



# Test Monitoring Center

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**MEMORANDUM:** 03-074

**DATE:** July 23, 2003

**TO:** Sequence III Surveillance Panel

**FROM:** Scott Parke

**SUBJECT:** IIIG Rating Workshop

The IIIG rating workshop requested by the Sequence III Surveillance Panel in its June meeting was held July 15-16, 2003. Compilation of the data produced during the workshop is now completed and is available on the TMC's website at the following URL:

[ftp://ftp.astmtmc.cmu.edu/refdata/gas/rating\\_workshop\\_data/iiig\\_2003\\_july/all\\_data.pdf](ftp://ftp.astmtmc.cmu.edu/refdata/gas/rating_workshop_data/iiig_2003_july/all_data.pdf)

## SUMMARY:

Fourteen raters attended the workshop. One calibration piston was rated followed by sixteen of the IIIG matrix pistons. The parts used in this workshop were identified by O&H Chairman Pat Lang as being of particular interest to the IIIG panel. All raters rated all parts. Among the data calculated for each piston is the standard deviation on each rated area and the range of the data for each rated area. The average across all 17 pistons for each area is shown in the table below.

	Groove 1	Groove 2	Groove 3	Land 2	Land 3	Under-crown	Thrust	Anti-thrust	Average Skirt	UWPD	WPD
pooled standard deviation	0.19	0.42	0.26	0.25	0.34	0.54	0.42	0.15	0.24	1.05	0.16
average range	0.56	1.33	0.87	0.82	1.15	1.73	1.53	0.50	0.84	3.61	0.56
pooled standard deviation (lab raters)*	0.18	0.40	0.26	0.24	0.35	0.49	0.37	0.13	0.20	1.01	0.16
average range (lab raters)*	0.53	1.23	0.87	0.74	1.12	1.55	1.25	0.41	0.66	3.44	0.55

\*Data from one non-lab rater is removed from these calculations.

## DISCUSSION:

Fourteen raters attended the workshop. Each rater first rated one composite calibration piston<sup>1</sup>. This data is analogous to the "as found" values when calibrating an instrument. The attendees reviewed the calibration piston data for areas or raters requiring discussion but did not identify anything noteworthy. They did discuss the need to pay particular attention to the skirt ratings. The peaks and valleys caused by the machining on the skirts necessitate the extra caution. The combination of deposit buildup in the valleys and

<sup>1</sup> A composite calibration piston is a fictitious single piston made up of rating locations taken from several real pistons (in this case, four pistons). This is done to speed the calibration process; it allows four raters to rate the "same" piston simultaneously. Also, be aware that in this context, "calibration", though referring to calibration of a rater, is *not* "Rater Calibration".

polishing of the metal caused by wear to the peaks make skirt rating especially difficult at the severity level typically being seen on IIIG pistons. This was not a problem on IIIF pistons where skirt deposits were generally milder.

Rating of the matrix pistons then began. The pistons were labeled "1" through "16" in the workshop. In the data available on the TMC website, the part identification is called "PART ID" and is formatted as: "IIIG 16 48605-6". The first number following "IIIG" is the number that identified the piston at the workshop (16 in this example). That number is followed by the TMC CMIR number to identify the matrix test the piston came from. And finally, separated from the CMIR by a "-", is the piston number from that test (piston 6 here).

Pistons 1 through 8 were rated by each rater the first day. The data was reviewed at the beginning of the second day. This review revealed a discrepancy in one rater's undercrown numbers. This rater was rating a larger area of the undercrown that included more of the clean area with the consequence being milder numbers for him. The undercrown area rated for IIIG is not spelled out anywhere. *This is an item that should be addressed in the IIIG procedure.*

Following the discussion, pistons 9 through 16 were rated. At the end of the second day, the data was again reviewed and discussed. Over the course of the workshop, many of the raters experimented with an acetate template to aid in skirt varnish rating. Paul Yanchar, a Lubrizol rater, agreed to provide copies to the workshop participants. The raters felt that this template should also be made part of the IIIG procedure.

One final note: most of the undercrown ratings for piston 6 show ratings distinctly milder than the matrix rating. One of the workshop participants wiped some liquid (possibly oil) from the undercrown of this piston and removed a substantial amount of the deposits. The data obtained before this happened is highlighted on the data sheet.

The data published for this workshop consists of one page for each part followed by one page for each rater. All data is shown both as rated merit values and as standardized values (Yi values).

Please contact me at 412-365-1036 with questions pertaining to the workshop or the data posted.

SDP/sdp/mem03-074.sdp.doc

c: F. M. Farber  
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IIIG Rating Workshop Participants

Distribution: email