	VERT.	OUT OF RD.
1							
2							
3							
4							
5							
6							

CRANKSHAFT END PLAY _____ (spec: 0.076-0.276 mm)

OIL PUMP MEASUREMENTS

OIL PUMP GEAR DROP _____ (spec: 0.025-0.089 mm)
OIL PUMP GEAR TIP CLEARANCE _____ (spec: 0.076-0.127 mm)
OIL PMP OUTER GEAR DIA. CLEAR. _____ (spec: 0.025-0.127 mm)

VALVE TRAIN MEASUREMENTS

VALVE SPRINGS BATCH : _____
INTAKE VALVE SEALS BATCH : _____
EHXAUST VALVE SEALS BATCH: _____

CYLINDER HEAD SPRING CALIBRATION -180 ± 5 lbs. @ 0.375" (205 lbs.± 10 for IIIG)

	1 EX	1 INT	3 EX	3 INT	5 EX	5 INT
LT HEAD# :						
SHIM SIZE :						

	2 EX	2 INT	4 EX	4 INT	6 EX	6 INT
RT HEAD# :						
SHIM SIZE :						

Fig. A10.2 Sequence IIIF Engine Build Worksheet, Page 2