

33. L-33-1 LTMS Requirements

The following are the specific L-33-1 calibration test requirements.

A. Reference Oils and Critical Parameter

The critical parameter is Final Rust. The reference oils required for test stand and test laboratory calibration are reference oils accepted by the ASTM L-33-1 Surveillance Panel. The mean and standard deviations for the current reference oils for the critical parameter are presented below.

FINAL RUST
Unit of Measure: Merits
Gear Versions V99.1 & V01.1

| Reference Oil | Mean | Standard Deviation |
|---------------|-------|--------------------|
| 123 | 8.560 | 0.230 |
| 123-2 | 8.740 | 0.260 |
| 151-3 | 9.640 | 0.250 |
| 155 | 9.580 | 0.250 |
| 155-1 | 9.580 | 0.250 |

FINAL RUST
Unit of Measure: Merits
Gear Version AAM K2XX & T1XX & 31XX

| Reference Oil | Mean | Standard Deviation |
|---------------|------|--------------------|
| 123-2 | 8.51 | 0.35 |
| 126* | 8.90 | 0.27 |
| 155-1 | 9.47 | 0.16 |
| 155-2 | 9.47 | 0.16 |

*Oil 126 not approved for use on K2XX hardware only.

B. Acceptance Criteria

1. New Test Stand

- A minimum of two (2) operationally valid calibration tests, with no stand Shewhart severity alarms, must be conducted on any approved reference oils assigned by the TMC.
- 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.

| L-33-1 Reference Oil Targets | | | | | | |
|------------------------------|---------------|-----------------|-------------------|----------|---------------------|---------------------|
| Oil | Gear Version | n | Effective Dates | | Rust | |
| | | | From ¹ | To | \bar{X} | s |
| 121 | V94.1 | 12 ² | 6-5-96 | 4-19-00 | 9.370 ² | 0.280 ² |
| | V95.1 | 12 ² | 6-5-96 | 4-19-00 | 9.370 ² | 0.280 ² |
| 121-1 | V94.1 | -- | 1-19-98 | 4-29-99 | 9.370 ³ | 0.280 ³ |
| | V94.1 | 45 ² | 4-30-99 | 11-17-00 | 9.390 ² | 0.218 ² |
| | V95.1 | -- | 1-19-98 | 4-29-99 | 9.370 ³ | 0.280 ³ |
| | V95.1 | 45 ² | 4-30-99 | 11-17-00 | 9.390 ² | 0.218 ² |
| | V99.1 | 8 | 4-20-00 | 11-17-00 | 9.830 | 0.260 ⁴ |
| | 121-2 | V94.1 | -- | 12-14-99 | 11-17-00 | 9.390 ⁵ |
| | V95.1 | -- | 12-14-99 | 11-17-00 | 9.390 ⁵ | 0.218 ⁵ |
| | V99.1 | -- | 4-20-00 | 11-17-00 | 9.830 ⁶ | 0.260 ⁴ |
| 123 | V94.1 | 54 ² | 5-5-95 | 4-19-00 | 9.000 ² | 0.330 ² |
| | V95.1 | 54 ² | 5-5-95 | 4-19-00 | 9.000 ² | 0.330 ² |
| | V99.1 | 12 | 6-11-02 | 8-24-04 | 8.430 | 0.390 |
| | V01.1 | -- | 11-25-02 | 8-24-04 | 8.430 ¹⁰ | 0.390 ¹⁰ |
| | V99.1 & V01.1 | 30 | 8-25-04 | *** | 8.560 | 0.230 |
| 123-1 | V94.1 | 13 ⁷ | 4-20-00 | 11-17-00 | 8.240 ⁷ | 0.330 ⁸ |
| | V95.1 | -- | 12-14-99 | 4-19-00 | 9.000 ⁹ | 0.330 ⁹ |
| | V95.1 | 13 ⁷ | 4-20-00 | 11-17-00 | 8.240 ⁷ | 0.330 ⁸ |
| | V99.1 | 13 ⁷ | 4-20-00 | 11-17-00 | 8.240 ⁷ | 0.330 ⁸ |
| 123-2 | V99.1 | -- | 11-25-02 | 8-24-04 | 8.430 ¹⁰ | 0.390 ¹⁰ |
| | V99.1 & V01.1 | -- | 8-25-04 | 6-1-06 | 8.560 ⁹ | 0.230 ⁹ |
| | V99.1 & V01.1 | 15 | 6-2-06 | *** | 8.740 | 0.260 |
| | AAM K2XX | 10 | 6-24-16 | 06-28-17 | 8.05 | 0.43 |
| | AAM K2XX | 19 | 6-29-17 | 11-07-17 | 8.09 | 0.41 |
| | AAM K2XX | 22 | 11-08-17 | 0-01-20 | 8.12 | 0.38 |
| | AAM K2XX | 19 | 01-02-20 | 08-31-20 | 8.37 | 0.39 |
| | K2XX & T1XX | 37 | 09-01-20 | *** | 8.51 | 0.35 |
| 126 | T1XX | 6 | 02-22-23 | *** | 8.90 | 0.27 |
| | 31XX | -- | 12-24-25 | *** | 8.90 | 0.27 |
| 151-3 | V99.1 | 13 | 6-11-02 | 8-24-04 | 9.690 | 0.350 |
| | V01.1 | -- | 11-25-02 | 8-24-04 | 9.690 ¹¹ | 0.350 ¹¹ |
| | V99.1 & V01.1 | 30 | 8-25-04 | *** | 9.640 | 0.250 |
| 155 | V99.1 & V01.1 | -- | 6-2-06 | --- | 9.580 | 0.250 ¹² |
| 155-1 | V99.1 & V01.1 | -- | 4-4-12 | --- | 9.580 | 0.250 ¹² |
| | AAM K2XX | 9 | 6-24-16 | 06-28-17 | 9.26 | 0.12 |
| | AAM K2XX | 20 | 6-29-17 | 11-07-17 | 9.24 | 0.19 |
| | AAM K2XX | 23 | 11-08-17 | 01-01-20 | 9.25 | 0.22 |
| | AAM K2XX | 20 | 01-02-20 | 08-31-20 | 9.47 | 0.13 |
| | K2XX & T1XX | 42 | 09-01-20 | *** | 9.47 | 0.16 |
| 155-2 | K2XX & T1XX | - | 08-25-21 | *** | 9.47 | 0.16 |

1 Effective for all tests completed on or after this date.

2 Based on V94.1 & V95.1 data.

3 Based on oil 121 data.

4 Based on lab pooled s of V94.1 & V95.1 data (all blends of oil 121).

5 Based on oil 121-1 data.

6 Based on V99.1 data on oil 121-1.

7 Based on V99.1 and V95.1 data.

8 Based on lab pooled s of V94.1 & V95.1 data (all blends of oil 123).

9 Based on oil 123 data.

10 Based on V99.1 data on oil 123.

11 Based on V99.1 data on oil 151-3.

12 Based on V99.1 & V01.1 data on oil 151-3.