

COAST SIDE PINION SCORING

Unit of Measure: % Scoring

Gear Batch P8L604

Reference Oil	Mean	Standard Deviation
115	25.3	4.58
116	22.9	4.81
116-1	22.9	4.81

COAST SIDE PINION SCORING

Unit of Measure: % Scoring

Gear Batch P4L806

Reference Oil	Mean	Standard Deviation
116	25.1	5.49
116-1	25.1	5.49

COAST SIDE PINION SCORING

Unit of Measure: % Scoring

Gear Batch P8L119

Reference Oil	Mean	Standard Deviation
116	23.0	5.49
116-1	23.0	5.49

COAST SIDE PINION SCORING

Unit of Measure: % Scoring

Gear Batch P8T025A

Reference Oil	Mean	Standard Deviation
116-1	23.0	5.49

B. Acceptance Criteria

1. New Test Stand

- A minimum of four (4) operationally valid calibration tests, with no stand Shewhart severity alarms, must be conducted. Three (3) tests must be conducted on reference oil 114, 115, 116, or subsequent approved reblends. All three tests must be completed on the same reference oil. The remaining one (1) calibration test must be conducted on discrimination reference oil 112, 113 or subsequent approved reblends. The end of test coast side pinion scoring value of the discrimination oil must be a minimum of twice the average value of the preceding three (3) acceptable reference oil tests. If a second discrimination oil test is needed, the test, if acceptable, will count as one (1) of the 15 non-reference oil tests. In the event that neither discrimination oil test meets the above

requirement, a complete new calibration sequence must be performed. The results from tests conducted on discrimination oils are not charted.

- All operationally valid calibration test results must be charted to determine if the test stand is currently “in control” as defined by the control charts from the Lubricant Test Monitoring System.

2. Existing Test Stand

- The test stand must have been an ASTM TMC calibrated test stand prior to LTMS introduction or previously accepted into the system by meeting LTMS calibration requirements.
- A test stand must complete three (3) operationally valid calibration tests, with no stand Shewhart severity alarms, on reference oil 114, 115, 116, or subsequent approved reblends. All three tests must be completed on the same reference oil. Every six months or fourth calibration sequence, an additional test must be conducted on discrimination reference oil 112, 113 or subsequent approved reblends. The end of test coast side pinion scoring value of the discrimination oil must be a minimum of twice the average value of the preceding three (3) acceptable reference oil tests. If a second discrimination oil test is needed, the test, if acceptable, will count as one (1) of the 15 non-reference oil tests. In the event that neither discrimination oil test meets the above requirement, a complete new calibration sequence must be performed. The results from tests conducted on discrimination oils are not charted.

3. Reference Oil Assignment

Once test stands have been accepted into the system, the TMC will assign reference oils for continuing calibration according to the following reference oil mix:

Gear Batch	Oil Assignments
P8L123	Assign either three 116, three 115, or three 114 oils (or subsequent reblend). Every 6 months or fourth calibration sequence, also assign one discrimination oil 112.
P8L119	Assign three 116 oils (or subsequent reblend). Every 6 months or fourth calibration sequence, also assign one discrimination oil 112 or 113.
P8L205	Assign either three 116, three 115, or three 114 oils (or subsequent reblend). Every 6 months or fourth calibration sequence, also assign one discrimination oil 112.
P8L737	Assign either three 115 or three 114 oils (or subsequent reblend). Every 6 months or fourth calibration sequence, also assign one discrimination oil 112.
P8L327	Assign either three 116 or three 115 oils (or subsequent reblend). Every 6 months or fourth calibration sequence, also assign one discrimination oil 112.
P8L604	Assign either three 116 or three 115 oils (or subsequent reblend). Every 6 months or fourth calibration sequence, also assign one discrimination oil 112.
P4L806	Assign three 116 oils (or subsequent reblend). Every 6 months or fourth calibration sequence, also assign one discrimination oil 112, 113 or

	subsequent reblends.
P8T025A	Assign three 116 oils (or subsequent reblend). Every 6 months or fourth calibration sequence, also assign one discrimination oil 112, 113 or subsequent reblends.

Note: See Sections 1 & 2 above for more details on oil assignments.

4. Control Charts

In Section 1, the construction of the control charts that constitute the Lubricant Test Monitoring System is outlined. The constants used for the construction of the control charts for the L-42, and the response necessary in the case of control chart limit alarms, are depicted below.

LUBRICANT TEST MONITORING SYSTEM CONSTANTS

		EWMA Chart				Shewhart Chart	
		LAMBDA		K		K	
Chart Level	Limit Type	Precision	Severity	Precision	Severity	Precision	Severity
Stand	Warning	--	--	--	--	--	--
	Action	--	--	-	--	--	1.80
Lab	Action	--	--	--	--	--	--
Industry	Warning	0.2	0.2	2.19	2.45	--	--
	Action	0.2	0.2	2.88	3.08	--	--

The following are the steps that must be taken in the case of exceeding control chart limits.

- Exceed Shewhart test stand chart limit for severity
 - Conduct an additional calibration test.

The following industry issues are handled by the TMC and do not require individual laboratory action.

- Exceed EWMA industry chart action limit
 - TMC to notify surveillance panel chairman. Meeting of TMC and the surveillance panel required to determine course of action.
- Exceed EWMA industry chart warning limit
 - TMC to notify surveillance panel chairman. Coordination of TMC and the surveillance panel chairman is required to discuss potential problem.

L-42 Reference Oil Targets						
Oil	Gear Batch	N	Effective Dates		Coast Side Pinion Scoring	
			From ¹	To ²	\bar{X}	s
114	P8L123	30	3-24-95	***	23.2	8.06
	P8L205	30	7-11-96	***	23.4	5.27
	P8L737	30	3-21-95	***	20.2	6.97
114-1	P8L123 ³	--	7-2-97	***	23.2	8.06
	P8L205 ³	--	7-2-97	***	23.4	5.27
	P8L737 ³	--	7-2-97	***	20.2	6.97
115	P8L327	30	6-1-99	***	25.3	4.58
	P8L123 ⁴	--	2-24-03	***	23.2	8.06
	P8L205 ⁴	--	9-22-03	***	23.4	5.27
	P8L737 ⁴	--	9-22-03	***	20.2	6.97
	P8L327 ⁴	--	8-8-01	***	25.3	4.58
	P8L604 ⁵	--	11-25-02	***	25.3	4.58
116	P8L123 ⁶	--	9-25-05	***	22.9	4.81
	P8L205 ⁶	--	9-25-05	***	22.9	4.81
	P8L327 ⁶	--	9-25-05	***	22.9	4.81
	P8L604	9	9-25-05	***	22.9	4.81
	P4L806	32	3-20-07	***	25.1	5.49
116-1	P8L119	10	3-22-09	***	23.0	5.49 ⁸
	P8L123 ⁷	--	3-1-09	***	22.9	4.81
	P8L205 ⁷	--	3-1-09	***	22.9	4.81
	P8L327 ⁷	--	3-1-09	***	22.9	4.81
	P8L604 ⁷	--	3-1-09	***	22.9	4.81
	P4L806 ⁷	--	3-1-09	***	25.1	5.49
	P8L119	10	3-22-09	***	23.0	5.49 ⁸
	P8T025A	10	4-17-12	***	23.0 ⁹	5.49 ⁹

- 1 Effective for all tests completed on or after this date
- 2 *** = currently in effect
- 3 Targets based on oil 114
- 4 Targets based on oil 114-1
- 5 Targets based on gear batch P8L327

- 6 Targets based on gear batch P8L604
- 7 Targets based on oil 116
- 8 Standard deviation based on gear batch P4L806
- 9 Carried over from previous hardware batch